

One of the purposes of Demand Side Management (DSM) is to reduce peak loads due to consumers' daily consumption behavior. This can be achieved by introducing dynamic pricing for demand flattening. However, uncoordinated consumer response may lead to a "herding effect", where the majority of consumers adjust their electricity consumption toward the same cheap time slots (hence, creating new peaks). To overcome this problem, in this paper, we explore strategies of assigning non-uniform participation rates to consumers. We employ a generic method to find a nearly-optimal distribution setting for participation rates, which can be tuned based on DSM designer's objective. Based on simulation experiments, we show that our approach is very effective as compared with existing ones in the literature. Moreover, we evaluate our approach in non-stationary environment, when consumers change their consumption behavior from day to day. In order to maximize consumer convenience, we also propose another method that assigns low participation rates to more consumers (which means less-frequent changes in consumption schedules). Based on our methods, DSM designers are able to tune their systems toward performance or consumer convenience.