

Sudan University of Science and Technology
College of Engineering
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Distributed Generation Using Biogas

التوليد والتوزيع عن طريق استخدام الغاز الحيوي

**A Project Submitted In Partial Fulfillment for the Requirements of
the Degree of B.Sc. (Honor) In Electrical Engineering**

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الاية

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بسم الله الرحمن الرحيم

(اللَّهُ نُورُ السَّمَاوَاتِ وَالْأَرْضِ ۚ مَثَلُ نُورِهِ كَمِشْكَاةٍ فِيهَا مِصْبَاحٌ ۚ الْمِصْبَاحُ فِي زُجَاجَةٍ ۚ الزُّجَاجَةُ كَأَنَّهَا كَوْكَبٌ دُرِّيٌّ يُوقَدُ مِنْ شَجَرَةٍ مُبَارَكَةٍ زَيْتُونَةٍ لَا شَرْقِيَّةٍ وَلَا غَرْبِيَّةٍ يَكَادُ زَيْتُهَا يُضِيءُ وَلَوْ لَمْ تَمْسَسْهُ نَارٌ ۚ نُورٌ عَلَى نُورٍ ۗ يَهْدِي اللَّهُ لِنُورِهِ مَنْ يَشَاءُ ۚ وَيَضْرِبُ اللَّهُ الْأَمْثَالَ لِلنَّاسِ ۗ وَاللَّهُ بِكُلِّ شَيْءٍ عَلِيمٌ)

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الى من أحمل اسمك بكل فخر

يا من يرتعش قلبي لذكرك

يا من أودعني لله أهديك هذا البحث أبي

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ABSTRACT

Energy is a problem in the world in coming days in most states for the lack of availability and high fuel prices on an ongoing basis for that the world start to think seriously for using another alternative methods for generate energy and specially pure energy. Sudan as growth country but have a rich sources of biomass production and in the first its state in the past oral agricultural foremost... for that it is able to produce all needs of energy to satisfy country needs of electricity. biomass considered as a resource Of pure gas and friend of the environment opposite of non-renewable energy sources addition to that it is charged unlike likes of renewable energy Sources like solar cells that are very expensive .biogas is the future of flowered for production of energy and smart way to take advantages of the accumulated organic waste and dispose of as waste that is excellent fertilizer for soil. In this project has been studied and experience gas production from local waste and use it to generate electricity and study the benefit that resulted from decreasing Use of fuel in produce electrical energy.

المستخلص

الطاقة هي مشكلة العالم في الايام القادمة ف معظم دول العالم لعدم توافرها وارتفاع اسعار الوقود بصورة مستمرة ولهذا بدا العالم في التفكير بصورة جادة لاستخدام وسائل بديله اخرى لتوليد الطاقة وخاصة الطاقة النظيفة .

السودان كدوله ناميه بلد غني بمصادر انتاج البيوماس فهو كدوله رعويه ف المقام الاول وزراعيه كفيل بانتاج مايكفي من طاقه قادره علي تغطيه احتياجات الدوله الكهربائيه وتقليل نفقات انتاج الطاقه الكهربائيه...فالبيوماس يعتبر مصدر نظيف صديق للبيئه علي عكس مصادر الطاقه الغير متجدده بالاضافه الي انه غير مكلف ف انتاج الطاقه علي عكس قرنائه من مصادر الطاقه المتجدده علي راسهم الطاقه الشمسيه والخلايا الشمسيه الباهظه الثمن...البيوماس يعتبر مستقبل مزهر لانتاج الطاقه وطريقه ذكيه للاستفاده من المخلفات العضويه المتراكمه والتخلص منها...كما ان نفاياتها سماد ممتاز للتربه والغازات المنتجه من عمليه التخمير لاتشارك بنسب كبيره ف ظاهره الاحتباس الحراري الذي اصبح خطر محقق بالبشرية .

في هذا البحث تم دراسته وتجربة انتاج الغاز من المخلفات المحليه واستخدامه في توليد الكهرباء ودراسه الفوائد الناتجه من تقليل استخدام الوقود في انتاج الطاقه الكهربائيه .

CONTENT

| Title | | Page No. |
|--|--------------------------------|----------|
| الآية | | I |
| Dedication | | ii |
| Acknowledgements | | iii |
| Abstract | | iv |
| مستخلص | | v |
| Contents | | vi |
| List Of Figures | | ix |
| List Of Tables | | x |
| List Of Abbreviations | | xi |
| CHAPTER ONE: INTRODUCTION | | |
| 1.1 | Background | 1 |
| 1.2 | State of problem | 3 |
| 1.3 | Objectives | 4 |
| 1.4 | Thesis lay-out | 4 |
| CHAPTER TWO: Biogas Generation unit | | |
| 2.1 | Introduction | 5 |
| 2.2 | Type of biomass | 5 |
| 2.2.1 | Agricultural biomass | 5 |
| 2.2.2 | Biomass from animal waste | 6 |
| 2.2.3 | Forest biomass | 6 |
| 2.2.4 | Municipal waste | 6 |
| 2.3 | GENERATION OF BIO-GAS | 6 |
| 2.4 | The biochemical process of AD | 8 |
| 2.4.1 | Organic load | 8 |
| 2.4.2 | Hydraulic retention time (HRT) | 8 |

| | | |
|--|---|----|
| 2.4.3 | Hydrolysis | 9 |
| 2.4.4 | Acid genesis | 9 |
| 2.4.5 | Cytogenesis | 10 |
| 2.4.6 | Methanogens | 10 |
| 2.5 | Anaerobic Digestion parameters | 11 |
| 2.5.1 | Temperature | 11 |
| 2.5.2 | Volatile fatty acids (VFA) | 14 |
| 2.5.3 | Ammonia | 15 |
| 2.5.4 | Macro- and micronutrients (trace elements) and toxic compounds | 16 |
| 2.6 | Biogas properties | 16 |
| 2.7 | A special application is biogas recovery from existing landfills | 17 |
| 2.7.1 | Agricultural biogas plants | 17 |
| 2.7.2 | Industrial biogas plants | 21 |
| 2.8 | Utilizations of biogas | 22 |
| CHAPTER THREE: BIOGAS HYBRID SYSTEM | | |
| 3.1 | Introduction | 23 |
| 3.2 | Biomass CHP technology based on a steam turbine process | 23 |
| 3.2.1 | Working principle and integration in a biomass CHP plan | 24 |
| 3.2.2 | Relevant technical data and efficiencies of the steam turbine process | 26 |
| 3.3 | Biogas and solar hybrid system | 27 |
| 3.4 | Power flow of the system | 29 |
| 3.5 | Bio ethanol | 29 |
| 3.5.1 | The benefits of bio ethanol | 30 |
| 3.5.2 | Bio ethanol production | 30 |
| 3.6 | Bio diesels | 33 |
| 3.6.1 | Energy security and balance | 33 |
| 3.6.2 | Air quality | 33 |
| 3.6.3 | Engine operation | 35 |
| 3.6.4 | Safety | 35 |
| CHAPTER FOUR ANALYSIS AND OPERATION OF BIO-DIESEL GENERATOR | | |
| 4.1 | Biogas digesters | 36 |
| 4.1.1 | Types of biogas plants | 36 |

| | | |
|---|---|----|
| 4.1.2 | Design of biogas station | 37 |
| 4.2 | Biogas purification processes | 38 |
| 4.2.1 | Methods for scrubbing carbon dioxide | 38 |
| 4.2.2 | Methods for removing hydrogen sulphide | 40 |
| 4.2.3 | Elimination of water vapor | 41 |
| 4.3 | Storage of biogas | 42 |
| 4.3.1 | Low pressure storage of biogas | 42 |
| 4.3.2 | Medium-pressure storage of cleaned biogas | 43 |
| 4.3.3 | High-pressure storage of biogas | 44 |
| 4.4 | Components of a Biogas System | 44 |
| 4.4.1 | Manure Collection | 45 |
| 4.4.2 | Anaerobic Digester | 45 |
| 4.4.3 | Biogas Handling | 45 |
| 4.5 | Experimental apparatus | 46 |
| 4.6 | Result | 48 |
| CHAPTER FIVE CONCLUSION AND RECOMMENDATION | | |
| 5.1 | Conclusion | 50 |
| 5.2 | Recommendation | 50 |
| | References | 51 |
| | Appendices | 52 |

LIST OF FIGURE

| Figure | Title | Page |
|---------------|--|-------------|
| 2.1 | The simplified diagram of the AD process | 7 |
| 2.2 | Relative biogas yields, depending on temperature and retention time | 12 |
| 2.3 | Relative growth rates of methanogens | 13 |
| 2.4 | schematic representation of a farm scale biogas plant, with horizontal digester of steel | 19 |
| 2.5 | horizontal digester of steel, built in Denmark | 20 |
| 2.6 | schematic representation of the closed cycle of centralized AD | 20 |
| 2.7 | the integrated concept of centralized co-digestion plant | 21 |
| 2.8 | over view of biogas utilisation | 22 |
| 3.1 | illustrating a typical biomass CHP plant based on an extraction condensing turbine process | 24 |
| 3.2 | biogas-PV hybrid systems | 28 |
| 3.3 | PV/T and Biogas DPS | 28 |
| 3.4 | average emission impact of biodiesel for heavy-duty highway engine | 34 |
| 4.1 | illustrate Storage of biogas | 43 |
| 4.2 | Components of a Biogas System | 44 |
| 4.3 | illustrate Manure Collection | 45 |
| 4.4 | illustrate Anaerobic Digester | 46 |
| 4.5 | illustrate Biogas Handling | 46 |
| 4.6 | Setup of the engine test rig | 47 |
| 4.7 | Setup of the HZ meter and voltmeter | 48 |
| 4.8 | illustrate relation between time and consumption of diesel when used pure diesel | 49 |
| 4.9 | illustrate relation between time and consumption of diesel when used mix of diesel and bio gas | 49 |

List of tables

| | | |
|-----|--|----|
| 2.1 | Thermal stage and typical retention times | 11 |
| 2.2 | relation between temperature and the solubility in water of some gases | 14 |
| 2.3 | Composition of biogas | 17 |
| 4.1 | biogas pressure storage | 43 |
| 4.2 | AC SYNCHRONOUS GENERATOR SPECIFICATION | 47 |

List of abbreviations

| | |
|-----|---|
| PV | Photovoltaic Panel |
| CSP | concentrating Solar power |
| AD | Anaerobic Digestion |
| LPG | Liquefied Petroleum Gas |
| CNG | Compressed Natural Gas |
| HRT | Hydraulic Retention Time |
| VFA | Volatile Fatty Acids |
| CHP | Wood-Fired Combined Heat and Power Production |
| DC | Direct Current |
| AC | Alternative Current |
| DEC | Dedicated Energy Crops |
| SCR | Selective Catalytic Reduction |