

**UCDAVIS**

Facilities Management

# AVEVA PI at UC Davis

September 7, 2022



# UC Davis Overview

- 40k Students
- 24k Faculty & Staff
- 1000+ Buildings, ~250 over 10,000 SF
- 11.3M SF total; 5,300 acres Land
- Founded 1905, Average Building Age: >40 years



# Carbon Neutrality Initiative

UNIVERSITY OF CALIFORNIA Office of the President

Jobs People Search

HOME ABOUT ORGANIZATION INITIATIVES

Carbon Neutrality Initiative >

## Carbon Neutrality Initiative

OVERVIEW ORGANIZATION STUDENT INVOLVEMENT REPORTS RESOURCES

UC, a national leader in sustainability, has pledged to become carbon neutral by 2025, becoming the first major university to accomplish this achievement.

Global climate disruption is impacting the planet in ways never experienced in human history. Warmer temperatures are contributing to changing weather patterns that cause more intense storms and heavier rainfall in some places, while elsewhere drought is parching the land. Glaciers are melting at an accelerated rate and oceans are rising.

The overwhelming scientific consensus is that climate change is being driven by the release of carbon dioxide into the atmosphere, primarily from the burning of fossil fuels.

The University of California has responded to this growing environmental crisis with direct action aimed at ending its reliance on fossil fuels.

In November 2013, [President Janet Napolitano announced the Carbon Neutrality Initiative](#), which commits UC to emitting net zero greenhouse gases from its buildings and vehicle fleet by 2025, something no other major university system has done.

The initiative builds on UC's pioneering work on climate research and furthers its leadership on sustainable business practices. UC is improving its energy efficiency, developing new sources of renewable energy and enacting a range of related strategies to cut carbon emissions.



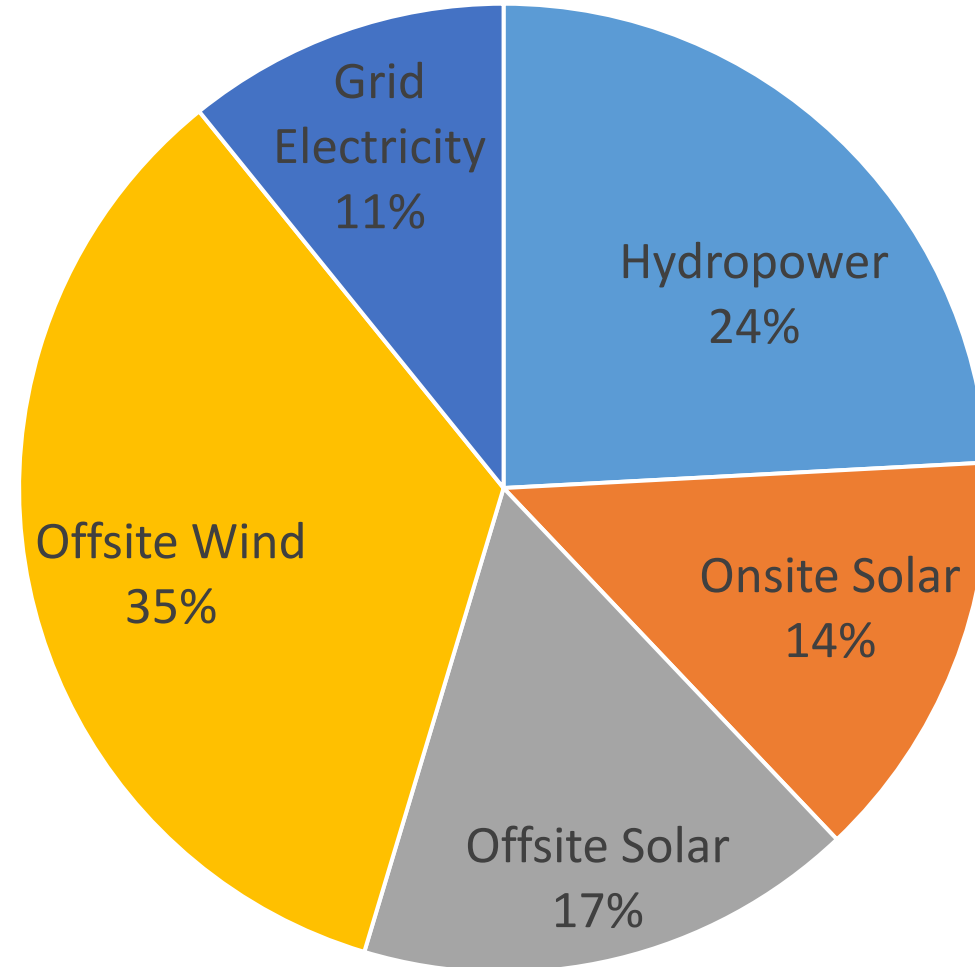
*"We are the University of California, and there is no reason that UC can't lead the world in this quest, as it has in so many others."*

— UC President Janet Napolitano



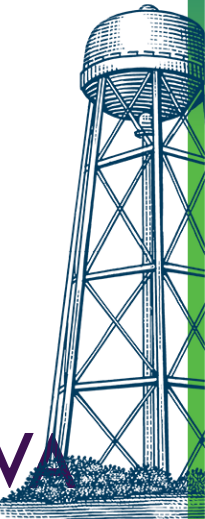
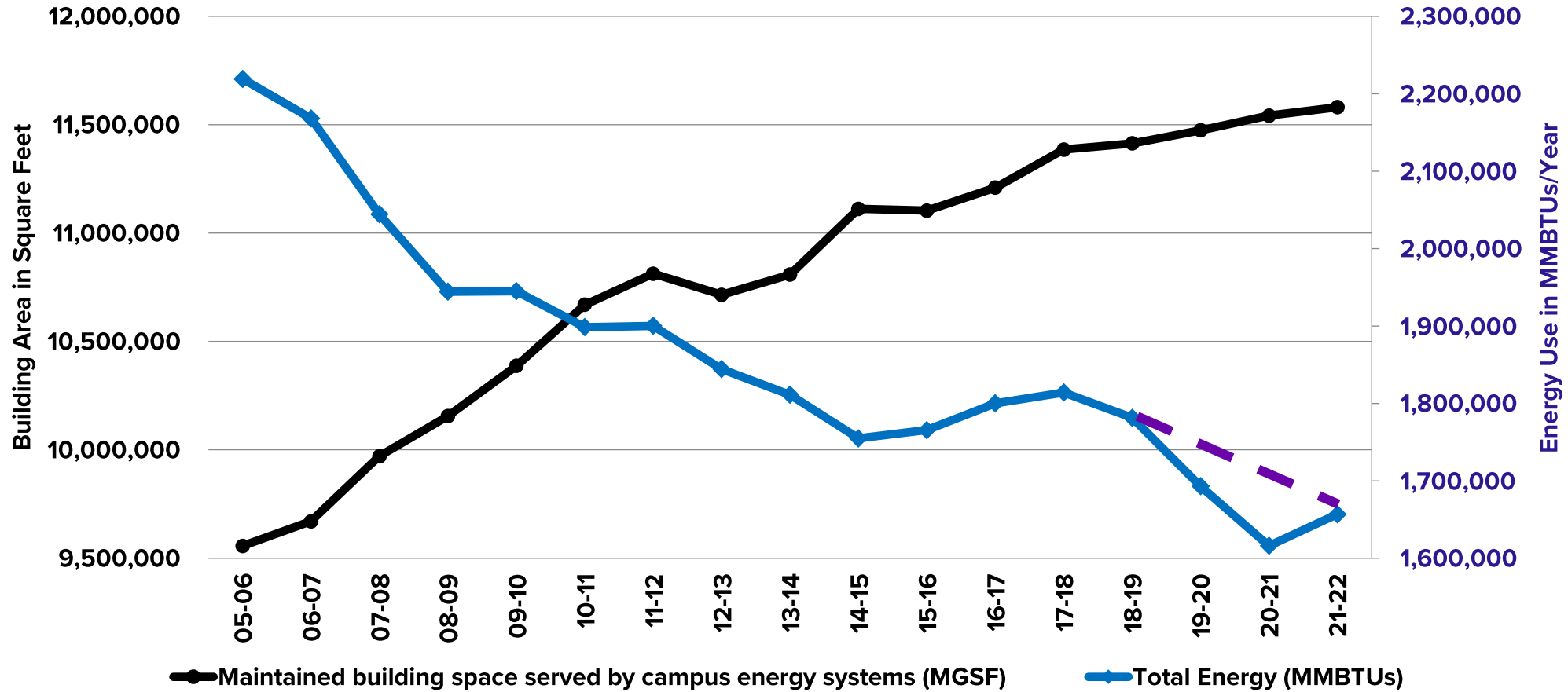


# Renewable Electricity (CY 2019)

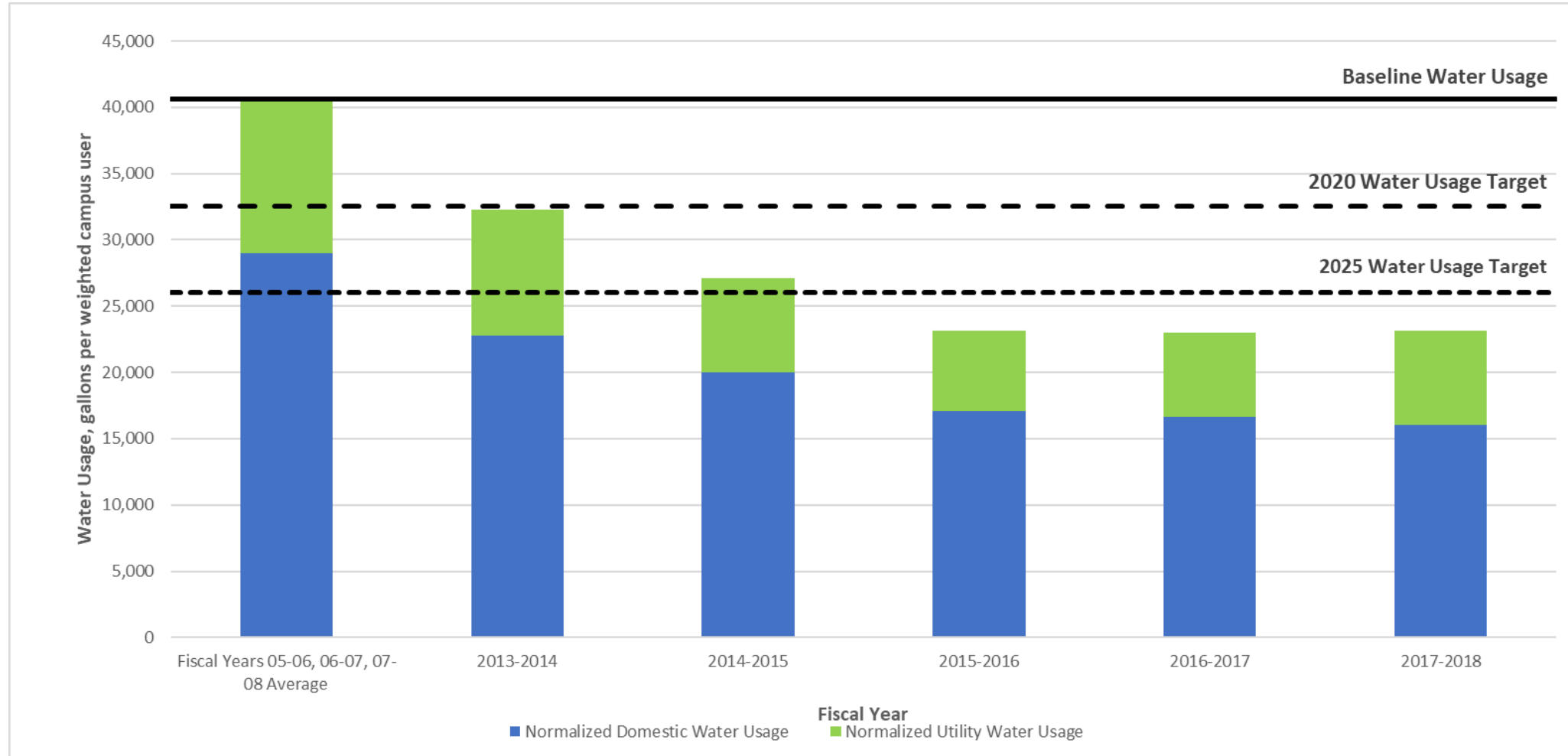


# Energy Savings

Recent on-Campus Energy Use & Building Space

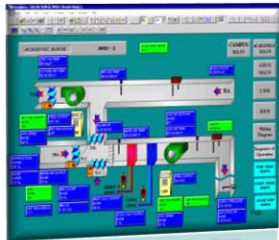


# Water Savings Results



# “Hub” for Smart City Data

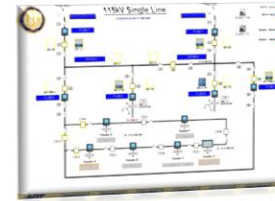
Building Utility  
Metering



HVAC Operations  
& Smart Thermostats



Interior Lighting &  
Occupancy



Substation  
Metering

Heating & Cooling  
Plant Operations



Water & Wastewater  
Operations

Exterior Lighting  
Controls

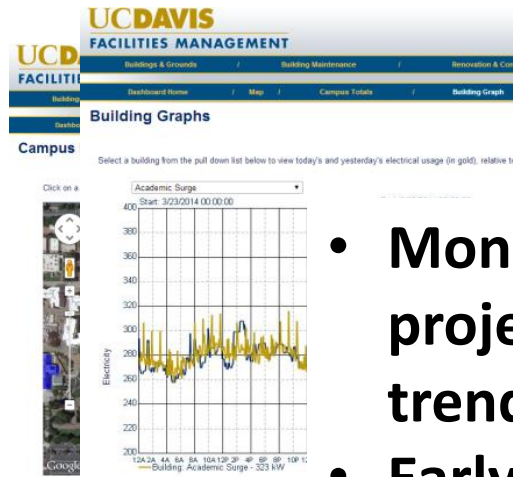


Building Level

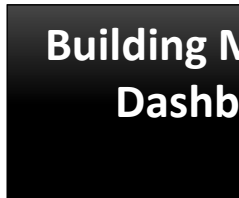
Campus Level



# Early Progress



Frequently Asked Questions list about the Utilities Consumption Dashboard.  
There is an ongoing effort to install meters and connect them.



2007

- Monitoring, tracking project outcomes, trending
- Early user engagement
- Plant operational and performance metrics

2010

2012

2014

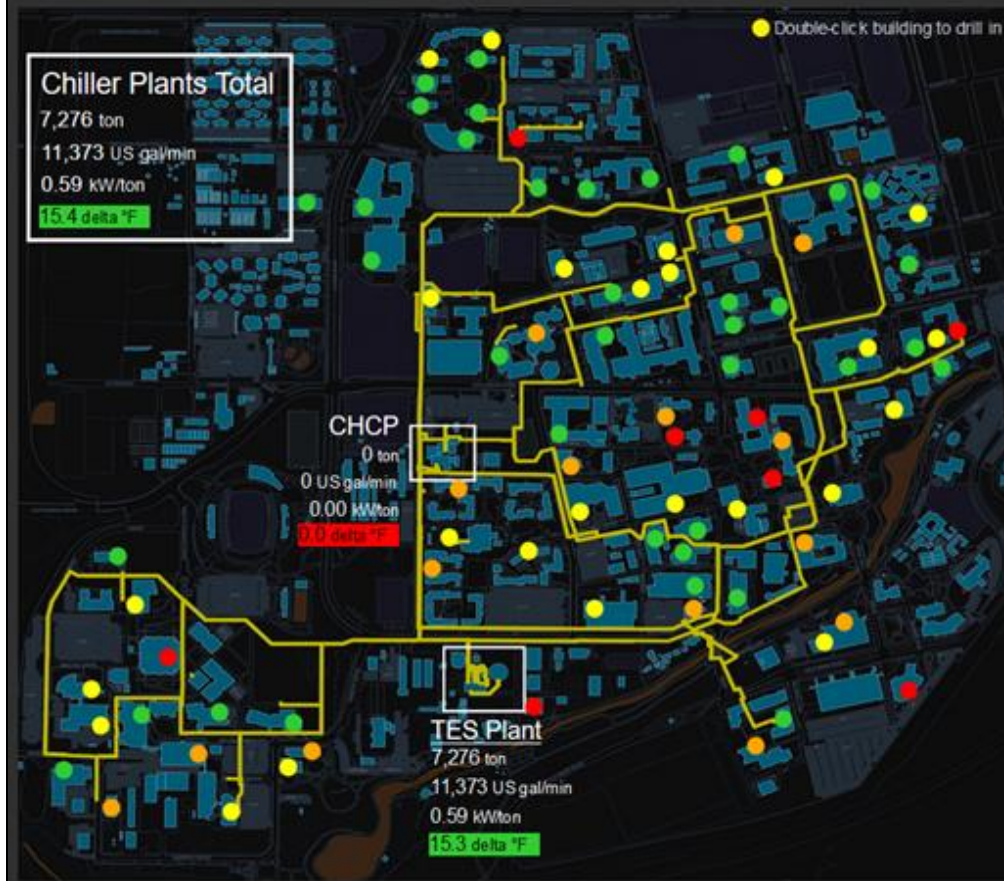




# Building CHW Utilization

## Chilled Water Utilization

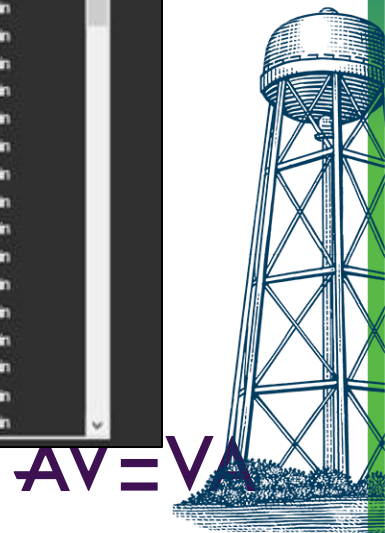
10/18/2019 2:39:30 PM



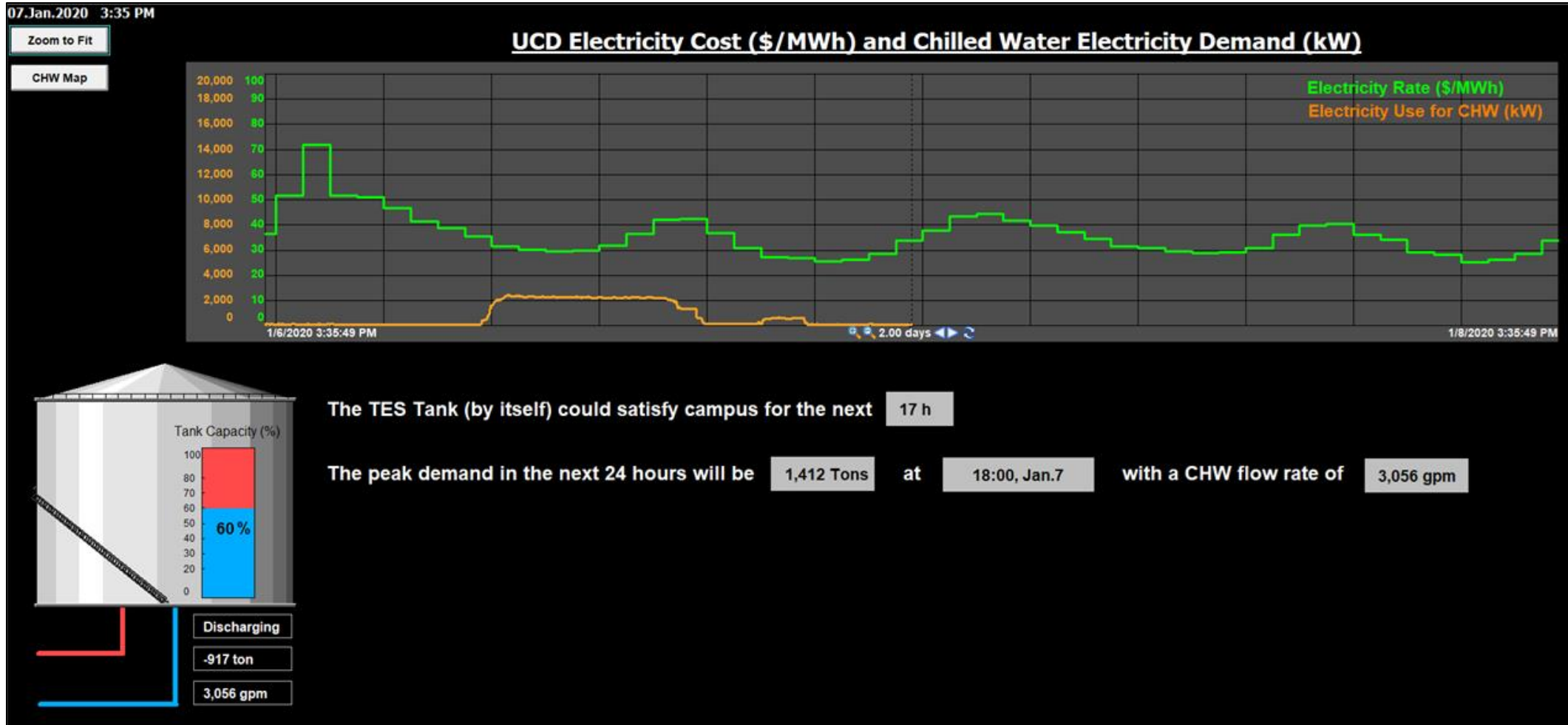
Chilled Water Utilization	Heat (tons)	Heat (% of Total)	Flow (gpm)	Flow (% of Total)
$\Delta T < 5^\circ\text{F}$	10	0 %	420	4 %
$\Delta T = 5 - 10^\circ\text{F}$	815	11 %	2,548	22 %
$\Delta T = 10 - 15^\circ\text{F}$	1,318	18 %	2,520	22 %
$\Delta T > 15^\circ\text{F}$	2,752	38 %	2,911	26 %
$\Delta T$ unknown	2,287	29 %	2,809	22 %

### Building Performance Double-click building name to drill in

Academic_Surge_Building	24.4 delta °F	97 ton	93 US gal/min
Activities_and_Recreation_Center	23.7 delta °F	232 ton	234 US gal/min
Ann_E_Pitzer_Center	16.7 delta °F	8 ton	12 US gal/min
Art_Music_&_Wright	10.4 delta °F	2 ton	4 US gal/min
Asmundson_Hall	14.3 delta °F	32 ton	53 US gal/min
Bainer_Hall	12.9 delta °F	16 ton	30 US gal/min
Briggs_Hall	9.8 delta °F	88 ton	217 US gal/min
California_Hall	11.1 delta °F	3 ton	7 US gal/min
Center_for_Companion_Animal_Health	11.7 delta °F	88 ton	180 US gal/min
Central_Cage_Wash	17.0 delta °F	22 ton	30 US gal/min
CFA_Administration_Building	10.1 delta °F	11 ton	27 US gal/min
CFA_Mondavi	7.7 delta °F	131 ton	403 US gal/min
Chemistry	3.2 delta °F	0 ton	0 US gal/min
Chemistry_Annex	5.4 delta °F	36 ton	161 US gal/min
Cole_B	2.9 delta °F	0 ton	0 US gal/min
Cruss_Hall	22.0 delta °F	20 ton	22 US gal/min
Dutton_Hall	33.1 delta °F	41 ton	25 US gal/min
Earth_and_Physical_Sciences_Building	17.7 delta °F	131 ton	180 US gal/min
Genome_&_Biomedical_Sciences	11.5 delta °F	89 ton	186 US gal/min

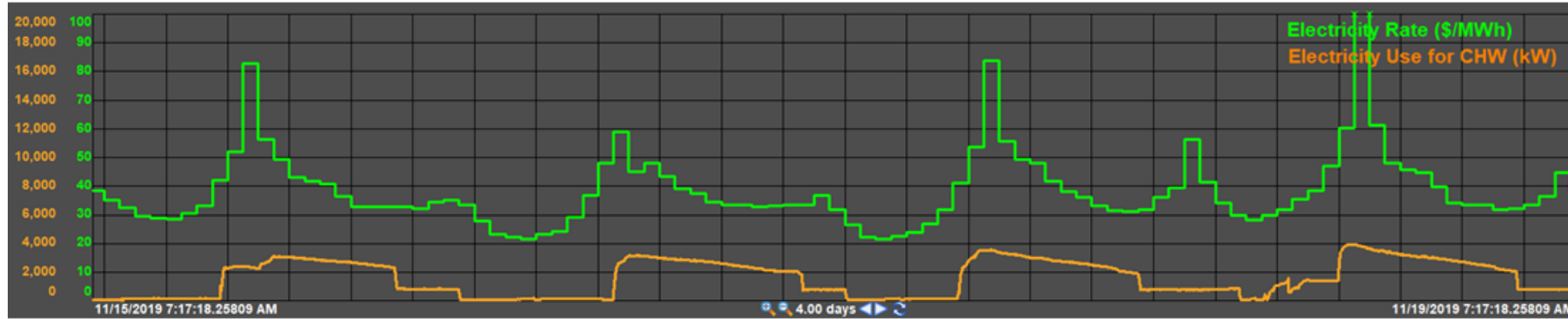


# Advanced Operator Feedback

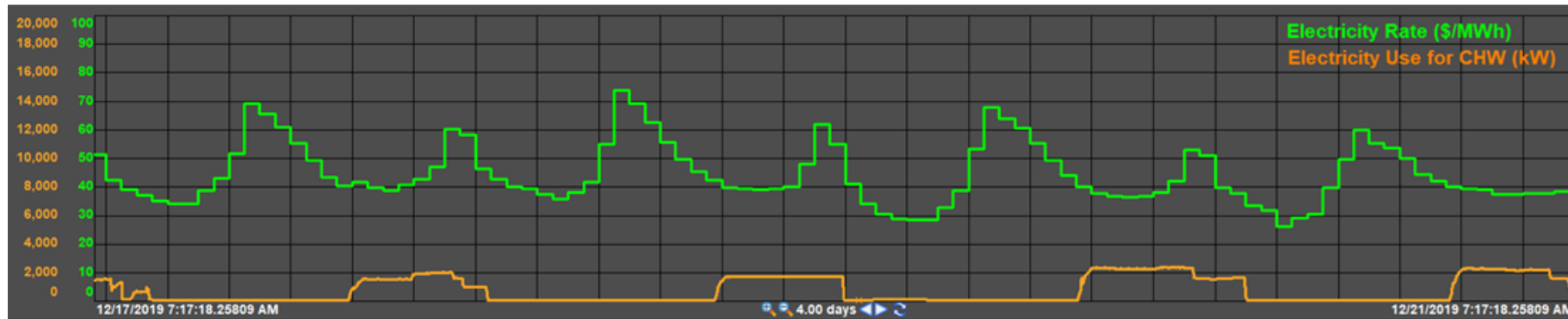


# Preliminary Chiller Dispatch

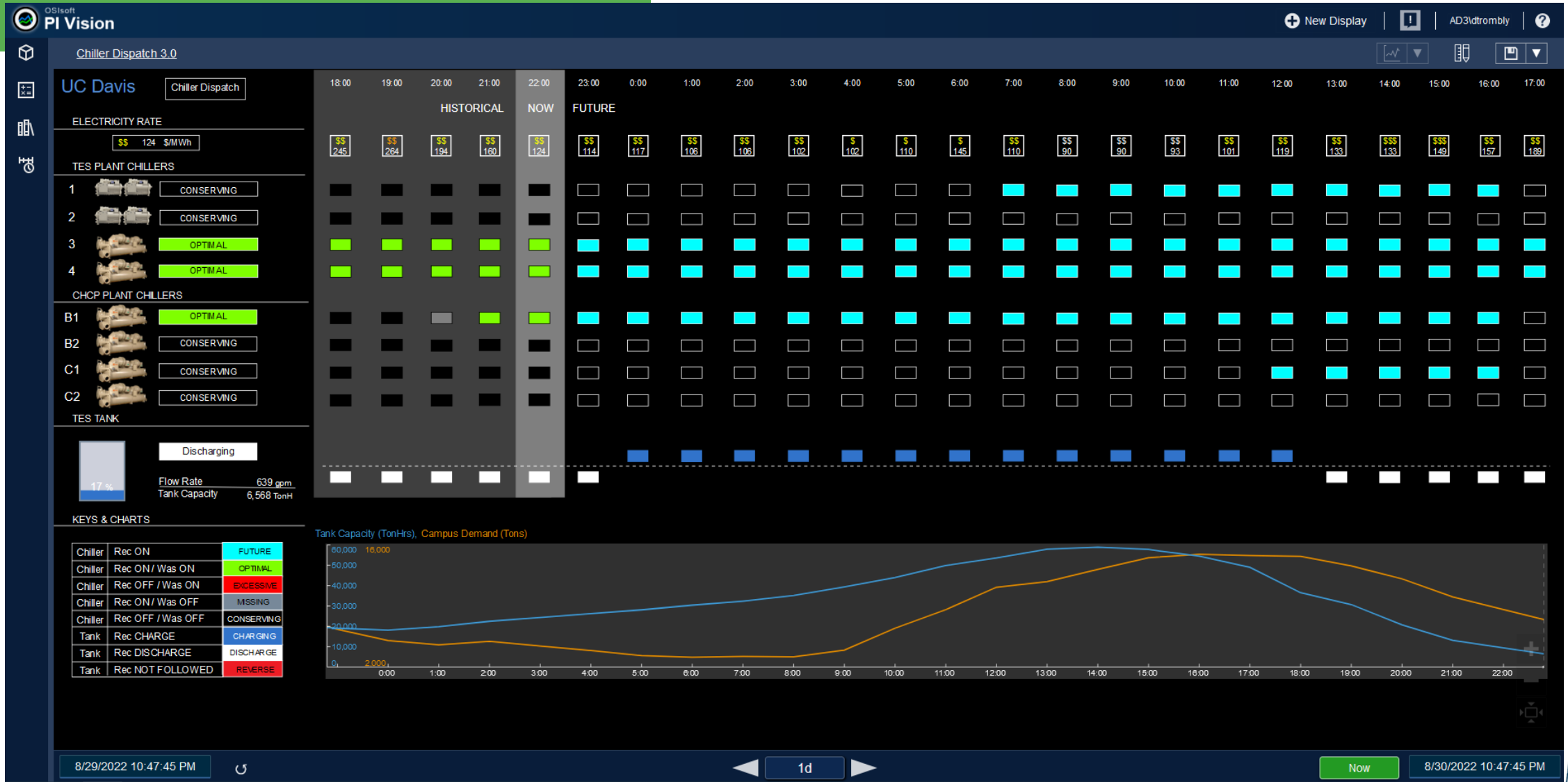
## Prior to Training



## Post Training



# CHW Optimization



Annual Savings: ~\$150,000





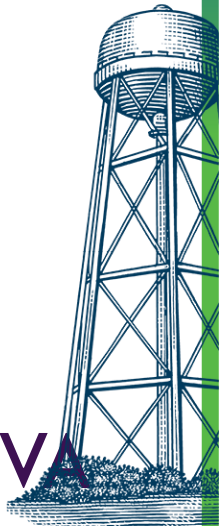
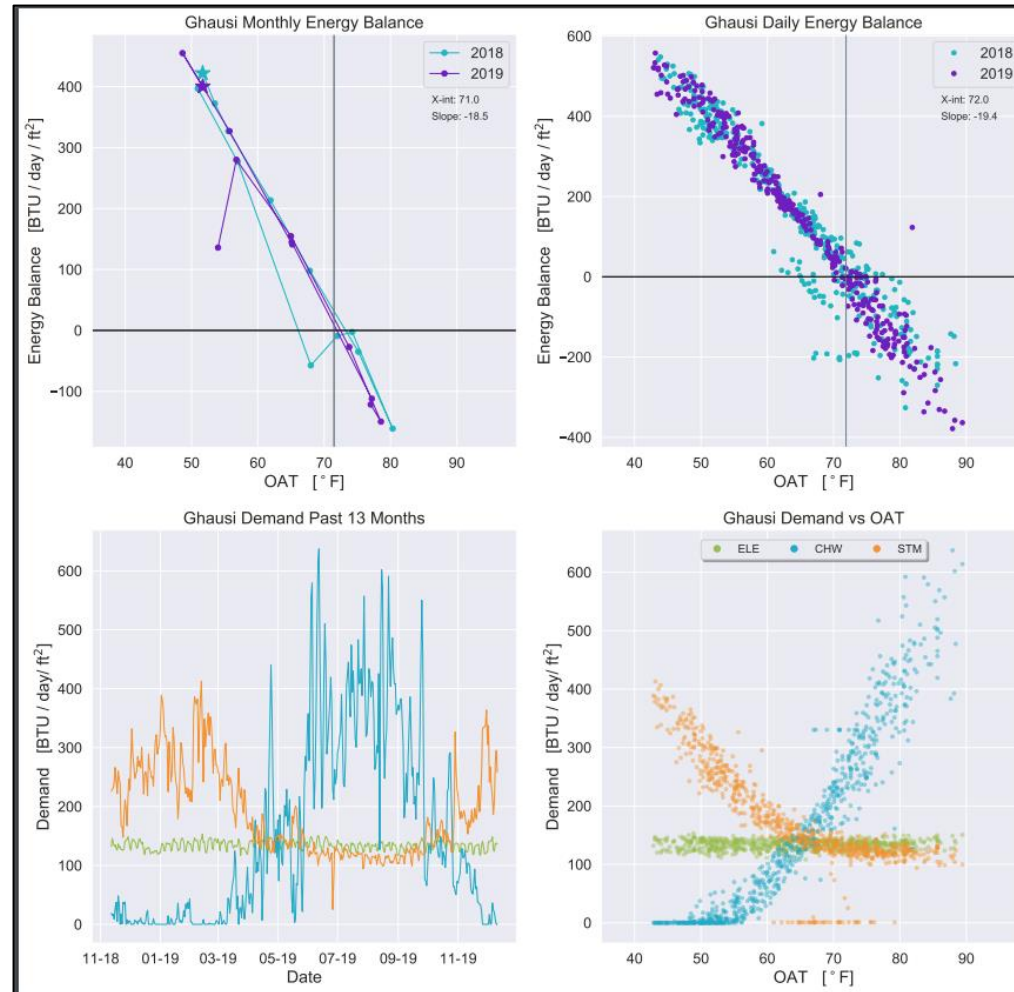
# Finding Opportunities/Verifying Savings

## Meter Quality

- Energy Balance:

$$\text{Electricity} + \text{Steam} - \text{CHW} = 0$$

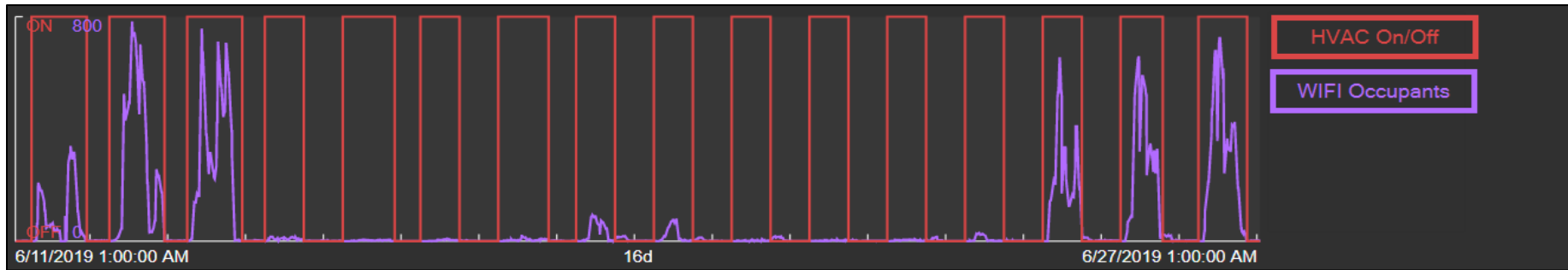
Utility Issues		
Name	Commodity	Building
STATUS: Investigation Count 12		
1 Primate CCM Steam	Steam/Condensate	Center for Comparative Medicin
5 RMI North South Sensory steam baseload high	Steam/Condensate	RMI North
3 SCC Student Community Center Condensate Increase	Steam/Condensate	Student Community Center
4 Sprocket high condensate baseload	Steam/Condensate	Sprocket Building
5 Bainer Condensate intermittent issues	Steam/Condensate	Bainer Hall
6 CCAH electricity	Electricity	Center for Companion Animal H
7 Dutton condensate	Steam/Condensate	Dutton Hall
8 Gourley condensate low	Steam/Condensate	Gourley Clinical Teaching Cente
9 Hunt condensate low	Steam/Condensate	Hunt Hall
10 Segundo Regan	Steam/Condensate	Regan
11 Sproul condensate	Steam/Condensate	Sproul
12 Cole B	Steam/Condensate	Cole B



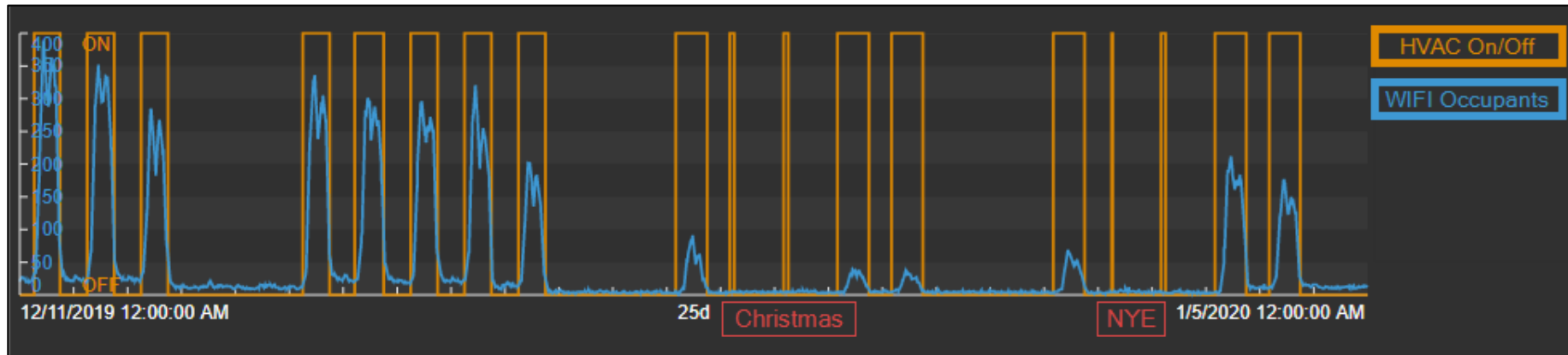


# WiFi/Schedule Alerting

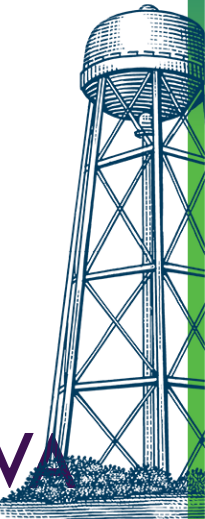
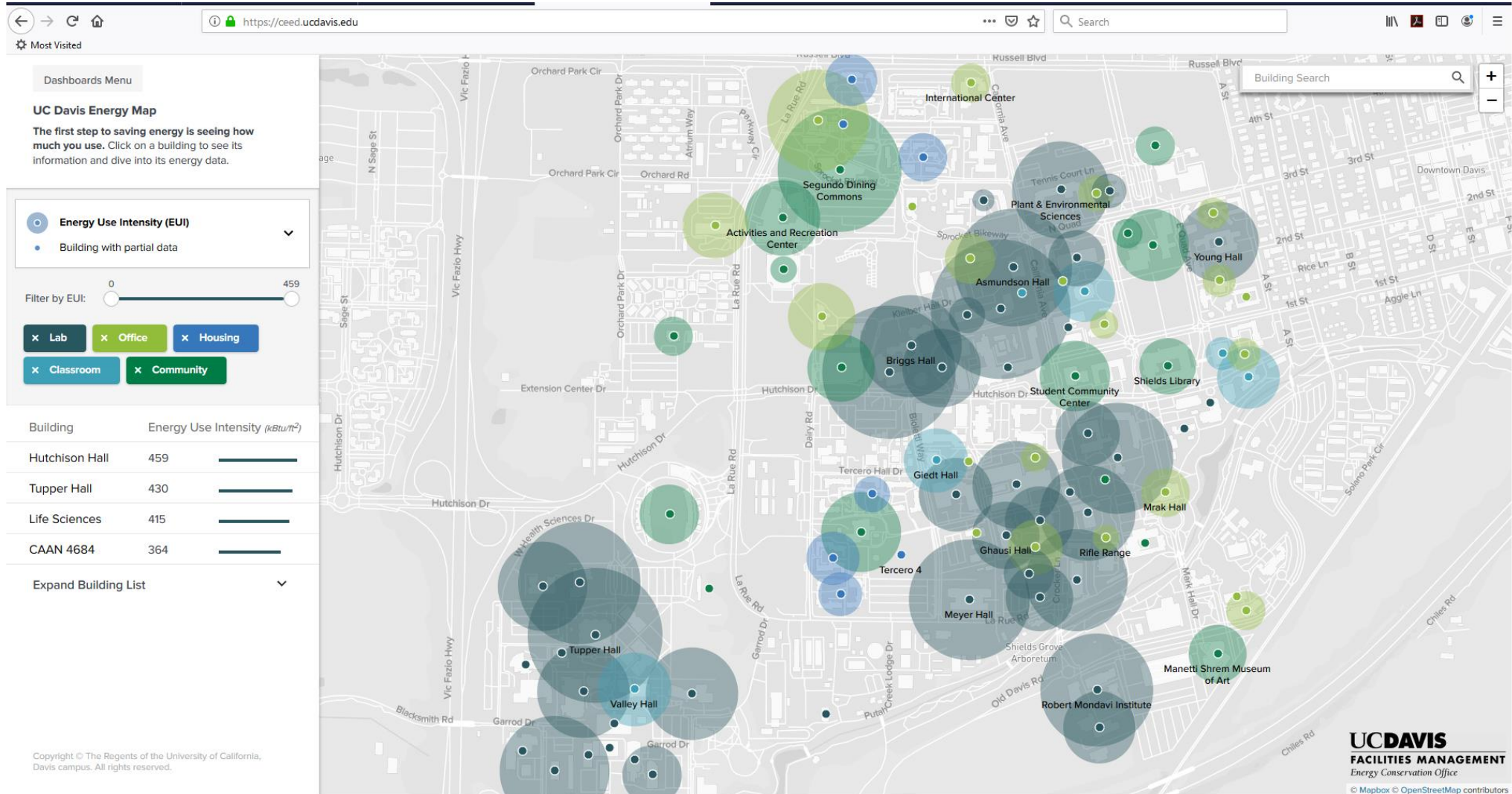
Bad:



Good:



# Energy Feedback: [ceed.ucdavis.edu](https://ceed.ucdavis.edu)



# Energy Feedback: ceed.ucdavis.edu

Building Type:

**Lab**

Meyer Hall

Energy Use Intensity:

**346 kBtu/ft<sup>2</sup>**

Annual

**75,256.0**

DEMAND
USAGE
COMPARISON
ACE-SAVINGS

