

**ASSESSMENT OF ENERGY LOSSES IN SINGLE
PHASE ENERGY METERING IN SRI LANKA**

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Degree of Master of Science

Department of Electrical Engineering

University of Moratuwa

Sri Lanka

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

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DECLARATION

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ABSTRACT

Sri Lanka has achieved almost 100% electrification at the end of the year 2017. The total number of consumer accounts adds up to 6.76 million and out of that about 6 million are single phase consumers in the tariff categories, domestic, religious, small general purpose and small industrial etc. (2017). Since all the energy served to these consumers is measured by electromechanical energy meters, the significance of the energy loss incurred in these single phase energy meters to the overall energy loss of the system is important.

In this research, losses in single phase energy meters are identified and analyzed using mathematical models. Two types of single phase energy meters are taken into consideration (one is the presently used electromechanical meter and the other is the electronic meter), and separately assessed for losses and compared as the method of discovering minimization of losses in energy meters. The losses are quantified by modelling load profiles of consumer categories and extrapolating to the consumer population.

The research concluded that the annual additional energy that can be accounted for, from single phase energy metering in Sri Lanka is 36.5 GWh. The total annual energy that could be saved by using single phase electronic energy meters is 19.4 GWh.

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List of Abbreviations

Abbreviation	Description
CEB	Ceylon Electricity Board
LECO	Lanka Electricity Company
IEC	International Electrotechnical Commission
DD2	Distribution Division 2
R&D	Research and Development
rms	Root Mean Square
V	Voltage
I	Current