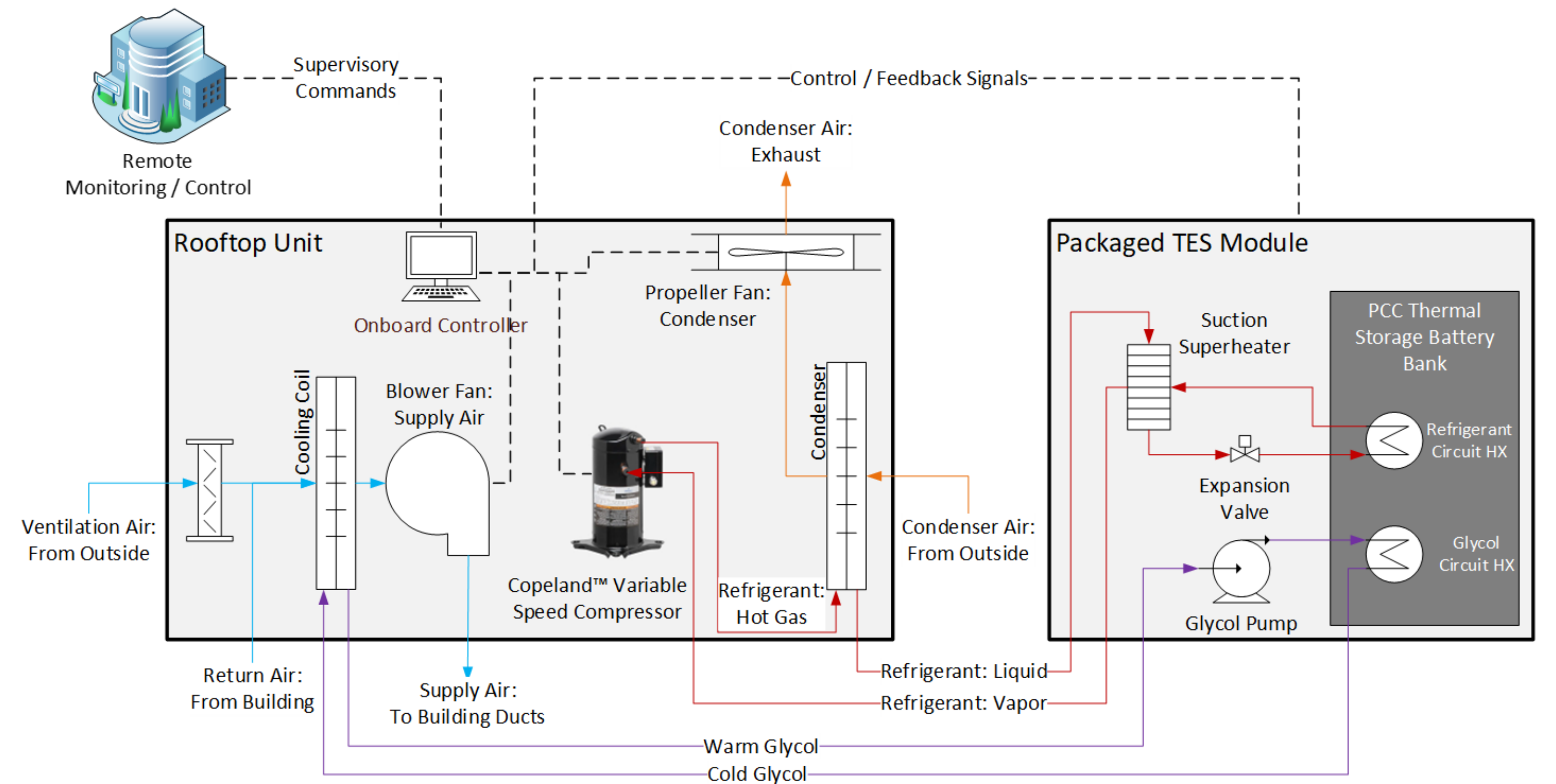
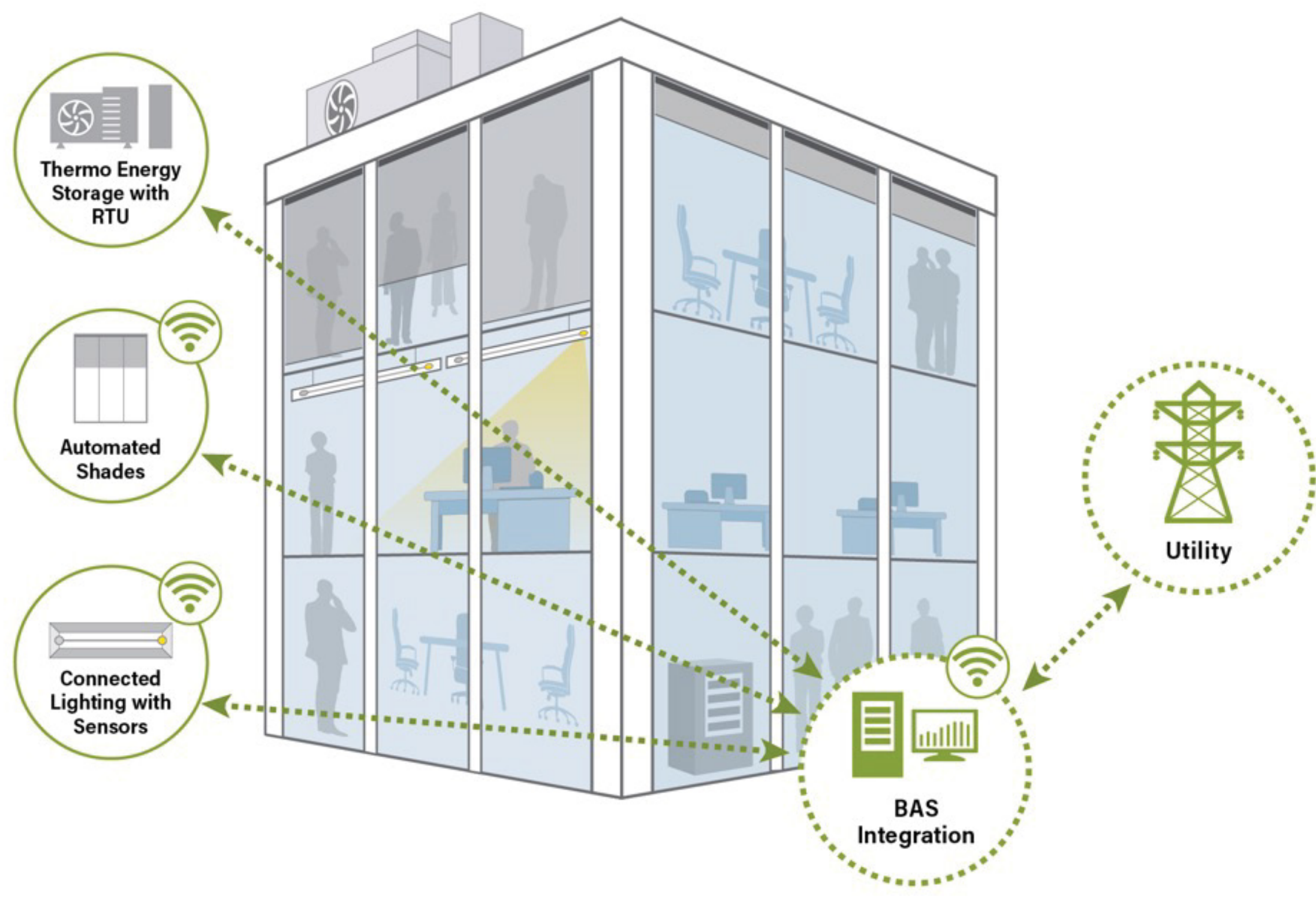


# Technology analysis and validation of integrating connected lighting, automated shades, and intelligent energy storage for load flexibility



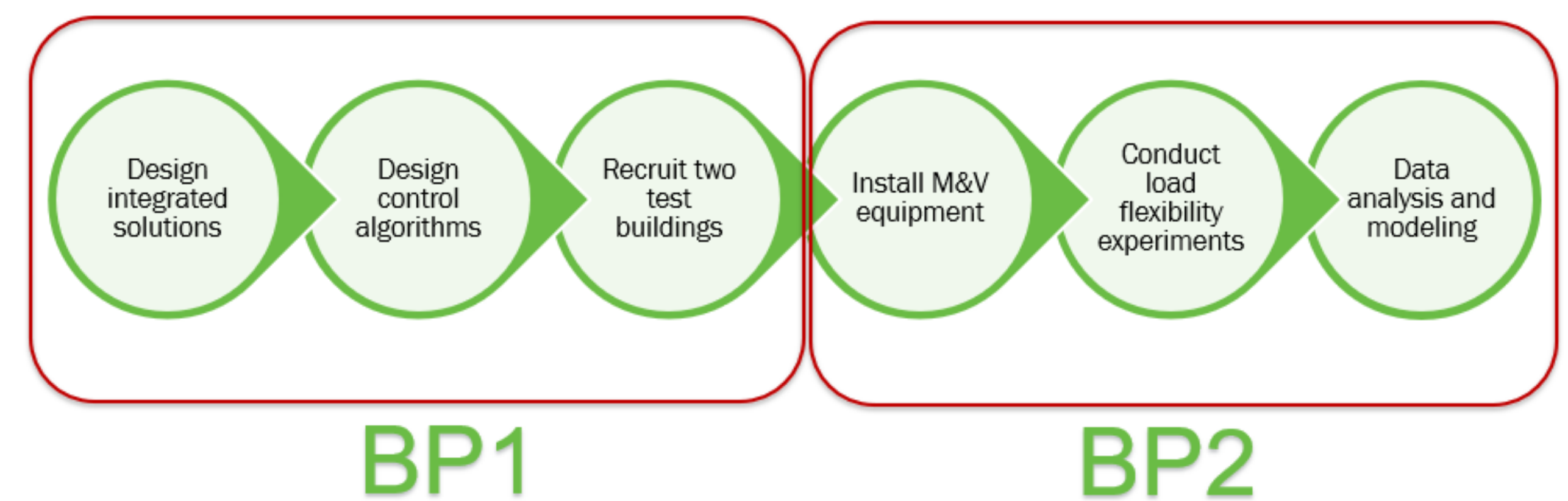
- Connected Lighting: POE LED
- Automated Shades: Mecho Solar Track 4
- Intelligent thermal storage: NETenergy hybrid RTU + PCM thermal storage

- NETenergy hybrid RTU + thermal storage
- Patented “black ice” technology
  - Standard RTU with load shifting / load management capability
  - Load reduction 40%+

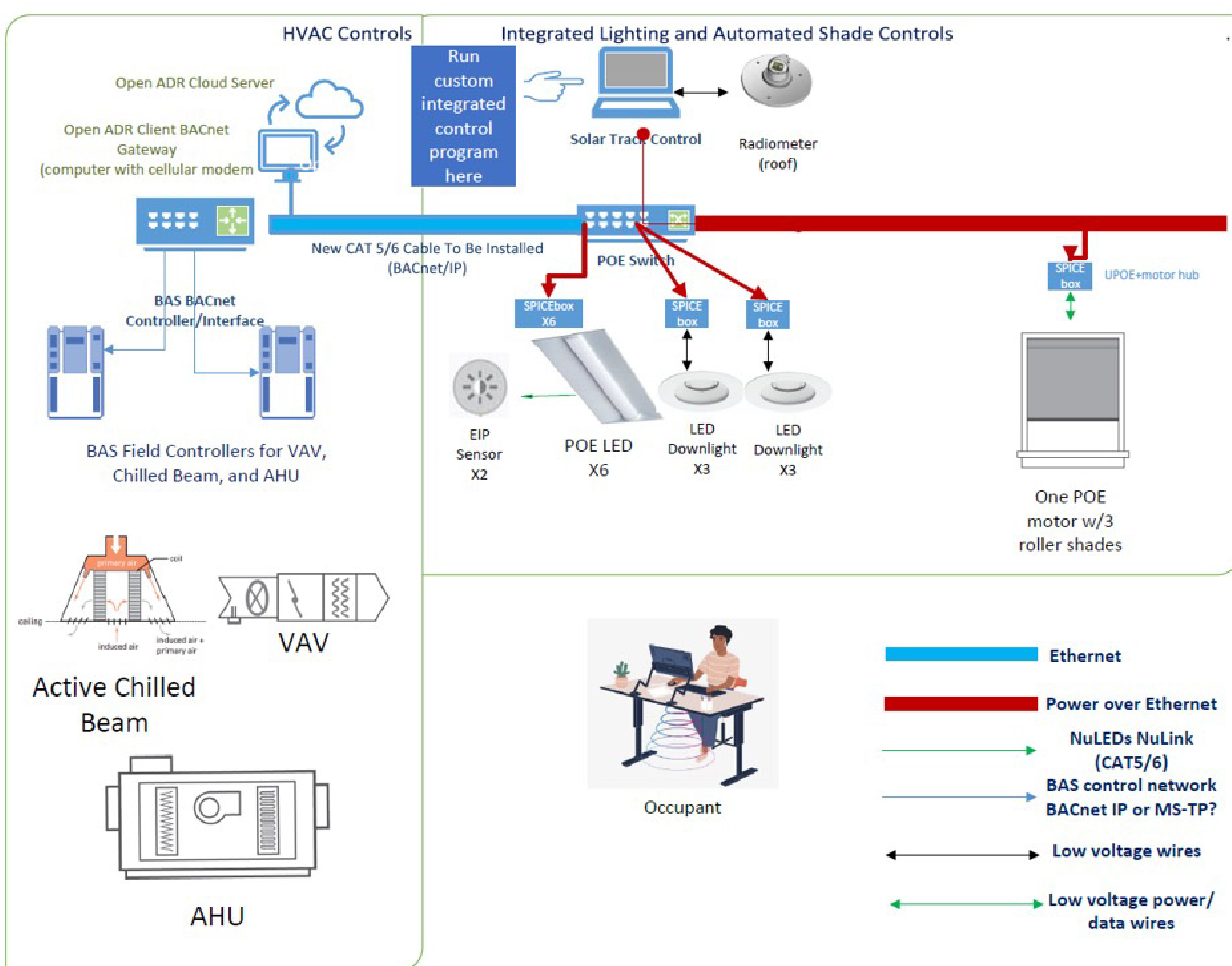
## Project Objectives

- Develop integrated controls concept and algorithms to maximize building load reduction.
- Field test the integration of automated shades, connected lighting, and NETenergy's new hybrid RTU + PCM thermal storage for building load shifting and peak load reduction at TWO commercial buildings.
- Conduct technical analysis using building energy modeling.

## Project Steps and Execution



## Automated Shades and Connected Lighting Controls



	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025														
Planned budget (total)		\$307,317			\$606,513															
Spent budget (total)		\$288,743			\$484,671															
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	
Past work																				
Task 1 IPMP and conceptual design																				Current
Task 2 Recruit test sites																				
Task 3 Preliminary analysis																				
Task 4 Retrofit, M&V, and testing																				
Current/Future work																				
Task 5 Modeling																				
Task 6 Data analysis and reporting																				

## NETenergy Hybrid RTU + PCM Storage R&D

### Hybrid RTU with PCM storage: Completed milestones

- Complete preliminary system design for hybrid RTU with PCM storage
- Built 1-ton PCM module for characterization at NREL

### Hybrid RTU with PCM storage: Remaining milestones

- Characterize 1-ton PCM with refrigerant
- Complete system construction
- Started modification of 5-ton RTU
- Characterize a 5-ton hybrid RTU (part of a DoD ESTCP project)

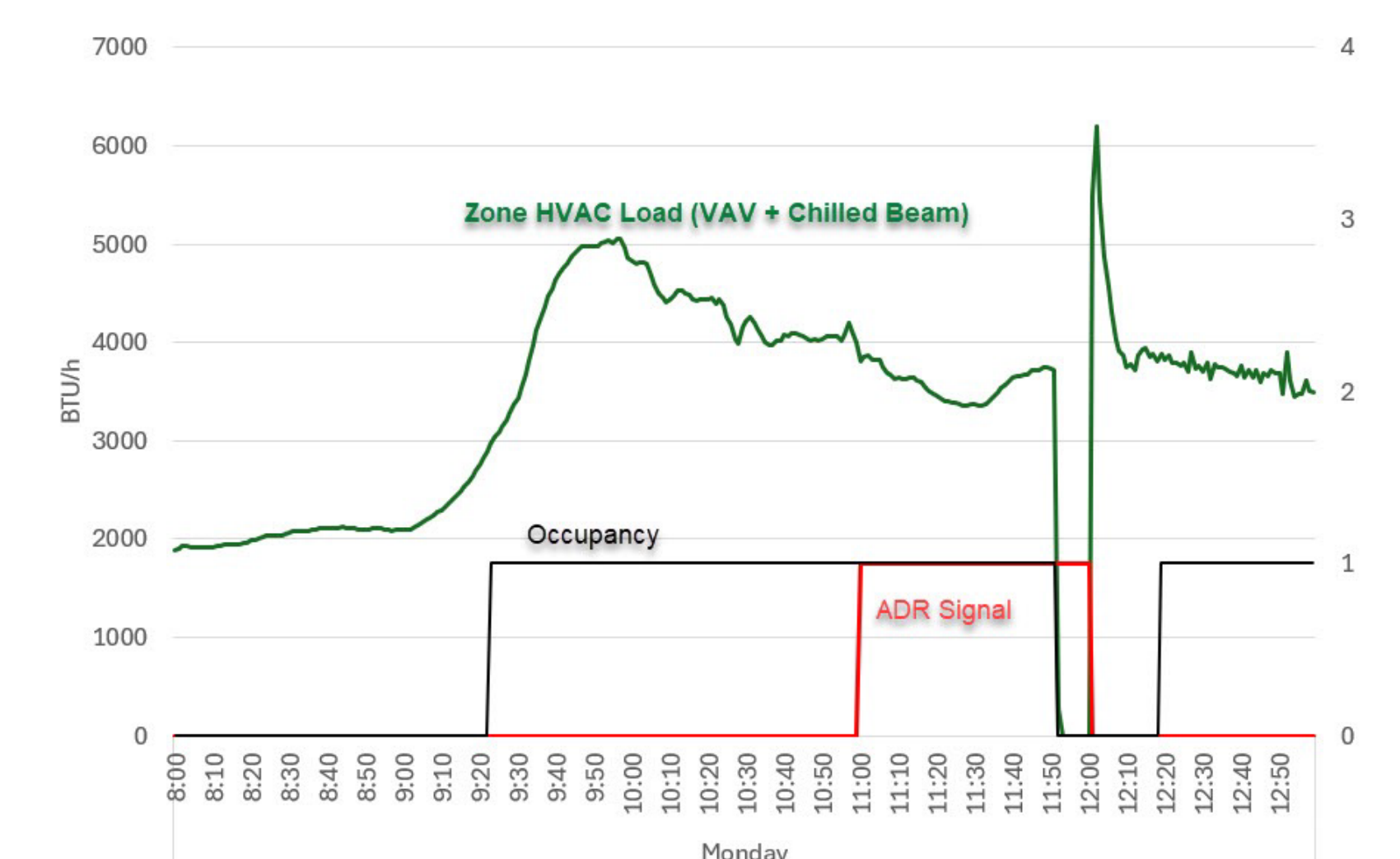
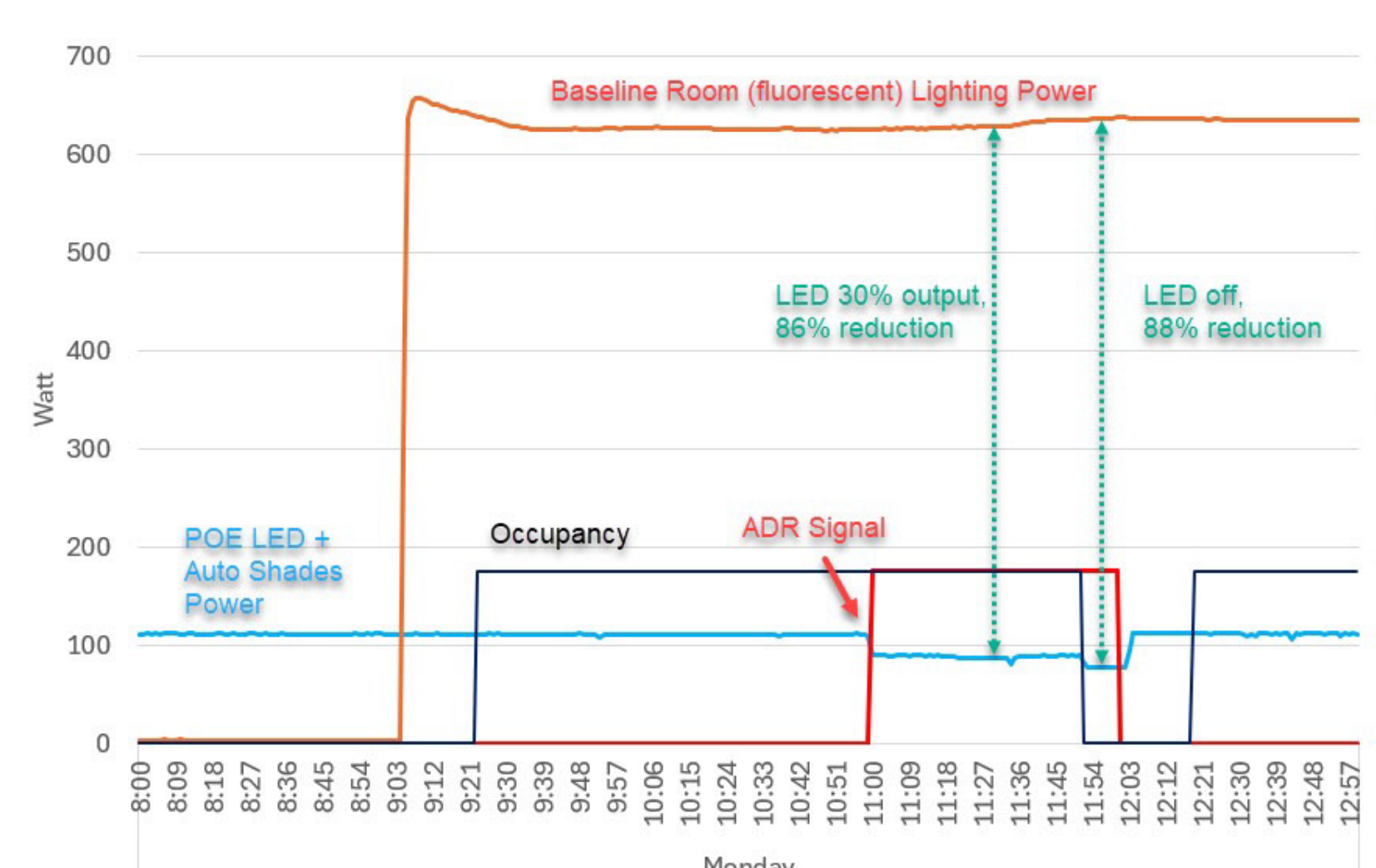
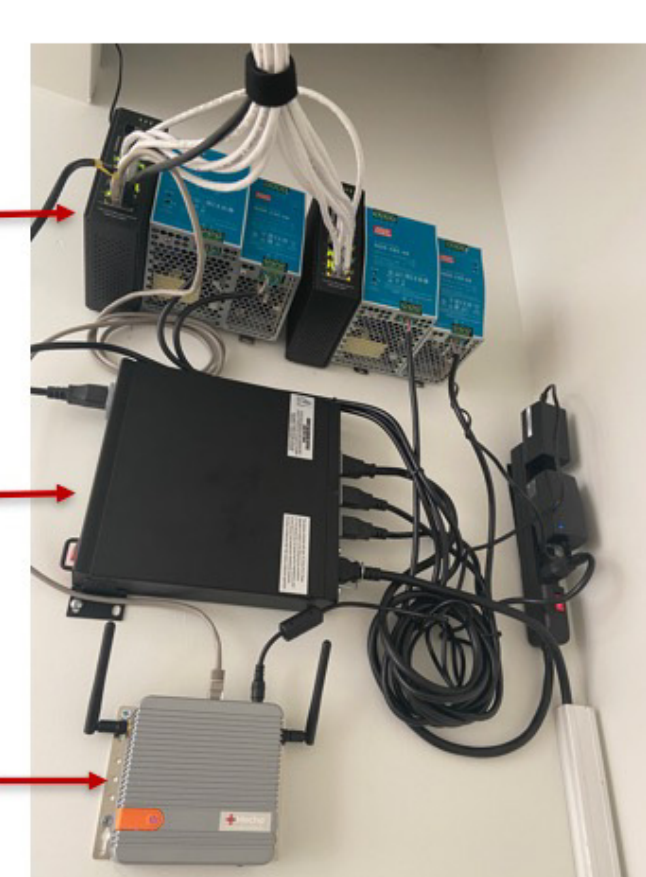
### Demonstration Site

- Ft. Belvoir Bldg. 1458 (office)
- Summer 2025

## BP2: Demonstrations Test Site #1 Adelphi University



- POE lighting and shade motor power and control
- POE lighting gateway
- Automated shades controller



Automated Shades + Connected Lighting Demo (Summer 2024) Preliminary Results