

DEMAND SIDE INTEGRATION: EXPLORING THE FLEXIBILITY OF A CLUSTER

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ABSTRACT

The influence of demand side integration on variations in electrical power flows is examined. For this purpose a simulation of several hundred households is built, which are clustered by an agent based distributed control algorithm, like the PowerMatcher. Every household consists of a rigid demand and a flexible controlled demand; some households produce solar power. We illustrate that (i) if no intelligent controlled devices are used and 20 % of the households produce solar energy, such a cluster remains stable; (ii) variations in load flow decrease proportionally to the fraction intelligent controlled devices. A model is proposed to measure the buffer capacity of a group of households with DR. Such a district, equipped with e.g. 10 % intelligent controlled devices, is able to buffer any variations up to 40% of its average demand for a couple of hours. Finally, this model is verified by means of a Monte-Carlo simulation. The latter confirms the predictions made.