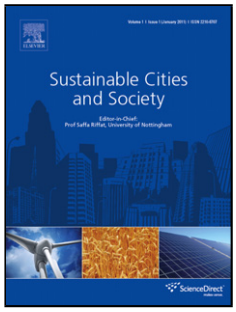

Title: Robust Optimization of Micro-grids Operation Problem in the presence of Electric Vehicles

Authors: Salah Bahramara, Hêriş Golpîra

PII: S2210-6707(17)30350-5
DOI: https://doi.org/10.1016/j.scs.2017.11.039
Reference: SCS 869

To appear in:

Received date: 3-4-2017
Revised date: 26-11-2017
Accepted date: 28-11-2017

Please cite this article as: Bahramara, Salah., & Golpîra, Hêriş., Robust Optimization of Micro-grids Operation Problem in the presence of Electric Vehicles.*Sustainable Cities and Society* https://doi.org/10.1016/j.scs.2017.11.039

Robust Optimization of Micro-grids Operation Problem in the presence of Electric Vehicles

Salah Bahramara, Hêriş Golpîra

Department of Electrical Engineering, Sanandaj Branch, Islamic Azad University, Sanandaj, Iran.

Department of Industrial Engineering, Sanandaj Branch, Islamic Azad University, Sanandaj, Iran.

Highlights

- Modeling the operation problem of a MG in the presence of PHEVs as a robust two-stage stochastic problem.
- The model robustness as well as the solution robustness are satisfied using two penalty factors provided in the objective function.
- In the proposed stochastic problem, power trading with the main grid and optimal scheduling of MG resources are determined as the first- and second-stage decision making.
- Control the MG operator risk in decision making using the risk-aversion parameter.

Abstract

The main objective of this paper is to optimally formulate Microgrid (MG) operation problem in a robust manner. Increasing importance of environmental issues such as Greenhouse Gases (GHGs) emissions leads to the widely use of Plug-in Hybrid Electric Vehicles (PHEVs) in recent years. The high integration of PHEVs in distribution networks may affect the operation of MGs due to their uncertain behaviors. Therefore, the uncertainties of input parameters are successfully considered in the model development. The proposed model is, therefore, a decision-making process of the MG operation in the presence of PHEVs that addresses solution robustness as well as model robustness, which is absent in the literature. The effectiveness of the model is demonstrated through a numerical example