

Protocols for the Internet of Energy

Abstract:

Part of the Internet of Things is an ecosystems of electric appliances like Electric Vehicles, Smart Thermostats and Smart Lighting that will allow customers to control the environment but also potentially interact with the market of electricity directly, satisfying economically the users preferences while better exploiting the variable production from renewable energy. The opportunities for good are immense but there is a key challenge to overcome: unlike the internet, which is managed in a decentralized fashion, power systems reliability requires to balance the whole system with global coordination through whole sale electricity markets. The interaction between the customers and their variety of uses and the market forces is hampered by the curse of dimensionality. We will discuss the issue of sifting through big data to decide the schedule and closing the loop on a large number of transactions and discuss an approach that would allow to reason about these multitude of transactions with low order models that facilitate the market level decisions and lead to simple protocols for telemetry, control and means to study the price response of customers in real time.