probabilistic modelling of load and renewable energy uncertainties by latin hypercube sellection for micrigrid optimal operation using hyuristics

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Microgrids are the conventional distribution systems with generation and control facilities. These grids are connected to upstream grid and dependent to load and generation level may have positive or negative power transaction or be idol of the up stream grid. Hence the control and management tasks of these grids is complicated. In example, the system operator would operate the system as economically as possible considering reliability constrains. On the other hand DG owners looking for maximum benefits. In this thesis optimal reliability constrained operation of microgrids operator point of view has been studied.Energy Storage Systems and uncertain generation resources are the microgrid paradigm. Hence the studies have been done on the microgrid with conventional as well as ESS and Renewable Energies. Uncertainty sources are load and generation of wind and PV arreys. Uncertainties have been handled by scenario generation probability distribution function of uncertain parameter through Latin Hyper Cube Sampling. Hence stochastic programming has been used to solve the model. Also to study the impact of reliability indices on the system total cost, tow types of reliability index have been implemented in modeling. First LOLP has been modeled and implemented as a constrain with maximum allowed level and then EENS, multiplied to VOLL, added to the model as the new term in objective function. Case study have been done and uncertainty and reliability indices impact have been evaluated.

Keywords : MicroGrid, Renewable Energies, Uncertainty, Stochastic Programming, Reliability.