

الاية

قال تعالى:

وَمِنْ آيَاتِهِ أَنْ يُرْسِلَ الرِّيحَ مُبَشِّرَاتٍ وَلِيُذِيقَكُمْ
مِنْ رَحْمَتِهِ وَلِتَجْرِيَ الْفُلُكُ بِأَمْرِهِ وَلِتَبْتَغُوا مِنْ فَضْلِهِ وَلَعَلَّكُمْ
تَشْكُرُونَ ﴿٤٦﴾

سورة الروم

Dedication

To my mother, my brothers and my sisters for their enduring love, patience, support and guidance.

Acknowledgement

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Abstract

The thesis chooses Nyala city and designs photovoltaic system (PV) about 3MW and wind energy farm about 20MW to reduce the operation cost depending on the renewable energy. Also the thesis explains how to connecting the wind farm into the diesel power plant and the turbine power curve in variable speed is presents. While in the side of the solar photovoltaic power system, the thesis shows the effect of the temperature on the solar cell and how to connect the system into the diesel grid.

This thesis investigates the design and the simulation of a 20MW wind turbine and 3MW photovoltaic (PV) systems using MATLAB program and the results are shown. The importance of this project is to explore the feasibility of connecting the wind farm and PV system with the grid to generate electricity to the city.

مستخلص

تم اختيار مدينة نيالا لدراسة وتصميم محطة طاقة شمسية باستخدام الخلايا الشمسية (Photovoltaic) بسعة 3MW ومحطة رياح (Wind Farm) بسعة 20MW لتقليل تكاليف التشغيل اعتماداً علي هذه الطاقات المتجددة. أيضاً تم توضيح كيفية ربط محطة الرياح بمحطة الديزل وكذلك ربط محطة الطاقة الشمسية بمحطة الديزل.

باستخدام برنامج ال MATLAB تم رسم منحنى القدرة المنتجة بواسطة توربينات الرياح باستخدام سرعات رياح مختلفة. وكذلك تم رسم منحنيات تأثير درجات الحرارة علي الخلية الشمسية و من ثم تم توضيح النتائج.

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Abbreviations

PV	Photovoltaic
WT	Wind turbine
GA	Genetic algorithm
LPSP	Loss of power supply probability
ACS	Annualized cost of system
OHL	Overhead line
IEC	international electrical committee
LI	Lahmeyer International
HAWT	Horizontal axis wind turbines
VAWT	vertical axis wind turbines
PMG	Permanent Magnet Generator
IG	Induction generator
TF	Transverse Flux
SCIG	Squirrel Cage Induction Generator
SMARTS	Simple Model of the Atmospheric radiative Transfer of sunshine
TMY	Typical meteorological year
MPPT	Maximum power point tracking (MPPT)
STC	Standard test conditions
AAAC	An aluminum alloy conductor
WECS	Wind energy conversion system