

Rahim Fathi , Behrouz Tousi, and Sadjad Galvani, 2021, A new approach for optimal allocation of photovoltaic and wind clean energy resources in distribution networks with reconfiguration considering uncertainty based on info-gap decision theory with risk aversion strategy, *Journal of Cleaner Production*, 295 (2021) 125984.

Abstract In this paper, a new approach for the optimal and simultaneous allocation of clean and renewable energy resources as photovoltaic panels and wind turbines and reconfiguration in radial distribution networks is presented with the aim of minimizing the cost of power losses and increasing of reliability considering generation and load the uncertainty using a new approach named information gap decision theory (IGDT) with risk aversion strategy. Decision variables include the maximum uncertainty radius of generation and load, location and size of renewable resources as well as opened network lines that are determined by satisfying the operating and radiality constraints using improved salp swarm algorithm (ISSA) based on differential evolutionary (DE) operators. The problem is implemented as deterministic and IGDT-based methods on 33 and 69 bus networks. The results indicate that the scenario of wind turbine allocation and reconfiguration in the networks simultaneously is the best scenario with the lowest cost of losses and reliability and reconfiguration only scenario is the weakest scenario with the highest cost in the deterministic and the IGDT methods. The results also showed load increasing and clean production decreasing equal to 7.58% and 34.57% for 33 bus and 4.66% and 39.88% for 69 bus network using IGDT based risk aversion for 20% uncertainty budget. The results cleared that in IGDT, the percentage of changes in the uncertain parameters is clearly and simply obtained and the network operator is able to make robust and risk aversion decision according to existing the uncertainties unlike random methods based the Monte Carlo Simulation that the results depend on the definition of the large samples.

Keywords Radial distribution networks, Renewable resources allocation, Reconfiguration, Reliability, Uncertainty, Information gap decision theory