optimal operation of residential energy hub using intelligent gray algorithm

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Abstract: In our thesis, residential energy hubs mathematical models have been solved by artificial grey wolf optimizer which can be readily incorporated into smart grids. Household demand includes, i.e., fridge, freezer, dishwasher, washer and dryer, stove, water heater, hot tub, and pool pumps lighting, heating, and air-conditioning which mathematical model are formulated in this project. Also, mathematical models of other components of a residential energy system including solar PV panels and energy storage/generation devices are developed. Objective functions of developed mathematical models is defined as minimizing electricity energy consumption cost, while considering end-user preferences. Problem coding procedure will be developed in GWO problem. To evaluate the effectiveness of the model, simulation studies are carried out to a real household. Numerical results show that all devices operate optimally in permissible periods and GWO algorithm lead to residential energy hubs with high accuracy and precise convergence characteristic.

Keywords : Keywords: optimal operation, residential energy hub, gray wolf algorithm.