TECHNICAL PRE-FEASIBILITY FOR DEVELOPING A TRANSMISSION SYSTEM INTERCONNECTION BETWEEN INDIA AND SRI LANKA – *A CASE STUDY FOR MADURAI – VEYANGODA INTERCONNECTION*

A dissertation submitted to the Department of Electrical Engineering, University of Moratuwa in partial fulfillment of the requirements for the degree of Master of Science

by

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Declaration

The work submitted in this dissertation is the result of my own investigation, except where otherwise stated.

It has not already been accepted for any degree, and it also not being concurrently submitted for any other degree.

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Date: .....13-02-2009.....

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Abstract

To cater to the growing demand of power in Sri Lanka, establishing a power transmission interconnection between India and Sri Lanka has become very important at present. The objective of this study is to do a technically pre-feasibility analysis of such an interconnection with the power system in 2008 and to propose a new interconnection option for the transmission of power.

Capability of the power transmission and the capacity of the link are decided by analyzing the present and future generation capacity in both countries. The locations for the potential terminus points for the interconnection are decided by examining the transmission systems. The most suitable power transmission method is selected by considering the technical and economic aspects. Finally the power transmission system of Sri Lanka is modeled with the selected interconnections and the power flow studies are carried out to analyze the performance of the system and to find the most suitable interconnection.

According to the present and future generation and transmission capacity in both countries there is enough opportunity to justify a transmission interconnection between India and Sri Lanka. The capacity of the link has been decided for 500MW in short term and for 1000MW in medium term. Since there are many advantages of using HVDC over HVAC, HVDC technology has been chosen and for the reliability the bipolar configuration was selected. And the selected voltage was HVDC 400kV. As for the forecasted loads of the grid substations and the locations (nearness to the major load centers) of them Veyangoda grid substation was taken as the terminus point for the power interconnection in Sri Lanka. The decided route for the interconnection is via Mannar.

Transmission system analyses were done for two cases as 500MW connected to Veyangoda and to New Anuradhapura. The observed low voltages at 220kV AC busses in both cases highlighted the requirement of reactive power addition to the system. The results of the studies confirmed that the transmission system around New Anuradhapura is fairly weak compared to the transmission system around Veyangoda. Also the losses of the system were high in New Anuradhapura case. Therefore Veyangoda grid substation was selected as the terminus point of the India – Sri Lanka power interconnection.

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