OPTIMUM HYBRID POWER SUPPLY SYSTEM VIA BATTERY BANK MIXING FOR TELECOM BASE STATIONS

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DECLARATION

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ABSTRACT

The power requirement to operate a radio base station site is getting increased day by day due to the introduction of new services. Apart from that in order to provide a high-quality service to their customers operators tends to invest more on redundant power sources as well. At the same time, it's very important to reduce the capital costs and operational costs as much as possible to maintain the financial stability of the mobile operating companies. So, it's important to address the power requirements in an optimum manner. This thesis comprehensively explains an effort taken to identify the optimum way of providing grid power and the backup power for the telecom base stations. A simulation model is developed to derive the optimum hybrid power supply model with the best combination of mixed battery bank and diesel generator that determines, the optimal capital & operational cost for an RBS site with given load, type and environmental factors. This simulation model will mainly address existing energy sources optimization, backup power for poor grid connected sites and capacity upgrades in backup power supply. Also for the first time in Sri Lanka battery bank mixing was introduced for the radio base station sites with the help of this study.

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LIST OF ABBREVIATIONS

Abbreviation	Description
RBS	Radio Base Station
DAP	Dialog Axiata PLC
PV	Photovoltaic
OPEX	Operational Expenditure
CAPEX	Capital Expenditure
VRLA	Valve Regulated Lead Acid
DG	Diesel Generator
POC	Proof of Concept
TCO	Total Cost of Ownership
KPI	Key Performance Indicator
BB	Battery Bank
Li Ion	Lithium Ion
AC	Alternative Current
DC	Direct Current
AGM	Absorbent Glass Mat
FCB	Free Cooling Box
DoD	Depth of Discharge
CPH	Consumption Per Hour
CEB	Ceylon Electricity Board
O & M	Operation & Maintenance
NPV	Net Present Value