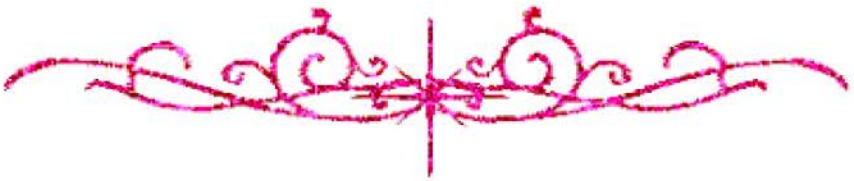
بسم الله الرحمن الرحيم

HOSSAM MAGHRABY

شبكة المعلومات الجامعية

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم



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شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها

علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

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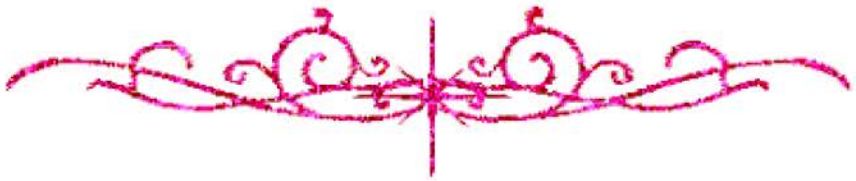
بعض الوثائق الأصلية تالفة



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شبكة المعلومات الجامعية

بالرسالة صفحات

لم ترد بالأصل

HOSSAM MAGHRABY

MENOUFIYA UNIVERSITY
FACULTY OF ENGINEERING
Electrical Engineering Department

NATURAL SOURCES AND ELECTRICAL POWER GENERATION IN RURAL AREAS OF EGYPT

THESIS SUBMITTED BY

AHMED MOHAMMED IBRAHEM ATEYA
Electrical Engineering, Educational Buildings Orgnization

IN PARTIAL FULFILMENT FOR THE AWARD OF THE DEGREE OF M.Sc. IN ENGINEERING IN ELECTRICAL ENGINEERING

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To my father, mather,
wife and children.

Acknowledgement

I would like to express my sincere gratitude and appreciation to prof. Atef A. El-Zeftawy, Dr. Mamdoh N. Serag for their continuos guidance, encouragement and kind support throughout this work. Special thanks to all members of the Electrical Engineering Department staff of the Menoufiya University for their constructive criticisms and useful suggestions. My dedication is due to my parents and my wife for their understanding patience and support.

Ahmed M. Ateya

CONTENTS

ABSTRACT

There is a large scope for renewable energy sources such as solar, wind and biomass energies to meet the decentralised requirements such as for lighting, heating, pumping water and electricity generation in remote and rural areas in many of the world countries as well as in Egypt. Biomass energy is the most convenient type of these resources for all rural areas of Egypt. So, this thesis aims to assess this renewable resource for rural areas development in Egypt.

Biomass is available in large quantities from agriculture, human and animal wastes. The main problem of biomass energy is the assessment of biogas fuel production and its costs. So, a proposed model has been introduced in this thesis to assess the biogass fuel production of the previous raw materials. Also, a statistics study is carried out to assess the annual amount of agriculture, human and animal wastes in an Egyptian village in Menoufiya Governorate. The results of this study is used with the proposed model to evaluate the biogas (methane) production for the study village. Then, a technical and economical model is presented to assess the economy of methane gas production, the electricity production of biogas-electricity generation system (BEGS) and the economy of this electricity. This model is applied to develop the economy of biogas production and electricity generation of BEGS at the study Egyptian village.

SUMMARY

Biogas energy is the most type of renewable sources pertaining the rural areas in developing countries as wili as in Egypt. Therefore, this thesis aims to assess the biomass and biogas production as a renewable energy source used for rural areas development in Egypt. The biogas production contains mixture of methane and carbone dioxide. Methane gas can be used in many applications such as cooking, lighting, heating, driven combusion engine for water pumps and electricity generation. So, in this thesis, the biogas production of agriculture, human and animal wastes is assessed. Also, the economy of biogas production, and electricity production of biogas-electricity generation system and its economy are assessed for rural areas of Egypt. It includes five chapters and the followings are brief summary of these chapters.

Chapter one: includes the main introduction and the historical review of the topics of the thesis.

Chapter two: presents a proposed model to assess the biogas production of agriculture, human and animal wastes. This model is used with a statistics study for these wastes in an Egyptian village to assess the biogas production for this village.

Chapter three: in this chapter the biogas digester is designed to accomodate the local conditions in the study Egyptian village. Also, an economical model is presented to evaluate the

economy of biogas production of different residules in rural areas. This model is applied to develop the cost of 1 m^3 of biogas production in the considered Egyptian village.

Chapter four: a technical and economical model is presented in this chapter to assess the electricity production of biogas-electricity generation system (BEGS) and its economy. This model is applied to evaluate the electricity generation of BEGS in the study Egyptian village and the unit energy cost of this generation system.

Chapter five: includes the final conclusions of the thesis.

CHAPTER (1)
MAIN INTRODUCTION