

**TECHNO-ECONOMIC ANALYSIS FOR EMPLOYING
OF ON-SITE HYDROGEN PRODUCTION & STORAGE
SYSTEMS WITH RENEWABLE ENERGY FOR
TELECOMMUNICATION SITES IN SRI LANKA**

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degree Master of Science in Electrical Installations.

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DECLARATION

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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ABSTRACT

Energy can be termed as the life blood of the telecommunication industry even its technologies had evolved very rapidly. The concern is focused not only on the way of the energy is supplied, but also on the continuity of the supply and the cost of the same are critical concerns in the industry.

With the ever-increasing price of the fossil fuel and the commercial electricity supply which depends on the fossil fuel, telecommunication industry had begun the seeking of options with renewable energy. The inherent limitations of renewable energy were identified and introduced the hydrogen storage concept in to the renewable energy conversion system to overcome them and maintain an un-interruptible power supply.

Under this research, the determination of the optimum composition of the system components is done which yields the best advantage of the proposed technological concept. Since the cost is a major concern when it comes to the industry, a mathematical model had been developed to perform the techno-economic analysis of the viability of deploying hydrogen storage with renewable energy system to power a given base station site under Sri Lankan context. In addition, the sensitivity analysis was performed taking the price of inputs as variables.

Tool HOMER had been used to validate the results of the developed mathematical model.

The developed model can be used to check whether the telecommunication operator can omit the capital expenditure of Diesel generator and Battery bank when investing on the power system for a particular base station site.

Key words: Techno-economic analysis, Hydrogen Storage, Optimum Cost.

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LIST OF ABBREVIATIONS

2G	Second Generation Cellular Technology
AC	Alternating current
CAPEX	Capital Expenditure
DAP	Dialog Axiata PLC
DC	Direct Current
GUI	User Interface
HOMER	Hybrid Optimization Model for Multiple Energy Resources
kVA	Kilo Volt Ampere
kW	kilo Watt
MS	Micro Soft
OPEX	Operational Expenditure
PLC	Public Limited Company
PV	Photo Voltaic
W	Watt