

## CHPB-17-2018: Extending the Unit Coordinator to Handle Economizers and Heat Pumping Equipment

### Motivation and Problem

- MPC Unit Coordinator previously developed for coordinating multiple RTUs
- Extensively demonstrated at multiple field sites
- Does not consider heat pump heating & economizers



**Example RTU UC Field Site**

### Objective

- Extend Unit Coordinator to Handle Economizers
- Extend Unit Coordinator for Heat Pumps in Heating Mode

### Expected results

- More energy and demand savings of the UC by utilizing economizer-enabled units
- Building demand could be further reduced using free precooling
- Improved overall heat pump performance during heating seasons

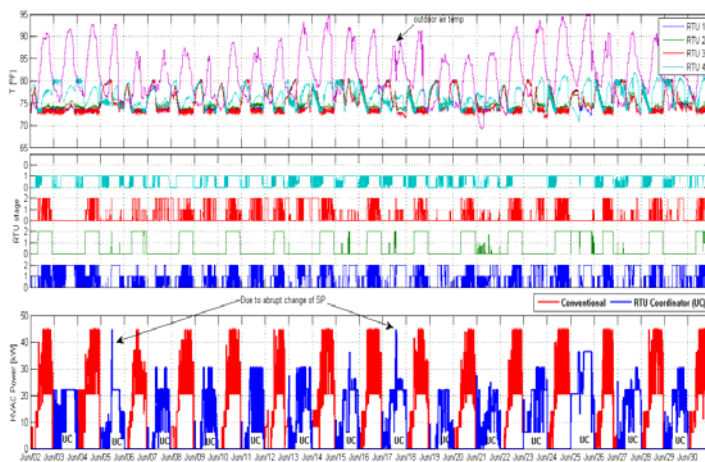


### Approach

- Adjust weights of the UC objective function to handle economizer operation, depending on outdoor conditions
- Modify UC algorithm to accommodate heating stages
- Use simulation, laboratory, and field site testing



## Summary of Site Performance of the UC



- A small commercial building (4 RTUs)
- Clear distinct behaviors (odd: RTUC, even: Conv)
- **Very significant reduction** of electric peak demand and energy consumption



**Percent energy & demand savings for selected sites (SR: small retail, SO: small office)**

Site description	# RTUs	Energy Savings (%)	Demand Savings (%)
SR	3	1	20
SR	4	12	19
SO	3	14	29
Herrick Lab	2	14	27

### Current control architecture

