H.T.I

MECHANICAL ENGINEERING COURSE

DIPLOMA PROJECT

DEVELOPMENT OF TECHNIQUES FOR THE RECOVERY AND UTILIZATION OF CO-GENERATED WASTE HEAT FROM A BIOMASS FUELED STEAM ENGINE

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DEVELOPMENT OF TECHNIQUES FOR THE RECOVERY AND UTILIZATION OF CO-GENERATED WASTE HEAT FROM A BIOMASS FUELED STEAM ENGINE

by

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Project Report

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SUMMARY

This project investigated the economic feasibility of the thermal energy of the exhaust steam of a steam engine, with various materials such as wood, paper and other, which can be called biomass. The problems, difficulties and results of the various experiments were noted and will be discussed. Furthermore, the various problems faced during the experiments and possible solutions were specified. Analytical definition of biomass and its benefits were specified. The need for desalination of seawater into salt and distilled water will be analyzed and the benefits, which have into the environment and the whole community, are noted. Another thing discussed in this project, is the various ways of distillation of alcohol and its effect in our community. The most important thing specified is weather this experiment is economically feasible to work here in Cyprus or not.

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INTRODUCTION

Over the years, as many of us are aware, the rapidly growing of the technology has made a profound impact in practically all segments of the industrial community. This influence has been felt at the recovery and utilization of waste heat from a steam engine.

Several techniques and ideas developed during these years from different people in the whole world, hopping that their dream would become true. To find ways of recovering and utilizing the co-generated waste heat from a biomass fueled steam engine.

Many investigations and experiments were performed for the best solution of this "problem" with success. Nowadays, at many countries in the world, we can see huge plants constructed and other under construction. In our country there are not such plants because of the lot of money that costs.

Even though, there are people in our country, who are interest and want to see if something like that would be cost effective, for a small country like ours. We had the pleasure to meet and work with such a person at his industry, called Environmental Energy Ltd. This person is Mr Demetris Lordos.

The objective of the project is to test the economic feasibility of utilizing the thermal energy contained in the exhaust steam of a steam engine, by using different materials such as biomass (wood, paper). The aim of the project is to evaporate and purify waste-alcohol, and to desalinate seawater in a flash distillation system to produce salt and distilled water, from the thermal energy of the exhaust of the steam engine.

The first thing to do is to prepare the steam engine properly, so it can be worked without any problem during our experiments. And then, we are going to test the several materials in the steam engine and take some measurements / results. At the end of the experiments, we will make a discussion about the results and some commends as well.

The operation of the steam engine is specified in detail, with all steps needed. The various investigations and experiments are shown in the chapter three. At the end of this chapter, the economic feasibility of the project is discussed and shows clearly weather such a construction should be made in Cyprus or not. A further information about biomass and its advantages will be mentioned, at the second chapter. An investigation about the need of desalinating salt water, its benefits in the whole community and some ways of desalinating seawater will be also specified.