Systemic Control of PCT Networks

Researcher: William Burke Advisor: David Auslander

Vision

PCT network reducing peak power demand.

Programmable Communicating Thermostat (PCT): •A replacement thermostat for individual homes. •Reacts to Demand Response signals by adjusting setpoint.

The PCT network consists of:

•PCT enabled homes.

•DR message dispatch.

Benefits

•On demand load reduction. •Eliminate rolling blackouts.

Research Questions

How does the network respond to DR signals?

•The system is complex and stochastic.

•Power systems require high reliability.

•Load control introduces an additional level of complexity.

•Reliability requires predictable response.

What control methods provide the best response?



Load Group Simulation

- •Neighborhood Task
- Array of individual PCT homes.

House parameters randomly generated.

- •Measurement Task
- Takes power measurements.
- •Control Task

Implements control algorithm.





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Findings

Response to static setpoint change.

•500 random houses

•4° F setback



Response to different length setpoint changes.

- •100 random houses
- •4° F setback•Different length events



Future Work

•Examine different types of DR signals – price, feedback control...

•Examine alternative event end strategies – random end time, ramped setpoint end, controlled end...

