

HIGHER TECHNICAL INSTITUTE

MECHANICAL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

**DESIGN AND CONSTRUCTION OF A
SMALL SCALE PILOT PLANT
FOR PRODUCING ETHANOL FUEL FROM
GRADE SURPLUS OR CO-PRODUCTS**

M/1016

**ZENONAS KANNAS
3M**

JUNE 2005

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PRODUCTS

by
Zenonas Kannas

Project Report
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INTRODUCTION

The world of the 20th century presents many critical challenges one of the most important being concerns over the environment. As population increases and the standard of living improves, there is an increasing concern that there will be a shortage of energy to heat our homes and power the vehicles we so heavily depend on. On the other hand we must consider the need for clean air, clear water, clean fuel, and biodegradable, renewable materials.

Alternative energy sources can be easily developed with the existing technology. These energy sources are renewable, cleaner, and more dependable than traditional fuel. Ethanol is one of them. It is an alcohol made by fermenting grape or other similar products which are rich in sugar, such as corn and sorghum are good sources, but potatoes, sugarcane, Jerusalem articholles, and other farm plants and wastes are also suitable.

The first blends in the 1970's were 10% by volume (E-10) while a blend of 85%by volume (E-85) was introduced in the late 1990's.

The idea to design and construction of a small scale pilot plant for producing ethanol fuel, has moved my interest, specially when I learned that alcohol industries in Cyprus have thousands of tons of alcohol waste stored in warehouses that can't be used and also can't be thrown away.

Ethanol can be used to increase octane levels, decrease engine emissions, and can extend the supply of gasoline.

There are three primary ways in which ethanol can be used as a fuel:

1. as a blend of 10 percent ethanol with ninety percent gasoline.
2. as a component of reformulated gasoline, directly and/or as ethyl tertiary butyl ether (ETBE) or
3. directly as a fuel with is percent or more gasoline know as "E-85"

So, I considered that, the idea of using this alcohol waste as a fuel will not only solve the problem of storing it but also help to solve the problem of depending on other sources, and to keep providing us with fuel. Everything in our country depends on the black gold (fuel) as many of us call it. We use fuel to produce electricity, fuel to heat our homes, fuel for our vehicles. Can anybody ever imagine if someday the deposits of fuel are no longer available, what will happen to all of us;!