Highlights

- Fuzzy-robust model is presented to determine energy procurement strategy of retailer.

- A new reliability model is proposed for scheduling of generating units.

- Different sources of uncertainty are modeled, simultaneously.

Abstract   Electricity retailers desire to specify the energy acquisition strategy and selling prices in a way that maximize the expected profit, and convince consumers to choose them as the energy provider. Reducing selling price decreases retailers income, and vice versa. Moreover, the higher selling price increases clients switching probability to rivals that reduces the retailers expected income. Therefore, the retailer faces a tradeoff between selling prices and clients consumption. Additionally, fluctuations of wholesale prices, random demand, unexpected failures of self-generation facilities, and risk of rivals strategies are other difficulties faced by retailers, and these uncertainty resources affect their profits. This paper presents a fuzzy Information Gap Decision Theory (IGDT) based framework for electricity retailers to specify the energy acquisition strategy. Uncertainty of wholesale price is modeled via unknown bounded intervals. Additionally, the Point Estimate Method (PEM) is proposed to cope with the uncertainty of rivals strategies. Clients reaction to retail-selling prices is incorporated into the proposed framework via fuzzy numbers. In order to model the availability of generating units, a novel scheduling framework considering the repair time for failed units, in addition to repair cost and forced outage rate (FOR) is presented in this research. Finally, IGDT methodology is applied to determine the retailers energy acquisition strategy based on financial risk preferences. Performance of proposed model is evaluated via a case study, and the numerical results are discussed.