

Impact of PV Distributed Generation on Loop Distribution Network at Saudi Electricity Company Substation in Riyadh City

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Abstract : Nowadays, renewable energy resources are playing an important role in replacing traditional energy resources such as fossil fuels by integrating solar energy with conventional energy. Concerns about the environment led to an intensive search for a renewable energy source. The Rapid growth of distributed energy resources will have prompted increasing interest in the integrated distributing network in the Kingdom of Saudi Arabia next few years, especially after the adoption of new laws and regulations in this regard. Photovoltaic energy is one of the promising renewable energy sources that has grown rapidly worldwide in the past few years and can be used to produce electrical energy through the photovoltaic process. The main objective of the research is to study the impact of PV in distribution networks based on real data and details. In this research, site survey and computer simulation will be dealt with using the well-known computer program software ETAB to simulate the input of electrical distribution lines with other variable inputs such as the levels of solar radiation and the field study that represent the prevailing conditions and conditions in Diriah, Riyadh region, Saudi Arabia. In addition, the impact of adding distributed generation units (DGs) to the distribution network, including solar photovoltaic (PV), will be studied and assessed for the impact of adding different power capacities. The result has been achieved with less power loss in the loop distribution network from the current condition by more than 69% increase in network power loss. However, the studied network contains 78 buses. It is hoped from this research that the efficiency, performance, quality and reliability by having an enhancement in power loss and voltage profile of the distribution networks in Riyadh City. Simulation results prove that the applied method can illustrate the positive impact of PV in loop distribution generation.

Keywords : renewable energy, smart grid, efficiency, distribution network

Conference Title : ICSG 2022 : International Conference on Smart Grids

Conference Location : Dubai, United Arab Emirates

Conference Dates : January 28-29, 2022