Reduced-order Home Modeling

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Goal: Reduce residential peak demand through use of passive thermal storage

Linear Time-series Model

$$Elec = f\left(\begin{array}{c}\text{Thermostat Set Point}\\ \text{Weather}\end{array}\right)$$

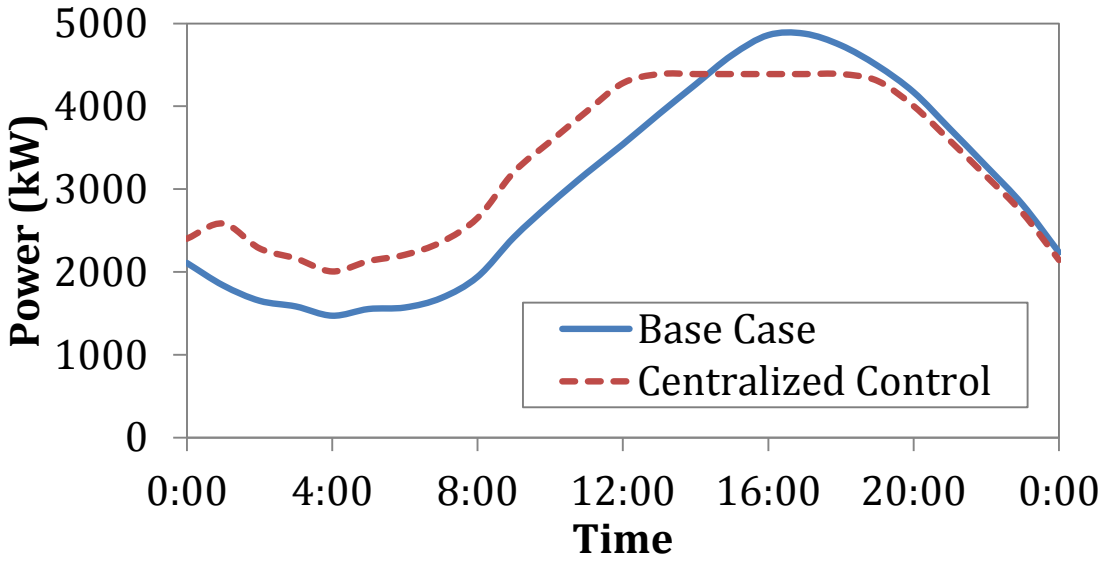





$$Elec_i = f_i(\ldots)$$

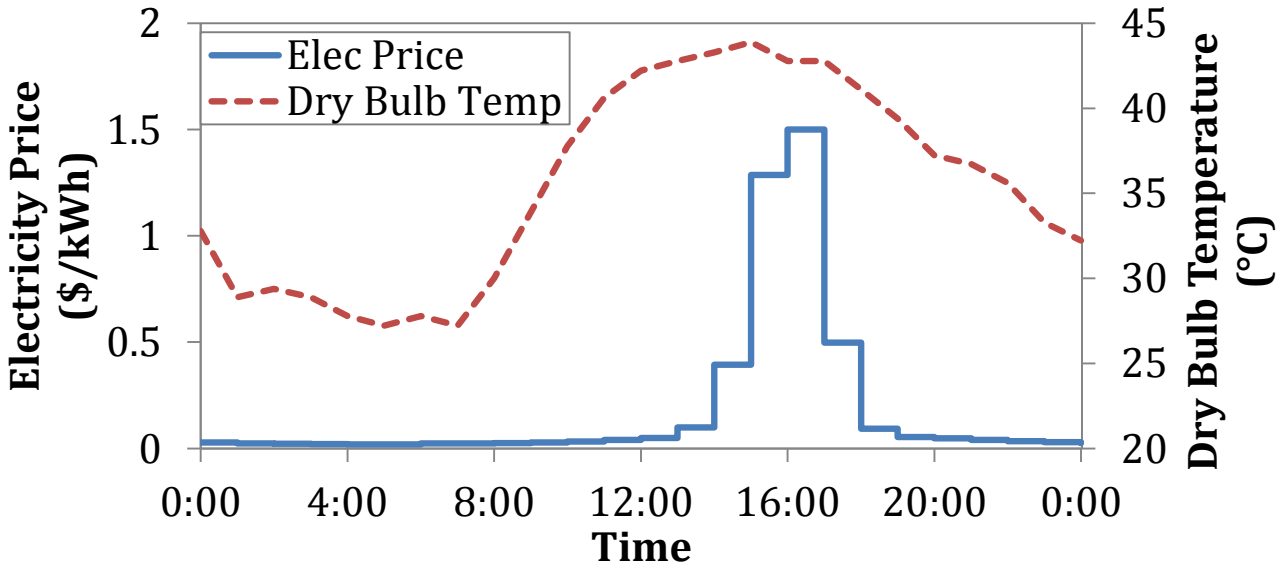
$$i = 1, \ldots, NumHomes$$

Peak Reduction (900 Homes) using MPC



$$\min\left[\max\left(\sum_{i}^{N} Elec_{i,j}\right)\right]$$

Peak Reduction: 10%



Data for August 28, 2011