A risk-averse two-stage stochastic model for planning retailers including self-generation and storage system

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Abstract-

Retailers are intermediaries between producers and consumers and supply electricity to consumers which are not willing or are not permitted to take part in wholesale markets. In retailer planning, optimal mix of electricity procurement resources as well as optimal price of demands are determined. In this research, a risk-averse two-stage photovoltaic unit are other resources of electricity procurement. The results show that CWP and CWO are only activated in scenarios with high demand; in other scenarios, the retailer prefers to pay the withdrawal/option fee and withdraws from CWP/CWO. The effect of different procurement resources on retailer profit, risk and retail prices are investigated. Residential, commercial and industrial demands with distinct price-quota curves are used. Retail pricing is done for different tariffs including flat, time-of-use (TOU) and real-time pricing (RTP) tariffs and the effect of tariff type on retailer profit, risk and prices is investigated. The effect of price-quota curves on retailer profit, risk and retail prices are also investigated.

Index Terms- Retailer; Electricity market; Uncertainty; Risk. Storage; Retail pricing