POTENTIAL FOR ENERGY CONSERVATION IN NWSDB WATER SUPPLY SCHEMES

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Degree of Master of Engineering

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Declaration

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The above candidate has carried out research for the Master's Thesis under my supervision.

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Abstract

This research was aimed to study the potentials for conservation of energy in main schemes of NWSDB in Southern Province. The results are usable on benchmarking energy usage on water supply schemes those operating under NWSDB. From the history of operation of NWSDB over 40 years, energy audits for the resent past were studied for water supply schemes. Specific energy consumption is used to benchmark the energy consumption of each category of operations which leads to identify the potentials for energy conservation. An energy audit was carried out in Southern Province, region-vise Matara, Galle and Hambantota to evaluate the energy conservation potentials.

In electrical energy form, kinetic energy around 25 % of the total consumed is used for pumping raw water. Other 75% is used for major components including water treatments, treated water pumping and distribution networks. Apart from the energy usage on water treatment and pumping, component from total energy as high as 12% was identified as loss on non-revenue water, an area to work on reduction of energy usage.

The main area identified as need for improvements was pumping and transmission equipment and their unit operations where around 14% energy could be targeted for energy saving.

It is worth to improve water sources for free from algae, impurities, pollution and contamination through community awareness, national policy planning and programmed long term vision to meet huge energy conservation in future and to harvesting healthy generation out in danger with numerous diseases.

Direct distribution of water to consuming terminals with continuous pumping is better option to focus to save energy in vigorous amounts instead of distribution through elevated towers yet not ready to be implemented with prevailing electricity pattern in the country.

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List of Abbreviations

Abbreviation	Description
ADB	Asian Development Bank
AWWA	American Water Works Association
BPH	Booster Pump Hour
CARL	Current Annual Real Losses
CEB	Ceylon Electricity Board
DAF	Dissolved Air Floatation
DMS	Demand Side Management
ELL	Economic Level of Leakage
EPRI	Electrical Power Research Institute
GHG	Green House Gasses
GOSL	Government of Sri Lanka
ILI	Infrastructure Leakage Index
IWA	International Water Association
KPI	Key Performance Indicator
LECO	Lanka Electricity Company
LKR	Sri Lanka Rupee
NRW	Non-Revenue Water
NWSDB	National Water Supply and Drainage Board
PI	Performance Indicator
SCADA	Supervisory Control and Data Acquisition
SEC	Specific Energy Consumption
UARL	Unavoidable Annual Real Losses
VFD	Variable Frequency Drive
WHO	World Health Organization
WOP	Water Operators Partnership
WSS	Water Supply Scheme
WTP	Water Treatment Plan

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