Aggregators are expected to play an important role in making households provide flexibility to the electricity system. We investigate the business case of aggregators offering a demand response product in a competitive retail market, then directly accessing their customers’ flexibility through remotely controlled demand response devices and marketing it on the electricity markets. As the value of flexibility largely relies on price variations, we use a stochastic electricity price model, which we combine with a linear optimisation program and a cash-flow model to determine expected operating gross margins and their probability distributions. We find that, for a case of Danish residential customers with optimistic assumptions on the available flexibility in terms of flexible volumes and load-shift time horizons, the benefits may be in the range of current investment cost for automation equipment. Furthermore, a Value-at-Risk analysis shows that income expectations are rather stable with more upside than downside potential. With foreseeable cost reductions for smart devices the aggregator business case might soon become attractive, particularly in markets with high shares of renewable production.