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Topic of Research: Application of Intelligent Techniques for DECISION Making in Modern Power System Operation.

FINDINGS

The important objective of the research is to achieve reduced carbon emissions and carbon footprints from thermal power plants. Even solar power plants also contribute to carbon emissions indirectly. One of the major issues for the on-going researchers is to reduce carbon emissions in order to meet the increased demands. A new method is proposed and compared with well research genetic algorithm to assess the carbon output and carbon footprint in the electricity generation. It is found that genetic algorithm gives better result for the minimization of carbon footprint. A proposed algorithm for the controlling the congestion management in a deregulated system are applied to IEEE 14 bus and IEEE 57 bus system. LMP difference is used to estimate the various congested zones with the help of hybrid method and genetic algorithm. It is observed that least LMP difference is attained with genetic algorithm. After identifying the various congested zones, optimal number of DGs are placed to meet the load demand. The converter controlling of DGs are assessed with vector control and FLC. It is observed that performance parameters like THD content of real power and reactive power are also reduced effectively with FLC. The positioning of multi- DGs in terms of real power loss, sensitivity, and accuracy at appropriate location are estimated with proposed heuristic probability distribution method (pdf) and genetic algorithm. Sizing of DGs in terms of real power and reactive power are also obtained. It is observed that best location and size of multi-DGs are estimated with genetic algorithm in comparison to heuristic pdf. Still there is a scope for improvement in certain parameters like voltage profile and THD of real power and reactive power which is attempted through positioning the FACTS devices like D-STATCOM at appropriate location. The assessment of positioning of D-STATCOM is being realized on IEEE 33 bus system for constant power load flow and constant impedance load flow with Fuzzy logic controller. The D-STATCOM is placed at such location where distortion or THD is highest. The controlling of D-STATCOM with FLC has improved the voltage profile and THD of real power and reactive power.

Keywords: Congestion, distributed generator, locational marginal pricing, solar, emission, FACTS.