POTENTIAL FOR PROMOTION OF DEMAND SIDE MANAGEMENT THROUGH A MARKET BASED APPROACH

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Degree of Master of Science

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University of Moratuwa

Sri Lanka

May 2016

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Thesis/Dissertation submitted in partial fulfillment of the requirements for the degree of Master of Science in Electrical Engineering

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……... ……...

Signature of the supervisor Date

(Prof. J P Karunadasa)

…… ……

Signature of the supervisor Date

(Dr T Siyambalapitiya)

ACKNOWLEDGEMENTS

First of all my gratitude is towards my two supervisors, Professor J. P. Karunadasa and Dr. Tilak Siyamabalapitiya, who guided me throughout my thesis work, in spite of their busy schedules.

Also I would like to extend my gratitude to all the lecturers of Electrical Engineering Department, University of Moratuwa for the guidance provided by them to improve my thesis, with their valuable comments.

My gratitude also given towards Deputy General Manager Eng. K.M.K. Perera, Deputy General Manager Eng. R.A.A.S. Seneviratne, Deputy General Manager N.W. Kumarasinghe and Chief Engineer R.M.S.K. Gunatilake from Ceylon Electricity Board for all the support given to me to complete my research successfully.

I would also like to appreciate my colleagues K.H.G.S. Jayaneth, D.M.D.K. Dissanayake, A.M.G.H.S.B. Abeysinghe for the motivation given to me complete my research work.

Finally, I owe my gratitude to my parents, my husband and my little son for their endless support and encouragement and without them I would not have come this far.

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ABSTRACT

Today with the developments of technology, expansion and developments in industries and increase in the standard of living of the society, the demand for electricity keeps rising every day. It is the responsibility of the utility to increase its supply to meet this demand in order maintain the demand supply balance. It is not always economical to meet this increasing demand by building new power plants. Hence today, more interest is shown towards controlling the demand, through Demand Side Management (DSM).

In this thesis, several customer categories were first studied in order to identify the potential DSM options that can be implemented. The selected option was Thermal Energy Storage in buildings, by constructing storage tanks to store chilled water during the off-peak tariff period, and using the stored chilled water to meet the peak-time cooling demand. The technical potential for savings that can be obtained through applying this technology in Sri Lankan context is analyzed, and the potential saving that can be achieved in the General Purpose and Hotel category customer group is calculated.

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DSM projects should ideally be a win-win option to the economy, the utility and the customer. The potential benefits of thermal energy storage, to the three parties expected to benefit are separately analyzed in this study.

The results of the thesis is that Chilled Water Storage technology is a viable DSM project in Sri Lanka. It is the responsibility of the Utility to actively market it to its customer base and motivate them to participate in the project. This also requires the utility intervention to make this project more attractive to its customers through providing part of the investment cost. The effect of the customer payback period is also studied.

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LIST OF ABBREVIATIONS

Abbreviation	Description
BST	Bulk Supply Tariff
CEB	Ceylon Electricity Board
CWS	Chilled Water Storage
DL	Distribution Licensee
DSM	Demand Side Management
FOM	Figure of Merit
GP	General Purpose
GV	Government
H	Hotel
I	Industrial
IPP	Independent Power Producer
IRR	Internal Rate of Return
kVA	kilovolt Ampere
kW	kilowatt
kWh	kilowatt hour
LECO	Lanka Electricity Company
PUCSL	Public Utilities Company Sri Lanka
RT	Ton of Refrigeration
SPP	Small Power Producer
TES	Thermal Energy Storage
TL	Transmission Licensee
TOU	Time of Use
UNT	Uniform National Tariff

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