



University of Zabol
Graduate school
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**The Thesis Submitted for the Degree of Master of Science (M.Sc)
(In the field of Electrical Engineering)**

**Energy management and optimal allocation of hybrid systems based on
renewable energy to supply load**

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Abstract

Today, the importance of electrical energy is not hidden from anyone, and it can be said that in the present age, it is difficult to imagine life without electricity. The main purpose of power systems is to continue to provide electrical energy of the desired quality. High system losses, especially in the distribution sector, network voltage drop and load imbalance are among the problems that prevent the achievement of this goal. Therefore, optimization and improvement of these indicators are very important issues in the electrical energy system. In recent decades, the use of renewable sources such as the sun, wind, sea waves, etc. to generate electricity has been very popular, which are referred to as "distributed generation" units. Proper use of these resources, in addition to reducing pollution caused by the use of fossil fuels, can reduce losses and costs to a desirable level, as well as increase the reliability and quality of system power. Finding the optimal location and capacity of these products is one of the most important and hot topics in power systems. Because the power generated by photovoltaic systems and wind units depends on resource changes (solar and wind) and load demand fluctuations, the main purpose of hybrid systems is to improve their ability to satisfy load at any point in time and storage. Excess energy is critical for future uses. In this dissertation, a multi-source hybrid system separate from the network including battery, wind, photovoltaic and diesel generator units is considered, modeled, optimally allocated and with the results of different optimization algorithms in terms of The annual cost and emission of pollution are compared. Also, to solve the problem of optimal allocation of renewable energy sources, a swarm algorithm called the crow crow search optimization algorithm has been used to solve the optimization problem.

Keywords: Optimization, Hybrid System, Crow Search Swarm Algorithm, Wind Turbine, Photovoltaic System