The Impacts of Distributed Generation Penetration into the Power System

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***Abstract* - Nowadays, fossil fuels are depleted more and more. Renewable energy is one of the best solutions to replace conventional energy. The significant growth of Renewable energy sources indicates that it plays an important role in national energy system in near future. Distributed Generation (DG) technology is one of the technologies that gains more and more attention all around the world. According to International Renewable Energy Agency (IRENA), the number of countries ratifying renewable energy targets has risen to 180. These countries aim to synchronize the Distributed Generation to grid, including small scale of PVs (Photovoltaics) power plants and WPPs (wind power plants). The aim of this paper is to survey the impact level of DG penetration into the grid. To investigate these impacts, this paper uses a test system 9-BUS provided by IEEE to model the integration of DG into the grid, by using ETAP software. Three penetration levels are simulated to examine the influence of DG plants into the electrical grid. Four scenarios have been considered to check frequency, voltage and fault levels of DG. The results show that the system performs well while penetration is under 30% of the electrical grid. The higher is the penetration of DG, the lower is the stability of the system. This requires analysis and solutions to develop a more stable system.**

***Keyword:* Distributed generation DG; DFIG; ETAP; PV power plants; Transient stability; Wind power plant; 9BUS test system.**

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