MULTI-OBJECTIVE OPTIMIZATION OF MICROGRID WITH THE INTERMITTANT SOURCES

BY

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CERTIFICATE

We accept the work contained in this report as a confirmation to the required standard for the partial fulfilment of the degree of MS (EE).

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DEDICATION

Dedicated to my loving parents

DECLARATION OF AUTHORSHIP

I Muhammad Shahzad Nawaz # 01-244161-017 hereby declare that content of this thesis is my own work and that it is the result of work done during the period of registration. To the best of my knowledge, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgement has been made in the text.

Signature of student:

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In the name of **ALLAH**, Most Merciful, the most beneficent and the most gracious and countless salaam to **Holy Prophet Muhammad (Peace be Upon Him)**. Prior to anyone else, all gratitude and praises are due to almighty **ALLAH**, who gave me health to achieve this goal.

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ABSTRACT

There aremultiple renewable energy sources (REs) available due to the development of technology. In this research work hybrid renewable energy system (HRES) are used to get theoptimally environmental and economic benefit for a grid-connected mode.The grid-connected mode system consists on the wind turbine generator (WT), diesel generator (DG), a small hydro power plant, photovoltaic (PV) generation, and vented lead-acid batteries. The optimal objective of model is to minimize the pollutants emission and total net present cost (TNPC) in life cycle; under the multi constraints of generation units and batteries, the uncertainties of clearness index, wind speed and load demand are mainly focused in this model. To analyse effect of intermittent source on optimization problem,best fit and force fit probability methods are used to generate the sequences transition probability matrix for random variables and results are compared with the results of deterministic approach optimization.The proposed study is carried out by the hybrid optimization model for electric renewables (HOMER) program. Simulation results clearly shows that the intermittent sources affect the values of random variables which results in change of the TNPC and Total PollutantEmissions.

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