

KEYNOTE - 4

POWER GRID STABILITY DESPITE RENEWABLE INSTABILITY

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This keynote reports on formal behavioral models of power grids with a substantial share of photovoltaic microgeneration. Simulation studies show that the behaviour of the thus far installed hundreds of thousands of controllers on German rooftops might altogether induce severe frequency oscillations. This phenomenon is indeed recognized by the German Federal Network Agency responsible for overseeing the national power grids, and new regulations are currently being put in place to counter this phenomenon. We study the current proposal, and compare it with a set of alternative approaches that take up and combine ideas from communication protocol design, such as additive-increase/multiplicative decrease known from TCP, and exponential backoff used in CSMA variations. We classify these alternatives with respect to their availability and goodput.