Rationalization of Energy Consumption in Large Buildings by Using Technical Methods and Thermal Insulation.

(Case Study: Palestinian Territories)

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A Thesis Submitted in Partial Fulfilment of the Requirements for Master Degree of Science in Engineering projects management

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June , 2019

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ACKNOWLEDGMENT

Praise be to Allah, who empowered me to do this research. I am very grateful to my principal supervisor, Dr.Waild Emar for his deep remarkable suggestions and his guidance on my research. He was always friendly and modern in his teaching approach. I would like to extend my thanks to the faculty members who have enriched my knowledge and have added great value to my perspectives of scientific research.

I owe to my parents for their ceaseless support. Unforgettably, I highly value the great sacrifice and support of my sister , Engineer Ahlam Antari and my cousin Maen Antari, which have heightened my determination to pursue this study. As well as contributed tremendously for the successful completion of this work.

I would like to convey my immense thanks and sincere appreciation to my friend Mr Hussen Aydy, who has supported me to pursue my master degree. Also, great appreciation goes to Mr Samer Ahmad for his support during the study period.

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LIST OF ABBREVIATIONS

PCBS	The Palestinian Central Bureau of Statistics
PEA	Palestinian Energy Authority
PEC	Palestinian Electricity Company
PERC	Palestine Electricity Regulatory Council
PIPA	Palestinian Investment Promotion Agency
UNCTAD	United Nations Conference on Trade and Development
AUE	Arab Union of Electricity
EE	Energy Efficiency
MEMIP	Mediterranean Energy Market Integration Project
RCREEE	Regional Center for Renewable Energy and Energy Efficiency
CFFT	Complex Finite Fourier Transform
LPG	Liquefied Petroleum Gas
GDP	Gross Domestic Product
JEDCO	Jerusalem Distribution Electric Company
KWh	Kilo Watt Hour
KV	Kilovolt
KVA	Kilovolt Ampere
MW	Megawatt
MWh	Megawatt Hour
GWh	Gigawatt Hour
P. F	Power Factor
IEC	Israeli Electric Company

NGOs	Non-Governmental Organizations
BTU	British Thermal Units
HVAC	Heating, Ventilation, and Air Conditioning
SEEC	Saudi Energy Efficiency Center
CFL	Compact Fluorescent Lamps
HEMS	House Energy Management System
LCCA	Life-Cost Cycle Analysis
LCC	Life-Cost Cycle
PV	Present Value
FV	Future Value
IRR	The Internal Rate of Return
JD	Jordanian Dinar

ABSTRACT:

Electric power is undoubtedly one of the main pillars of economic and social development in modern times worldwide. In Palestine, as in the rest of the world, electric power has great importance; in some cases, it surpasses that of other nations because Palestine is a developing country under occupation aspiring to achieve an economic and social development free from the control of the Israeli occupation. The main objective of this thesis is to establish a pace toward the efficient use of energy and energy management in large or medium buildings through conducting several procedures in some different buildings where lighting, air-conditioning, oxygen generation units, power factor or other service levels can be reduced without detriment to comfort or health care. In this thesis, we will also define the concept and importance of rationalization of electric energy, and we will determine the responsibilities towards the rationalization of electric energy, the efforts of the electricity sector in the rationalization of electrical energy and procedures

Thermal insulation is one of the most important methods of energy conservation in buildings, which contributes to the preservation of the internal heat of buildings for long periods. In this thesis we will present an economic feasibility of thermal insulation, just to apply the economical strategies to determine the best heating and cooling isolation system (using polyethylene isolation materials) from the following alternatives: 1- Isolate all of floors and walls. 2-Isolate the walls. 3-Do nothing (Not use any isolation system) we have chosen a government building where the building consists of five floors, each has a 1950m^2, according to information obtained from the management of the building, the monthly bill for heating and lighting is 4,000JD. On other hand, 57% of the bill is for heating and cooling system and 43% is for lighting.

The economical engineering strategy that used in this study is life cycle cost analysis life (LCCA). The results show that using the polyethylene isolation materials to isolate walls will decrease the monthly bill to 55% and the IRR will be 16%. On other hand, isolated all walls and floors will decrease the monthly bill to 40% but the IRR will be 13%. The last alternative which is not using isolation were not accepted. Finally, the recommendation is to use alternative two; to save at least 121000 Jordan Dinars over 20 years, while 150000 Jordan Dinars will save if the building isolated all walls and floors over 20 years.