

A Principal-Agent model for pricing electricity consumption volatility

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Abstract:

The development of renewable energy sources for electricity generation in the electric systems are renewed the interest for demand response programs. Indeed, the volatility of renewable energies compels systems operator and electric utilities to increase their storage capacity to be able to cope with these important variations over small time steps. Instead of using a physical storage solution, we propose a model of demand pricing that allow a producer to incite a consumer to smooth her consumption over time. We use a Principal-Agent framework where the agent's consumption volatility is controlled, find the optimal contract and show with numerical illustrations how the agent's consumption volatility is reduced.