

**REVIEW OF TRANSMISSION NETWORK AND GRID  
CAPACITY LIMITATIONS FOR ABSORPTION OF  
DISTRIBUTED ENERGY GENERATION**

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Degree of Master of Science

Department of Electrical Engineering

University of Moratuwa  
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**Dissertation submitted in partial fulfillment of the requirements for the degree  
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Department of Electrical Engineering

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Sri Lanka

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## Declaration

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Dr. H M Wijekoon Banda

## Abstract

Grid connection of small generators to the distribution network to sell electricity to CEB has developed into a major business in Sri Lanka. Power purchase agreements, grid connection guidelines were also developed with the development of the industry. Limitations on the grid connection capability were also laid down. Two of the main limitations are as follows;

- a) Maximum capacity of generation that can be connected to a Grid Substation with 2\*31.5 MVA transformers is limited to 25MW.
- b) Maximum capacity of total generators that may be connected to the system be limited to the lower of either, 6% of the peak power demand or 15% of the Off Peak power demand.

It is stated that these limitations are to be revised with time to be in line with the latest system parameters and configurations.

Since no study has yet been made to review these, an attempt is made to review the above limitations. This study is mainly focussed on the first limitation.



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On analyzing the grid substation capacity limitation, it is noted that a detail study of the pattern of generation and the details of the individual feeder loads need to be made. Since there is a minimum (guaranteed load) at each GSS, this load can be considered in arriving at the maximum amount of DGs that can be connected at each GSS.

Accordingly it is noted that the maximum capacity of DGs that can be connected at Balangoda and Ratnapura grid substations with (n-1) reliability criteria amount to 40 and 38 MVA respectively. These values are calculated with load values at each of the grid substations relating to year 2010. As the demand for electricity has been increasing at around 9% annually in Sabaragamuwa province these values will also subject to revision annually.

It is noted that transmission system is having its limitations mainly on the Lynx single circuit line from Polpitiya to Seethawaka. Present situation need to be analyzed further before any more DGs are to be connected to the system.

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