

Electricity Trading between Smart Nano-grids - Abstract

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The current electrical grid has been in place in its current form since the Industrial Age. It was built to match variable electricity demand to a steady and adaptable supply (fossil fuels). As renewable energy is added to the grid however, the complexity involved in balancing supply and demand increases.

This dissertation proposes the design and implementation of nano-grid systems that aim to change grid intelligence to be more distributed in nature in order to handle this complexity, as well as laying the groundwork for improving overall grid efficiency. This dissertation implements nano-grid systems and a game theoretic bargaining algorithm that seeks to reduce the peak-to-average power ratio of the electricity grid through balancing planned usage.

A small nano-grid system was successfully established showing the implementation of the proposed nano-grid software design hierarchy.

The algorithm used is outlined and examined to evaluate its usefulness when used by different numbers of users. This research area is relatively new and much research still needs to be carried out.