Milad Eslahi; Behrooz Vahidi; Pierluigi Siano, 2021, A flexible risk-averse strategy considering uncertainties of demand and multiple wind farms in electrical grids, *IEEE Transactions on Industrial Informatics,* doi: 10.1109/TII.2021.3103117.

Abstract Nowadays, taking into account the intermittency of renewable energy resources such as wind farms and uncertainty of load demand seems helpful to obtain a more reliable strategy for the power systems. Nevertheless, Information Gap Decision Theory (IGDT) as a non-probabilistic method has been employed in numerous papers to address the uncertain behaviour of input parameters, the simultaneous optimal values of main objective functions (OF) such as cost and radius of uncertainty cannot be guaranteed. To overcome this issue, Fuzzy- IGDT is used, on the other hand, this approach reports the same value for the radius of uncertainty related to the uncertain resources. To cope with this problem, the current paper presents an algorithm considering uncertainties of multiple wind farms and load demand by acquiring different uncertain bands based on the decision-maker's preferences. Moreover, it is appropriate for uncertain resources with direct and inverse effects on the OF. In other words, it is more flexible than F-IGDT. The precision of the proposed framework is evaluated by Monte Carlo Simulation (MCS), meanwhile, its effectiveness and performances are proved. To guarantee global optimal results with reliable precision, the linearized approximation of the original Mix Integer Non-Linear Programming (MINLP) model has been accomplished in the GAMS platform. The performance of presented method is illustrated by utilizing IEEE 30 BUS and IEEE 62 bus systems.

Keywords uncertainty modeling, wind power generation, Fuzzy information gap decision theory.