

FINDING ENERGY SAVING OPPORTUNITIES ON A LARGE SCALE UNIVERSITY CAMPUS:

How the University of Texas strategically selects energy
optimization projects

JUNE 27TH, 2017

Agenda

- Demand Side Strategic Plan
- Project Selection
- Case Study: In House Recommissioning at North End Zone
- Case Study: Optimum Energy at BME

Demand Side Strategic Plan

Mission: Utilize innovative demand side energy management strategies to offset projected campus energy growth

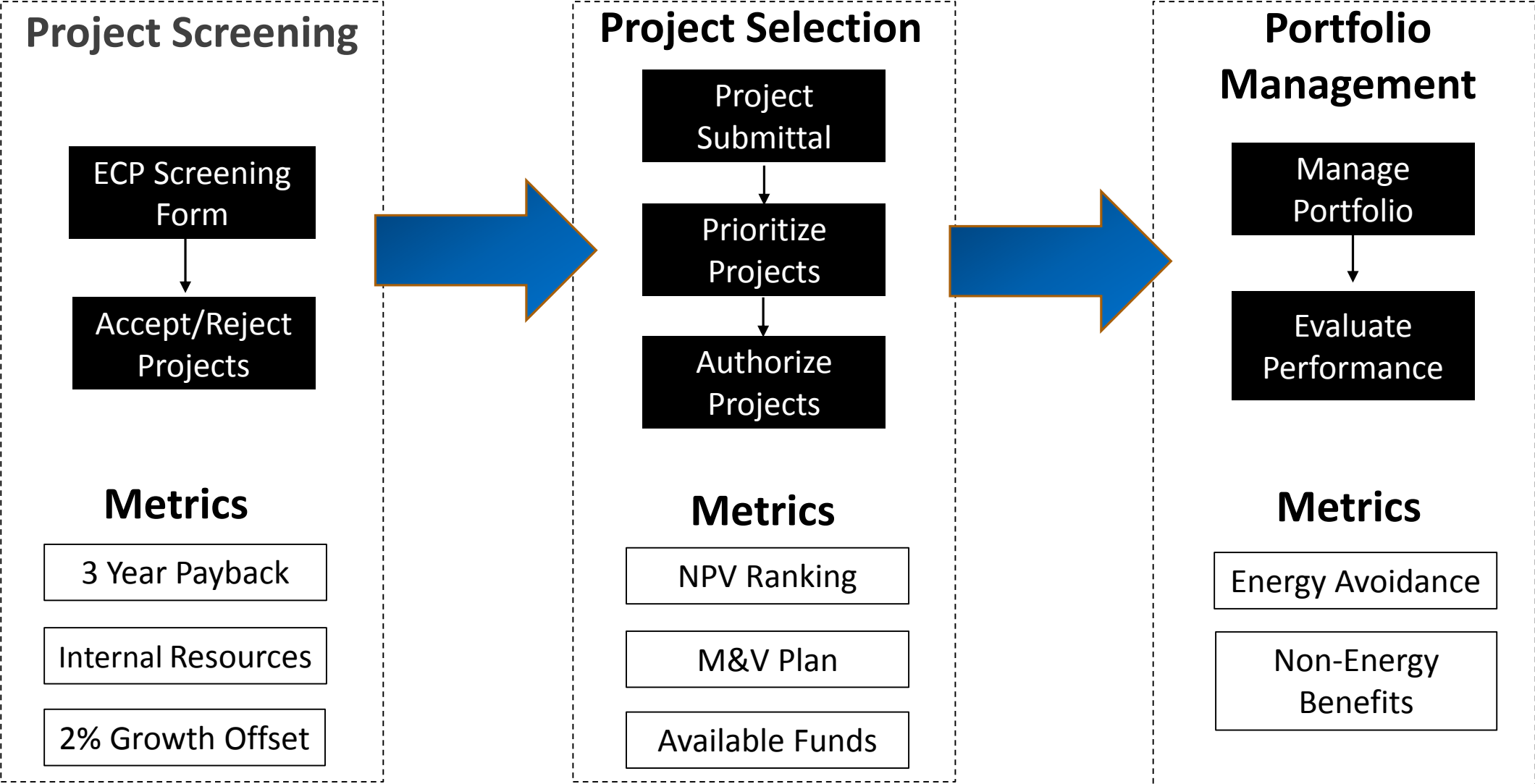
A large, light blue downward-pointing arrow with a white outline, indicating a flow from the mission statement to the goal.

Goal: Reduce the average EUI on main campus by at least 2% annually

A large, light blue downward-pointing arrow with a white outline, indicating a flow from the goal to the key strategies.

Key Strategies: Establish a revolving fund; Implement a PPM process for project selection

Project Portfolio Management



EBCx⁽¹⁾, External Optimizer⁽²⁾, Valve Replacement⁽³⁾, Lighting Projects

5 = Top Quintile MMBTU or EUI
5 = Full DDC to Zone Level

Project	MMBTU Rank	EUI Rank	DDC Level Rank	Resource	Proj. MMBTU Avoidance	Projected Avoidance
NEZ ⁽¹⁾	5	2	5	EMO	22,092	27%
BME ⁽²⁾	5	5	5	EMO/OE	11,921	20%
NMS ⁽²⁾	5	5	4	EMO/OE	15,807	25%
SZB ⁽¹⁾	4	2	2	EMO	6,087	16%
CBA ⁽³⁾	4	2	2	PMCS	3,569	12%
SAC ⁽¹⁾	1	3	5	EMO	6,589	22%
Total					66,065	

High Complexity
MMBTU = 5
EUI = 5
DDC Level >3

Meets 2%
Offset Goal

Case Study: Existing Building Commissioning Effort at North End Zone [NEZ]



Existing Building Commissioning Effort at North End Zone [NEZ]

Partnership with Athletics

Historically we don't work in Athletic buildings

- Few strategies implemented
- Maintenance focus. Energy takes backseat.

Why North End Zone?

One of the most expensive energy cost of all Athletics facilities on campus

How expensive?

FY 2015 = \$1,027,926

FY 2016 = \$1,200,874

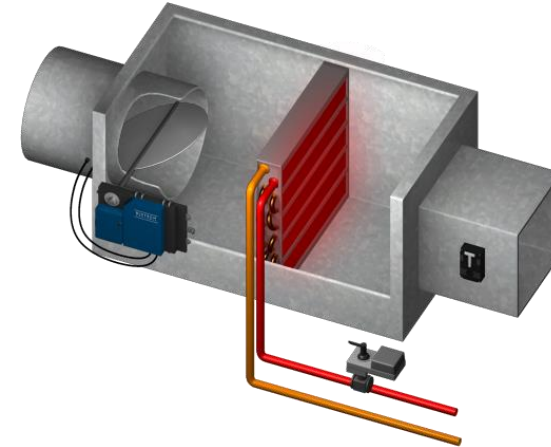
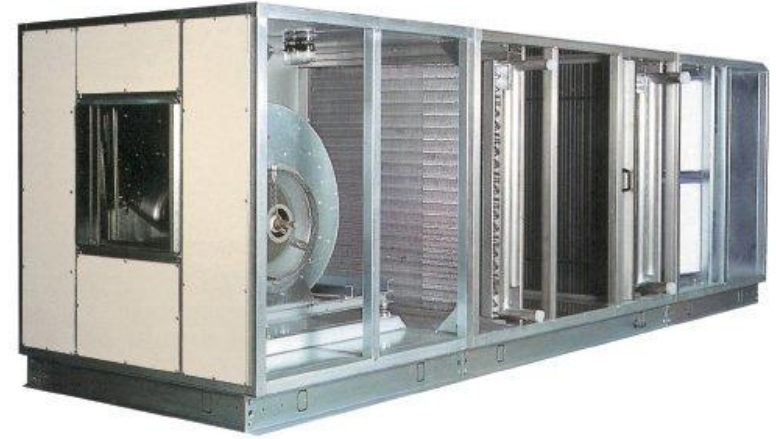


By partnering with us, they get to reduce that, and we get to reduce energy on campus.

Existing Building Commissioning Effort at North End Zone [NEZ]

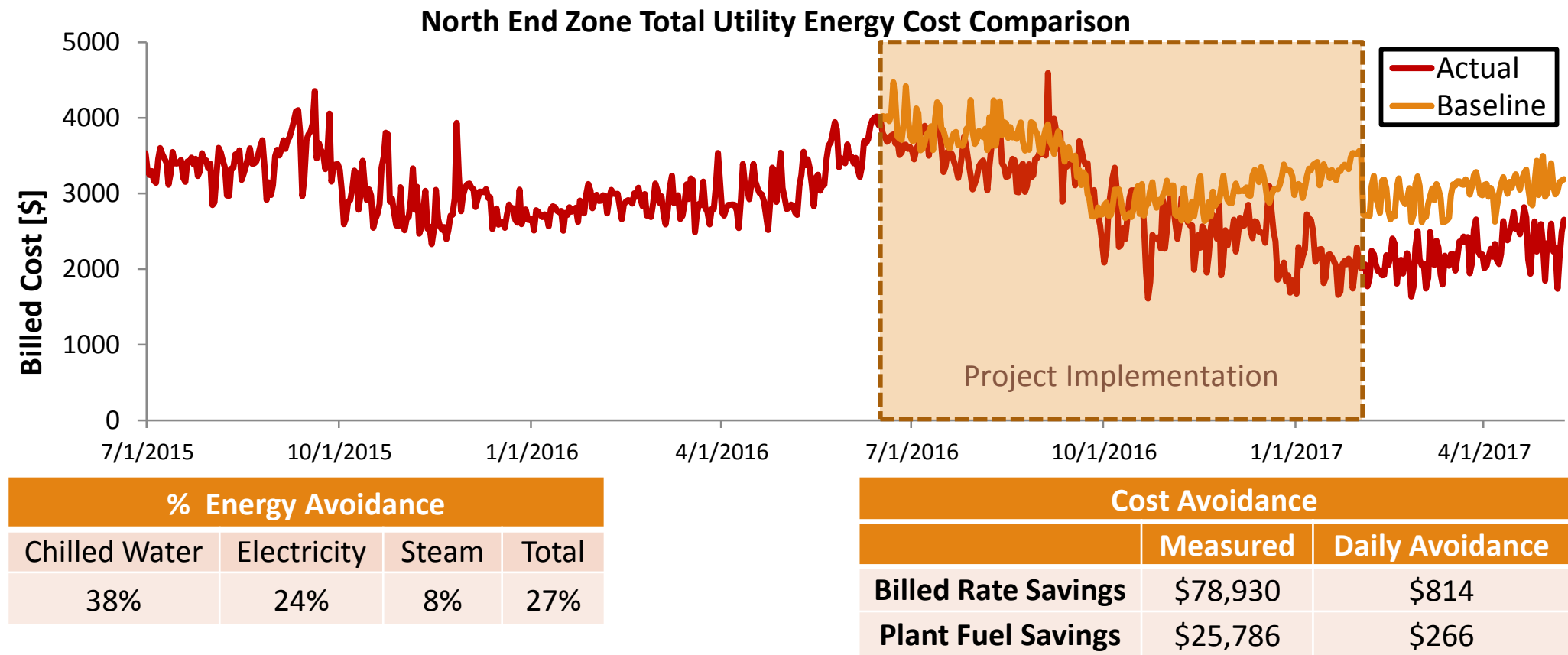
What did we do?

- Fix and replace failed components
- Unoccupied Scheduling and Holiday Scheduling
 - Static Pressure reset
 - Terminal Box Setbacks
- Supply Temperature resets
 - Occupied
 - Unoccupied
- Hot Water Resets
 - Supply Temperature
 - Pressure
- Outdoor Air Reduction
 - Occupied
 - Unoccupied
- Optimize Pre-heat Setpoints
- Terminal Box Optimization [320 Boxes]
 - Reduce Airflow Minimums to reduce Reheat
 - Average Zone Temps where applicable
 - Expand Temperature Band



Existing Building Commissioning Effort at North End Zone [NEZ]

How much did we save?



Total Project Cost to date including engineering, repairs, zone support, and programming = \$ **33,765**

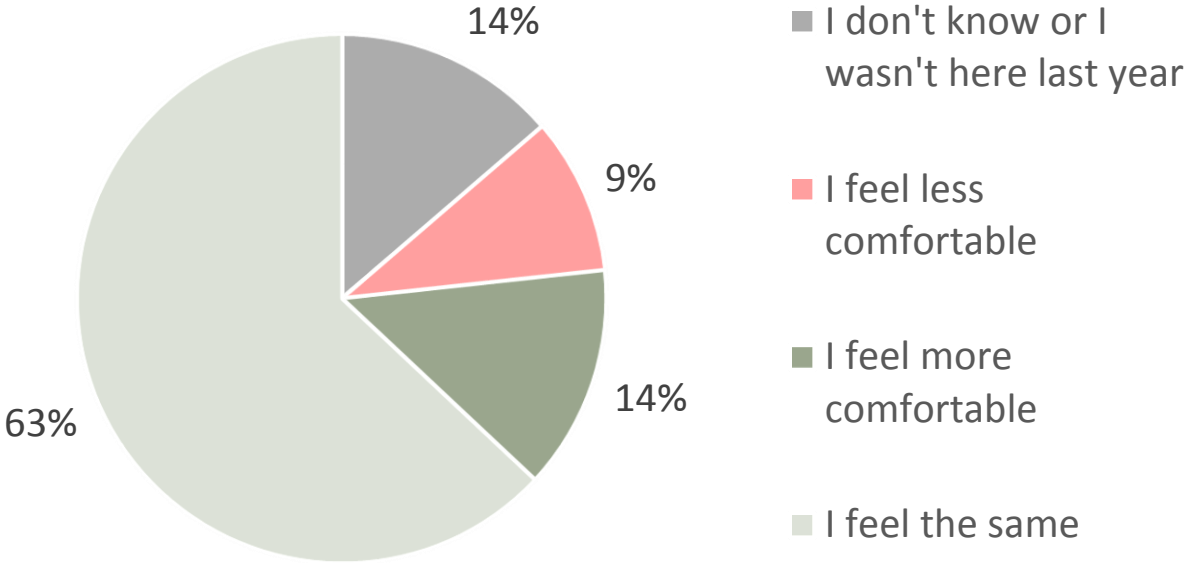
Simple Payback [Billed Rate] = **1.4 months**

Simple Payback [Plant Fuel] = **4.5 months**

Existing Building Commissioning Effort at North End Zone [NEZ]

Are people going to be uncomfortable?

“Since the start of the year (January 2017), how has your overall comfort been compared to last year (2016)? “



“Perfect. Thanks so much”

“Not as cold”

“Don't change it please!”

“It used to be freezing in my office all the time. Now I am just a little cold.”

Existing Building Commissioning Effort at North End Zone [NEZ]

Results:

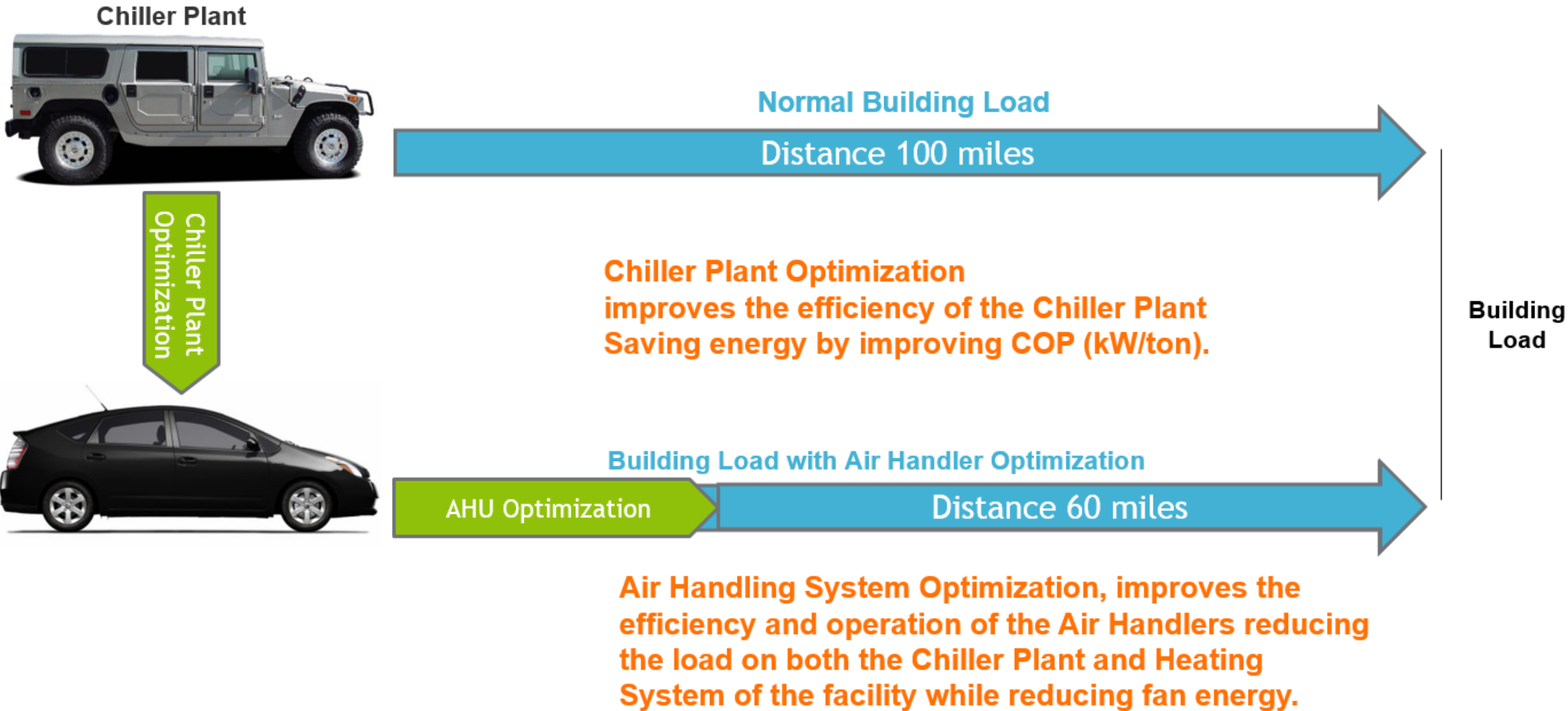
More reliable operation

Less energy waste

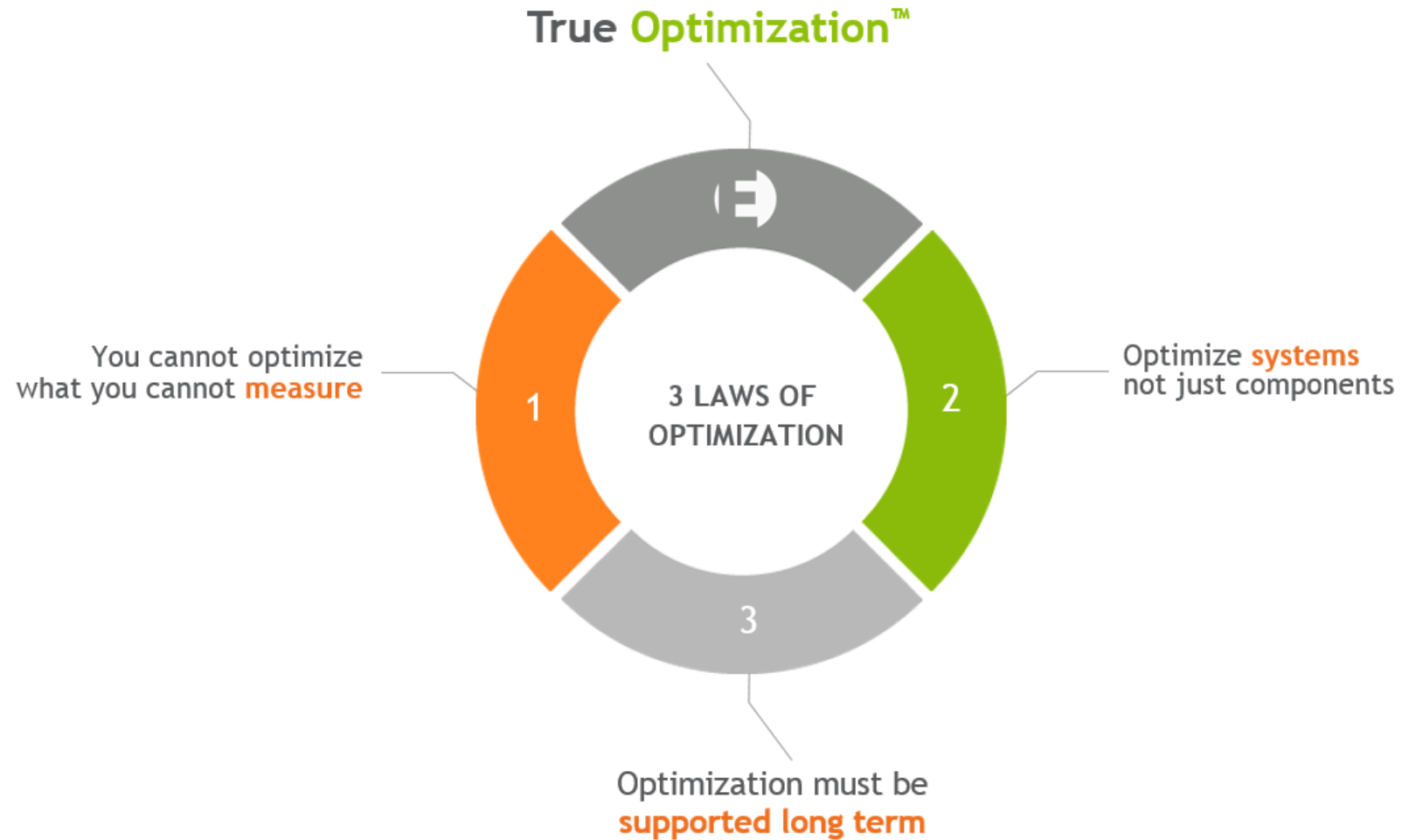
Good Value. Small cost with big benefit and short payback.

No significant comfort impact

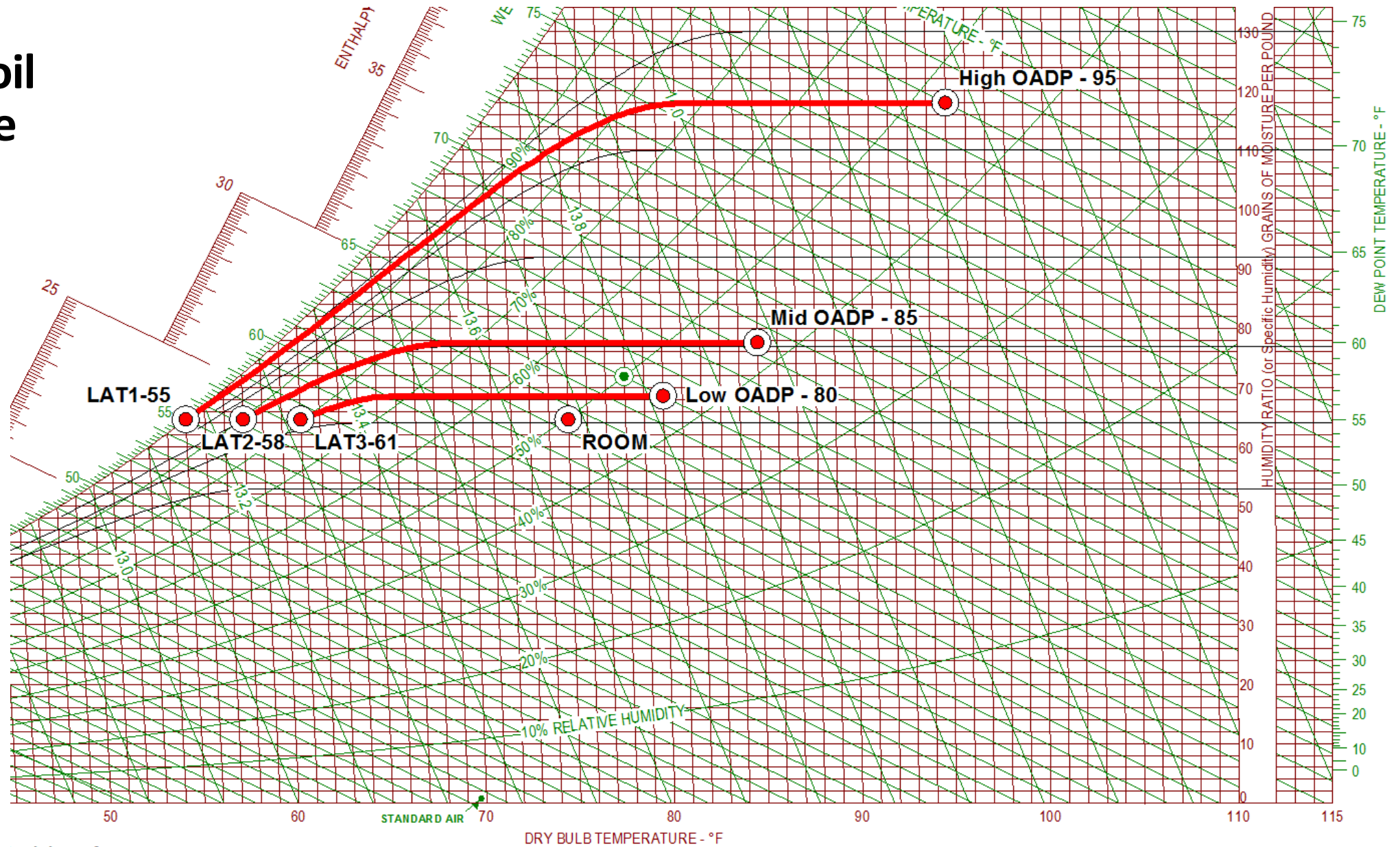
Building Optimization



The Foundation of the Optimization

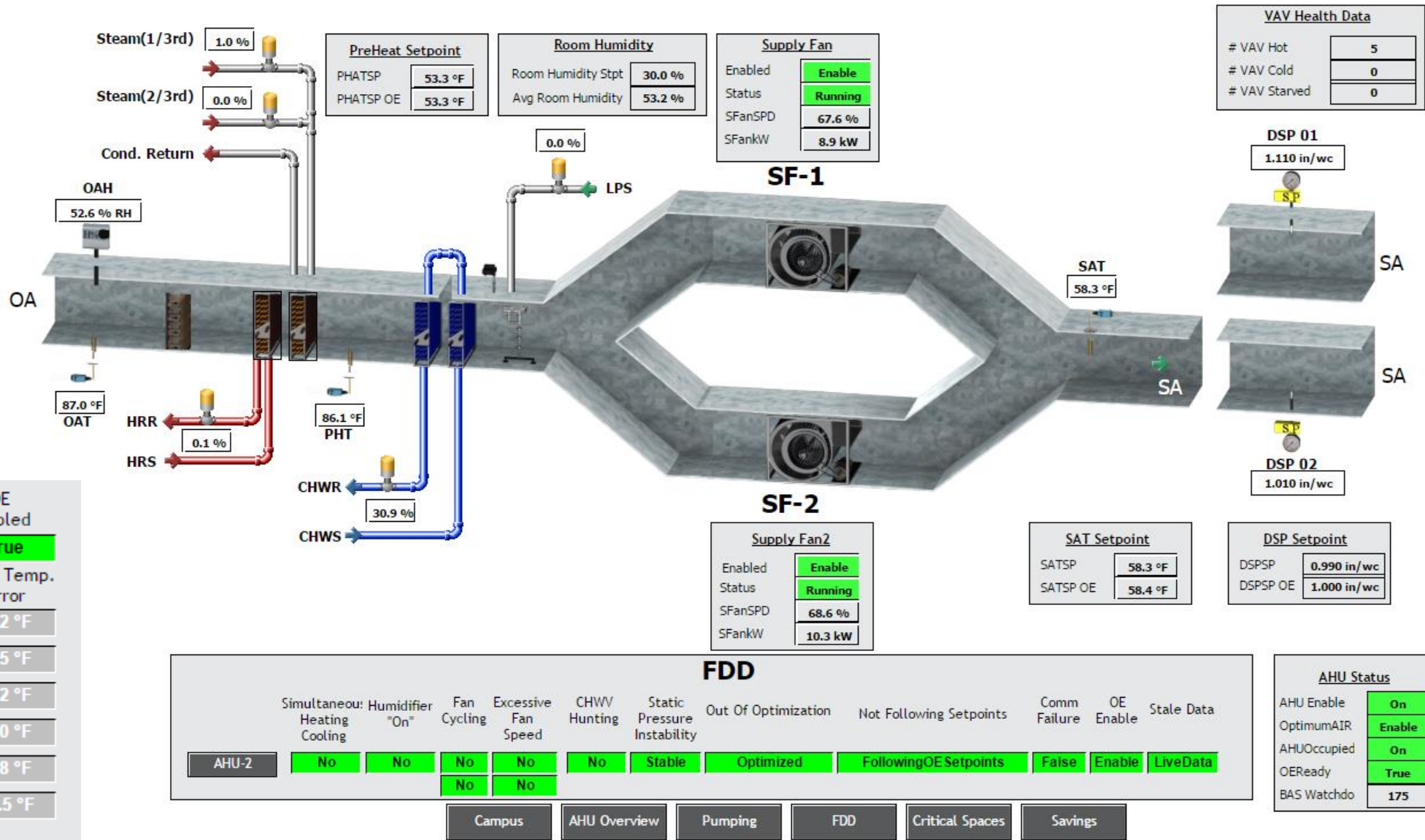


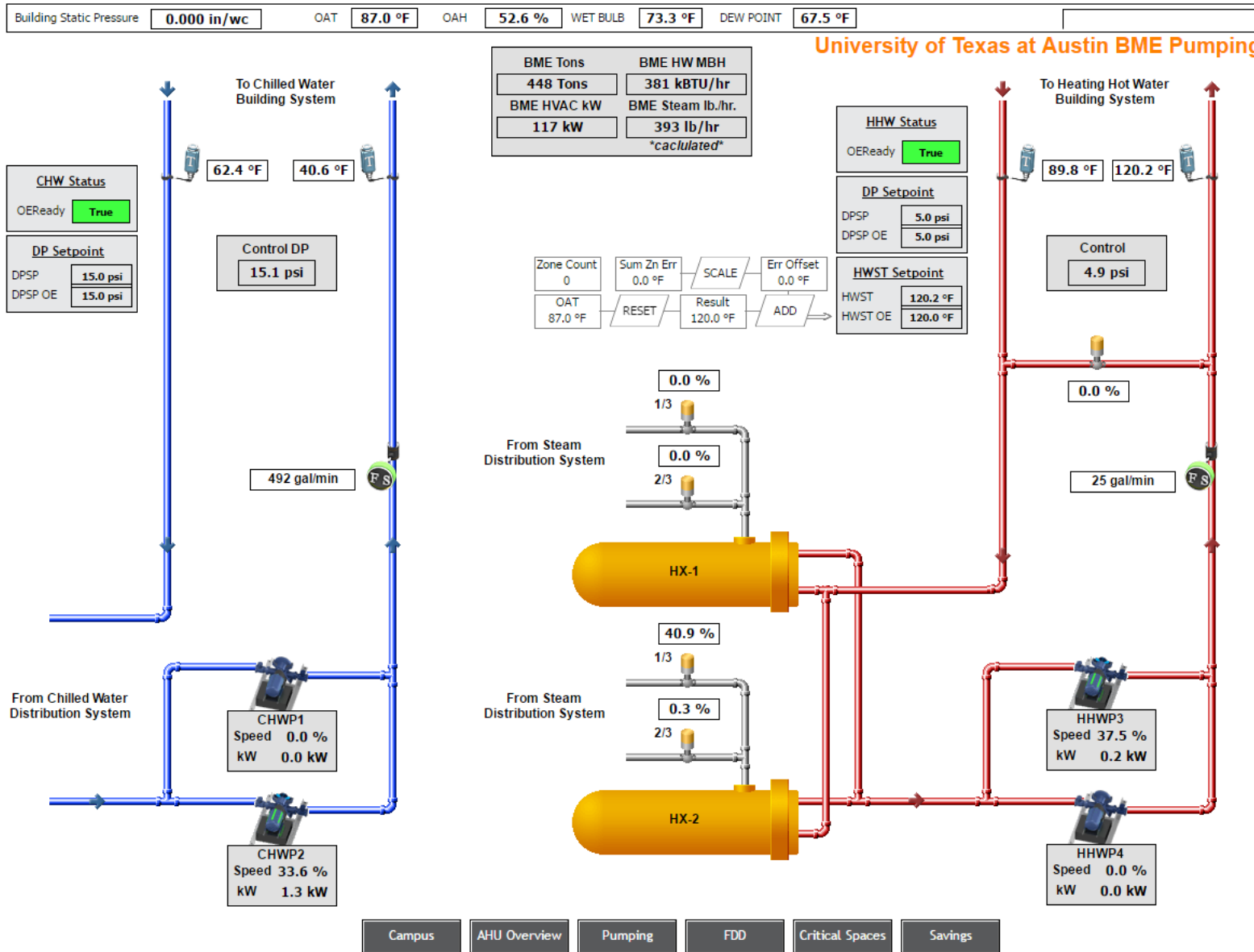
Dew-Point Reset and coil performance



Lab Unit

University of Texas at Austin BME AHU-2





Actual Savings to Date

Month	CHW (ton-hr)	CHW Savings (%)	STM (lb)	STM Savings (%)
Apr-17	56,973	25%	203,252	25%
Mar-17	63,375	22%	186,556	23%

*Plus 214,200 gallons of water saved at chilled water plants