BENCHMARKING MEDIUM VOLTAGE FEEDERS USING DATA ENVELOPMENT ANALYSIS: CASE STUDY WPS1 - CEB

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DECLARATION

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ABSTRACT

Benchmarking Medium Voltage Feeders using Data Envelopment Analysis: Case Study WPS1 - CEB

Presently there is no any proper method of finding performance of Medium voltage feeders except the number of feeder failures. Therefore available limited resources are not utilized for the most required feeders and also various issues and contradictions are occurred among Engineers when giving targets to be achieved for feeders. By identifying actual performance of feeders, system improvements can be done to the most needed feeders using limited resources.

Performance benchmarking can be used to identify actual performance of feeders. Results of such benchmarking studies allow the organization to compare feeders with themselves and identify poorly performing feeders. Then the limited resources can be used to develop poorly performing feeders therefore both Utility and Consumers can get maximum benefit from available limited resources.

In order to produce a suitable benchmarking methodology this dissertation focuses on prominent benchmarking techniques used in international regulatory regime and analyses the applicability to Medium Voltage Feeders. Through the analysis Data Envelopment Analysis (DEA) method was selected.

Correlation analysis and DEA analysis with different models were carried out. Then the base model was selected for the analysis and relative performance of 32 Medium voltage feeders of Western Province South-I of CEB were evaluated using the Data Envelopment Analysis (DEA). Relative efficiency scores can be identified for each feeder. This paper also discusses the classification of Feeders according to the sensitivity analysis.

Generally, the study concludes that DEA analysis can be carried out to evaluate the performance of Medium Voltage Feeders.

The evaluation can be carried out once a year or once in two years with the medium voltage Distribution Development Plan in order to identify the performance of feeders and utilized the available limited resources efficiently.

Key words: Relative Performance, Data Envelopment Analysis, Medium voltage feeders, Relative efficiency Score, Western Province South-I

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List of Abbreviations

Abbreviation	Description
CEB	Ceylon Electricity Board
CSC	Consumer Service Centre
CRS	Constant Returns to Scale
DD4	Distribution Division 04
DEA	Data Envelopment Analysis
DMU	Decision Making Unit
MV	Medium Voltage
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
VRS	Variable Returns to Scale
WPSI	Western Province South-I
DD1	Distribution Division 1
DD3	Distribution Division 3
DD4	Distribution Division 4
GSS	Grid Substation
LECO	Lanka Electricity Company
DDLO	Drop down lift over
LBS	Load break switch
ABS	Air Break Switch

List of Annexes