

# **Improvement of Voltage Profile and Stability of Wind-farm Connected Medium-voltage Distribution Networks: A case study**

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## **Abstract**

Many countries have now recognized wind as a sustainable source of energy and the installed capacity of wind generation worldwide now exceeds 25GW. In Sri Lanka very little emphasis is given for wind generation. No major wind farms are in operation or planned. Further utility has imposed various restrictions for connecting wind turbines to the grid especially at medium-voltage level.

In the work presented in this paper, a wind farm connected at a high wind potential region in the country was modeled together with the associated medium-voltage network. Voltage curves of the nodes in the system were obtained at critical points of the system and maximum generation that could be connected to the system within the stability limit was estimated. The transient stability analysis was carried out to demonstrate the possibility of maintaining stability of the wind farm under fault conditions. Finally, the application of reactive Var compensation to minimize voltage fluctuation was discussed.