Farhad Nazari-Heris, Behnam Mohammadi-ivatloo, D. Nazarpour, 2019, Network constrained economic dispatch of renewable energy and CHP based microgrids, *Electrical Power and Energy Systems,* 110: 144–160.

Highlights

- Economic dispatch of MG under AC power flow constraints is studied.
- CHP units with non-convex feasible operating zones are utilized.
- Robust optimization method is used to consider the uncertainty of market price.
- Scenario-based model is used to consider the uncertainty of renewable units.
- Information gap decision theory is used to model load uncertainty.

Abstract Micro-grids (MGs) are appropriate solutions to various problems in power systems. Different types of energy sources such as renewable energy sources, combined heat and power (CHP) plants and distributed energy resources can be integrated in MGs. Local generation of mentioned energy systems can help system operators to satisfy energy demands with no need to the purchased power from grid. In this paper, a new optimization model based on mixed-integer non-linear programming (MINLP) is proposed to solve economic dispatch of MG containing CHP units, conventional power generators, heat-only units, wind turbines (Wfs), photovoltaic (PV) system and battery storage system under uncertainties. The main goal of proposed paper is to find the optimal solution of economic dispatch of MGs in power systems in which technical constraints like AC power flow limitations are taken into account. In the proposed paper, the effects of dual dependency of produced heat and power by CHP units as well as the impact of electrical energy storage and heat buffer tank are studied in the optimal solution of economic dispatch of MGs. Uncertainties of renewable generation units, price of grid power and load are taken into account using scenario-based method, robust optimization approach and information gap decision theory (IGDT), respectively. The proposed model is studied regarding a 14-bus test system in various cases and the results are presented to evaluate the performance of employed methods.