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Abstract In a competitive electricity market, consumers seek strategies to procure their energy needs from different resources (pool, bilateral contracts, and their own generation facilities) at minimum cost while controlling the risk. In this paper, a novel method is proposed to address the electricity procurement problem of large consumers using the concept of information gap decision theory. The method can be used as a tool for assessing the risk levels, considering whether a large consumer is risk-taking or risk-averse regarding its midterm procurement strategies. In the proposed method, procurement decisions are evaluated by means of two criteria. The first criterion is the robustness of the decision against experiencing high procurement costs, and the second one is the opportunity of taking advantage of low procurement costs. The pool price is considered an uncertain variable, and it is assumed that the large consumer has an estimate of the prices. In this study, two models of uncertainty are addressed for the pool price based on the concept of weighted mean squared error using a variance-covariance matrix, and the expected procurement cost is modeled using a joint normal probability distribution function. A case study illustrates the working of the proposed technique.

Keywords Decision making, energy procurement, information gap decision theory (IGDT), large consumer.