Sima Aznavi, Poria Fajri, Eric M. Wilcox and Mohammad B. Shadmand, 2020, Risk Assessment of Smart Buildings Equipped with Solar Generation Using Information Gap Decision Theory, 2020 IEEE Energy Conversion Congress and Exposition (ECCE), Detroit, MI, USA, pp. 2142–2147, doi: 10.1109/ECCE44975.2020.9235433.

Abstract This paper focuses on evaluation of the effect of uncertainties in anticipated fluctuations of solar generation on the operating cost of a smart building. By utilizing Information Gap Decision Theory (IGDT), a model is developed to assess the associated uncertainty under risk-averse and risk-seeking strategies. A cost analysis is performed on the energy management of a smart building considering different uncertainty occurrence times throughout the day. The simulation results show that not only the intensity of uncertainty, but also its occurrence time directly impacts the total operation cost of the smart building. The results of this study are useful for decision makers to evaluate risks and opportunities, recognize priorities, and make informed decisions about uncertainty management in smart buildings equipped with solar generation.

Keywords household battery storage, information gap decision theory, optimization, smart home, solar energy, uncertainty.