Title: Distributed Control of a Swarm of Buildings Connected to a Smart Grid

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Abstract: Building control tools today address only a single building and do not consider the interactions between the building and the electrical grid, e.g., supply/demand imbalance and voltage/frequency increase. We present a set of control and simulation tools that do take into considerations these interactions. The core of the system is a simulator, called the Smart Grid Swarm Simulator (S^2Sim) that simulates the grid dynamics, interfaces the tools in a distributed fashion and assesses their impact on the grid including stability.

The submission includes both a verbal presentation/demo and a poster presentation.

Demo details:
The demo consists of a grid simulator (S^2Sim) and several individual building management tools that connect to S^2Sim as clients. S^2Sim receives the power consumption of these individual tools and simulates the grid dynamics in terms of stability. This way, we have a better understanding about how different tools affect the grid simultaneously. Based on how much they consume power, S^2Sim calculates a price value for each client and sends it back to them. This price signal can also be seen as a feedback factor from S^2Sim to the clients. For the demo, we require an Internet connection.