University of Utah Campus Energy Efficiency Project

How the University solved chiller plant capacity needs

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University of Utah by the Numbers

32,760 Total University Enrollment



1,535 Acres of University-Owned Land

Chilled Water

Plants

>500 Buildings

15MM Square Feet

High-Temperature Hot Water Plants

CampusEnergy2020





Utah Health Science Campus Transformation Project









Master Plan







Long-Term Cost Difference

First Cost 40 Year NPV \$50,000,000 \$39,300,000 \$40,000,000 \$30,384,000 \$30,000,000 \$30,000,000 \$20,000,000 \$10,000,000 \$-\$(10,000,000) \$(20,000,000) \$(30,000,000) \$(40,000,000) \$(40,000,000) \$(50,000,000)

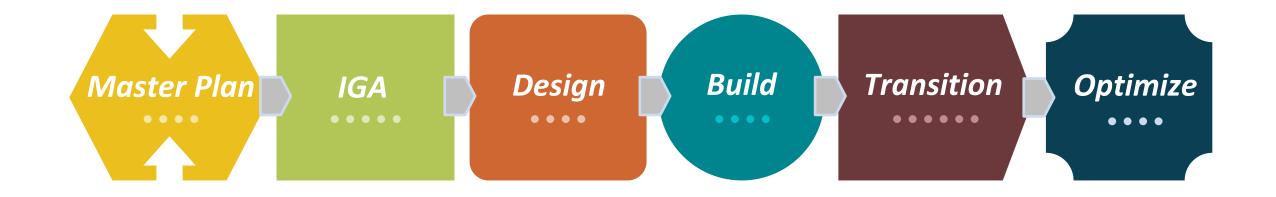
Central Plant Addition
Conservation Measures







Scope of Work









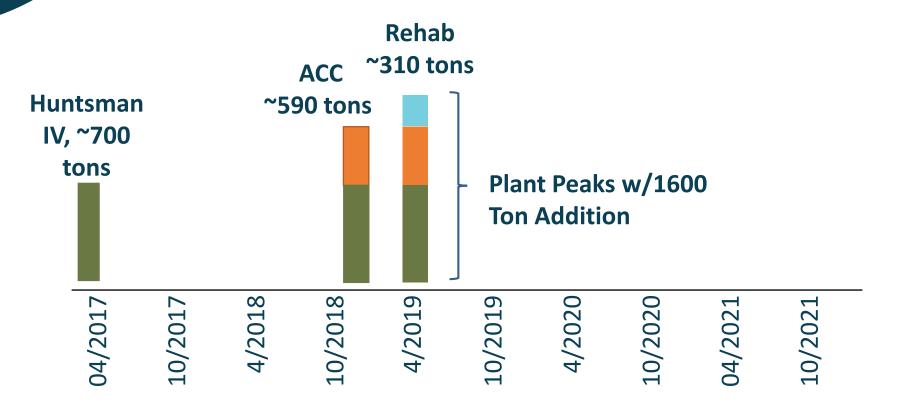
Solutions







Transformation Project Impact Timeline









Conservation Strategies

400 to 600 Ton Load Reduction with Evaporative Cooling on Lab AHUs with 100% OA

200-300 Ton Load Reduction with Lab Fume Hood VAV Retrofit with Occupancy Sensor

700 to 1100 Ton Capacity Increase on Central Plant







Improving Plant Delta T

Installed 82 HW and CHW precision control valves that account for more than 85% of the design capacity of the East Plant







Valves will measure CHW delta T and flow at each coil providing valuable data for analytics





Direct Evaporative Cooling



12 Fan Arrays



4 Evaporative Cooling Systems







Indirect Evaporative Cooling



- Installed 1 new cooling tower
- Rebuilt 1 cooling tower
- Installed new indirect cooling coils









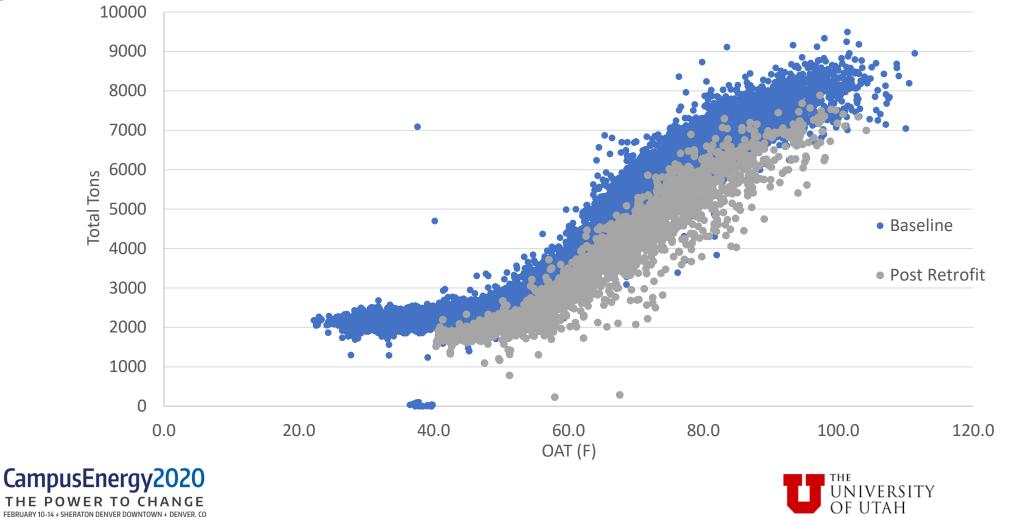
Results





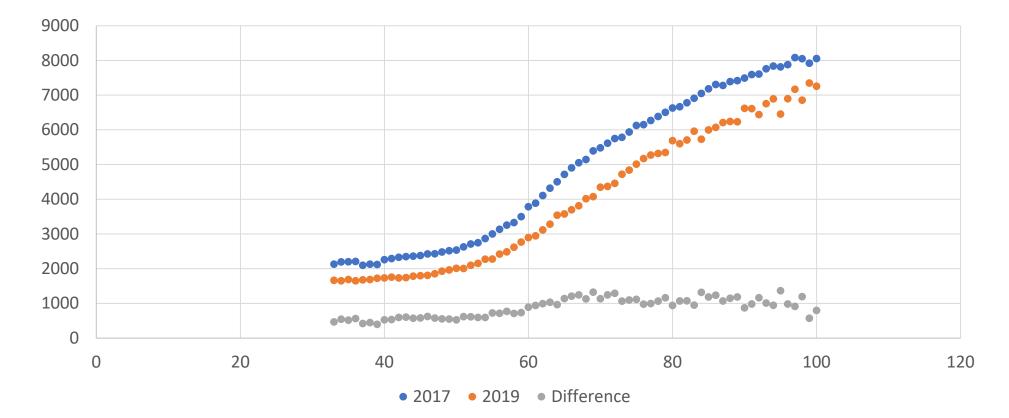


East Plant Load as a Function of OAT





East Plant Load as a Function of OAT

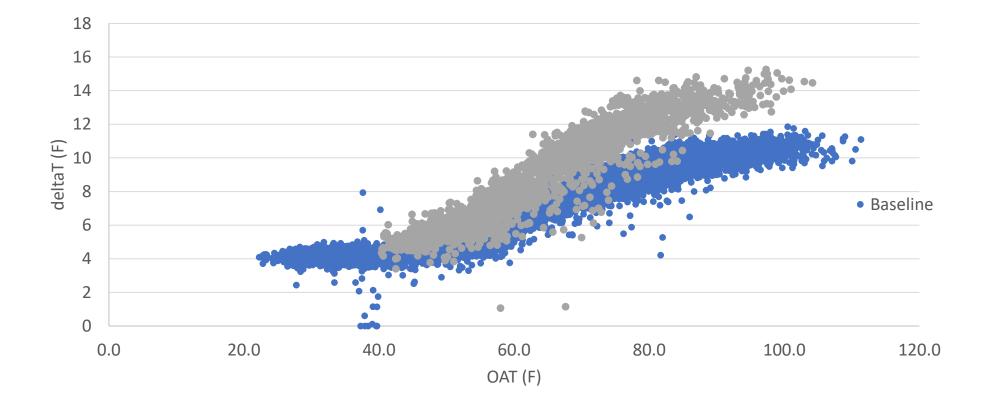








East Plant DeltaT as a Function of OAT



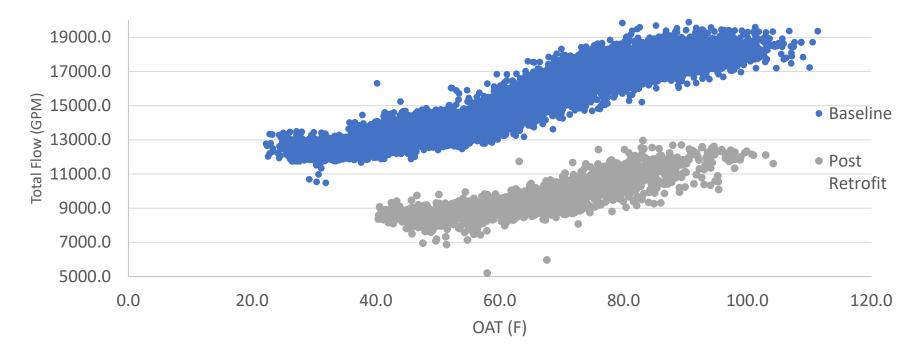






East Plant Flow as a Function of OAT

University of Utah Health Science Campus Chiller Plant Secondary Loop Flow

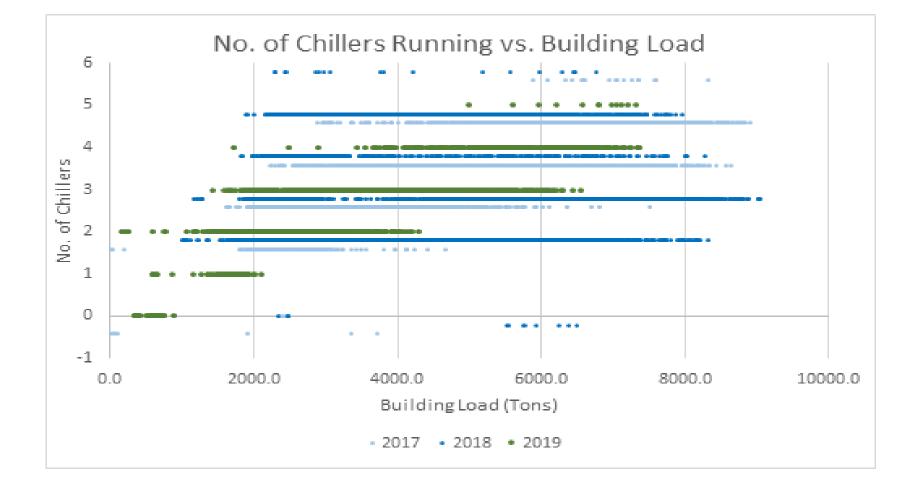








East Plant Chillers vs. Building Load









University of Utah Healthcare Campus



East CHW Plant







Persistence







Campus Performance

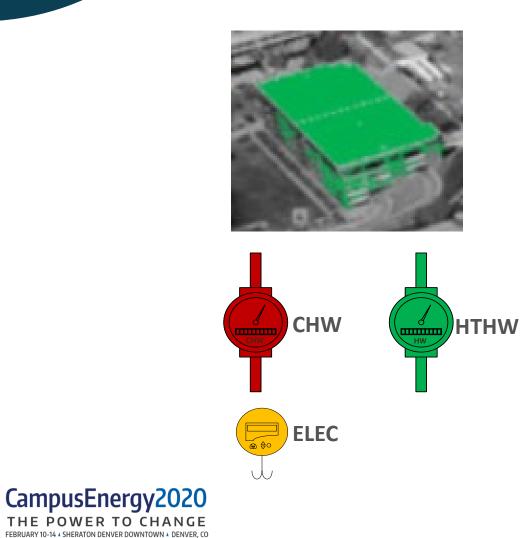


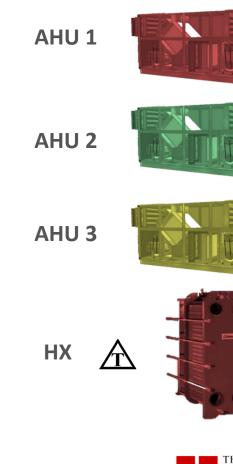






Building Performance











Equipment Performance



High KW / RPM

CampusEnergy2020 THE POWER TO CHANGE FEBRUARY 10-14 + SHERATON DENVER DOWNTOWN + DENVER, CO Very High BTUs / OAT (Evap. Not Working) OK







Thank You!

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