ENERGY CONSUMPTION BENCHMARKING FOR ENERGY CONSERVATION AND SUSTAINABILITY IN LARGE SCALE NAVAL ESTABLISHMENTS OF SRI LANKA NAVY

K. Isuru Malinda Kularatne

228451R

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Department of Mechanical Engineering

University of Moratuwa
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ABSTRACT

The Sri Lankan government has required a reduction in the electrical energy use of the Sri Lanka Navy due to growing fossil fuel prices and macroeconomic issues made worse by the post–COVID economic conditions. By imposing strict energy standards on military bases and infrastructure, this directive seeks to save expenses and adjust to current economic situations. Naval bases require more energy for essential equipment, HVAC systems, lighting, and specialized facilities since they must run continually, unlike commercial buildings, to ensure 24/7 security and readiness. The unique energy consumption patterns of naval military facilities in comparison to other types of structures, commercial building and other type of buildings, both internationally and in Sri Lanka, are not readily apparent. Although, there are military energy benchmarks for the USA, Korea, and Sri Lanka, but there aren't many that are specific to the region. Further, it is confirmed that no such research has been done yet for the Sri Lankan military.

In order to close this gap, this research created a customized energy consumption benchmarking value for large-scale Sri Lankan naval bases. Specific Energy Consumption taking into account the Total Built Area (SEC_{TBA}) and the particular operational demands of naval bases, the study suggests a baseline benchmarking value of **60 kWh/m²/year**. By applying cutting-edge energy-saving strategies found by a thorough examination of current energy use and trends, the research seeks to lower the amount of energy usage. Energy audits, the integration of renewable energy, improved insulation, energy-efficient HVAC and lighting systems, sophisticated building automation, energy storage, workforce development, and sustainable design principles are some of the strategies. The research shows the Sri Lankan Navy's dedication to environmental care and larger sustainability goals by outlining **set of guidelines** for naval structures to increase energy efficiency while maintaining national security.

Keywords: Sri Lanka Navy, Energy Benchmarking, Specific Energy Consumption, Sustainable Design Principles, Set of Guidelines, National Security

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Subscripts	**Description**
EUI	Energy Use Intensity

Abbreviation	**Description**
IEC	International Electro-technical Commission
CEB	Ceylon Electricity Board
LKR	Sri Lankan Rupees
Mn	Million
PUCSL	Public Utilities Commission of Sri Lanka
SLSEA	Sri Lanka Sustainable Energy Authority
BMS	Building Management System
LED	Light-Emitting Diode
VFD	Variable Speed Drive
TFA	Total Floor Area
TBA	Total Built Area
TLA	Total Land Area
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers

Measurement Scales	
kg	Kilogram
kWh	Kilo Watt Hour
GJ	Gigajoules
GWh	Giga Watt Hour