

Final Report

POTENTIAL ANALYSIS FOR SOLAR THERMAL SYSTEMS IN THE HEALTH SECTOR

(Lesotho)

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Report by

Name: Oliver Nyamukondiwa

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Institute: National University Of Lesotho

Programme: Masters Of Science in Sustainable Energy

Status: Student

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Project title: POTENTIAL ANALYSIS FOR SOLAR THERMAL SYSTEMS IN THE HEALTH SECTOR.

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1.0 BACKGROUND

- Potential analysis for solar thermal systems in the health sector:
- Survey of hospitals and clinics in the country, including the number of beds and the monthly average number of patients;
- Calculation of hot water consumption in hospitals and clinics and
- Derivation of potential for thermal solar systems for the health sector.

The study aims at increasing understanding of the use of solar thermal in providing hot water demand in hospitals and clinics.

Most hospitals and clinics in Lesotho suffer deficiency in supply for hot water leading to cold related diseases like pneumonia and recently Covid 19 to take death toll increase.

Moreover the study also seeks to improve in the design and system of installing solar water heater in hospitals since most installed solar water geyser in the hospitals are not properly designed its either they are under designed or they are over designed. So there is need to balance energy supply demand and economics.

The study showed that the cold and hot water consumption of hospitals can vary significantly based on the type, size, geographical location and services offered by the hospital. This variation is accounted for using cold water measurements and available literature.

1.1.0 Problem Statement

The study aims at increasing understanding of the use of SOLAR THERMAL in providing hot water demand in hospitals and clinics.

1.2.0 Research Questions and Objectives

The main objective of the study is the assessment of solar THERMAL SYSTEM potential in HOSPITALS AND CLINICS of Lesotho to justify necessity in investing in the POTENTIAL AND DESIGN SYSTEMS of solar THERMAL SYSTEMS IN WATER heating production.

The main research questions are:

- (1) what is the potential of solar thermal systems in the health sector in LESOTHO and can it be used as the country's energy substitution?
- (2) how appropriate is the use of solar thermal systems in hospitals and clinic as in terms of economics and sustainability;
- (3) Is there any prospect of satisfying an essential part of the country's health sector thermal energy demand

1.3.0 Justification

- Domestic hot water is an essential facility in hospitals which accounts for a large part of the thermal energy demand and represents approximately 15% of a hospital's thermal consumption [1].

- Moreover, hot water in a hospital is used mainly for sanitary purposes, laundry, kitchen and heated swimming pools for rehabilitation. It has been estimated that up to 50 kWh are needed to prepare 1 m³ of domestic hot water [2].

Another study has gone deeper, creating indicators that relate thermal energy consumption to healthcare activity: 0.50 MWh/hospital discharge, 0.20 MWh/hospital stay, 1.60 MWh/surgery and 0.07 MWh/emergency action [3].

Furthermore, these types of technical solutions contribute to improving the environmental efficiency of hospitals by reducing the CO₂ emissions of their facilities.

Studies have even shown that it is possible to achieve zero emissions by satisfying the energy needs of a hospital through hybridization of renewable energy sources [4].