

SOE 16: Collective Failures in Energy Networks (Topical Talk Stefan Bornholdt)

Time: Wednesday 15:00–15:30

Location: H36

Topical Talk SOE 16.1 Wed 15:00 H36
Blackouts from smart meters? Self-organized criticality and collective effects in power networks — ●STEFAN BORNHOLDT —
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The average economic agent is often used to model the dynamics of simple markets, based on the assumption that the dynamics of a system of many agents can be averaged over in time and space. A popular idea that is based on this seemingly intuitive notion is to dampen electric power fluctuations from fluctuating sources (as, e.g., wind or solar) via a market mechanism, namely by variable power prices that

adapt demand to supply. The standard model of an average economic agent predicts that fluctuations are reduced by such an adaptive pricing mechanism. However, the underlying assumption that the actions of all agents average out on the time axis is not always true in a market of many agents [1,2]. I review mechanisms for possible collective effects in markets of many consumers and discuss these in the context of the former concept of self-organized criticality, originally proposed for large fluctuations in nature.

[1] S. Krause, S. Börries, & S. Bornholdt, Phys. Rev. E 92, 012815 (2015). [2] A. Pentland, Economics: Simple market models fail the test, Nature 525 (2015) 190.