World Academy of Science, Engineering and Technology
International Journal of Energy and Environmental Engineering
Vol:9, No:01, 2015

A Cognitive Approach to the Optimization of Power Distribution across an Educational Campus

Authors : Mrinmoy Majumder, Apu Kumar Saha

Abstract : The ever-increasing human population and its demand for energy is placing stress upon conventional energy sources; and as demand for power continues to outstrip supply, the need to optimize energy distribution and utilization is emerging as an important focus for various stakeholders. The distribution of available energy must be achieved in such a way that the needs of the consumer are satisfied. However, if the availability of resources is not sufficient to satisfy consumer demand, it is necessary to find a method to select consumers based on factors such as their socio-economic or environmental impacts. Weighting consumer types in this way can help separate them based on their relative importance, and cognitive optimization of the allocation process can then be carried out so that, even on days of particularly scarce supply, the socio-economic impacts of not satisfying the needs of consumers can be minimized. In this context, the present study utilized fuzzy logic to assign weightage to different types of consumers based at an educational campus in India, and then established optimal allocation by applying the non-linear mapping capability of neuro-genetic algorithms. The outputs of the algorithms were compared with similar outputs from particle swarm optimization and differential evolution algorithms. The results of the study demonstrate an option for the optimal utilization of available energy based on the socio-economic importance of consumers.

Keywords : power allocation, optimization problem, neural networks, environmental and ecological engineering
Conference Title : ICEESD 2015 : International Conference on Energy, Environment and Sustainable Development
Conference Location : Paris, France
Conference Dates : January 23-24, 2015