Coordinating Smart Homes in Microgrids: A Quantification of Benefits

Abstract:
A growing number of households are seeking energy autonomy and economic benefits by installing micro-CHP and PV generators, as well as battery storage units in their so-called smart homes. An option to further increase benefits, is to install a community microgrid and coordinate smart homes intelligently. To quantify this increase, we apply numerical simulations using real-world data for household loads in a temporal resolution of 15-minutes. In systems consisting of CHP-units, the degree of electricity autonomy rises from 50% to 80% through installing a microgrid, allowing lucrative CHP operation. In PV-based systems, the benefits are fewer and if battery storage is installed additionally, they almost disappear completely. As a consequence, intelligently managed microgrids are as valuable option for the integration of microgeneration as long as decentralized battery storage is not profitable and thus not employed.

Stichworte:
Smart Grid, Microgeneration, PV, CHP, Microgrids

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