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Carbon Emissions Reduction and Power Losses Saving besides Voltage Profiles Improvement Using Micro Grids

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ABSTRACT

The objective of this paper is to evaluate the value of enhancement in voltage, amount of emission reduction and amount of power losses saving with using micro grids. The paper is divided in two parts, the first part evaluates the voltage improvement and power losses saving with micro (μ) sources (distributed generators like fuel cell, micro tur-bine, solar cell, wind turbine etc.). The obtained results indicate that using μ sources reduce voltage drop by about 3%, Also, it is found that using μ sources can reduce the power losses to more than one third of its value without using μ sources. The voltage at the buses near the μ sources location will suffer from small drop than the buses far from μ sources locations. The second part calculates amount of CO2, SO2, NOx and particulate matters emissions from main grid and from μ sources which forms micro grid. The results indicates that more penetration of μ sources in the power systems especially the renewable sources (solar and wind) will help in reducing or removing emission problems and solve the green house gas problems. Finally this paper proved with calculations that the micro grid can solve most of the problems which facing the conventional power system and keep the surrounding environment clean from pollution and the micro grid will be the future power system.

KEYWORDS

Micro Grid, Voltage Enhancement, Losses Saving, CO2, SO2, NOx and Particulate Matter Emissions

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