



OpenBlue

OpenBlue Central Utility Plant (CUP) Optimization

Illinois Green Alliance Getting to Zero Tech Forum

Sept. 23, 2026

Kate Anderson

OpenBlue
Enterprise Manager





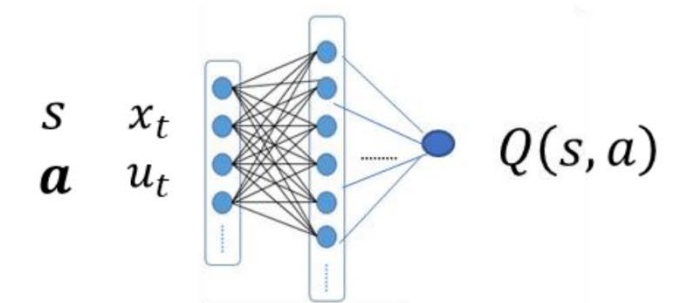
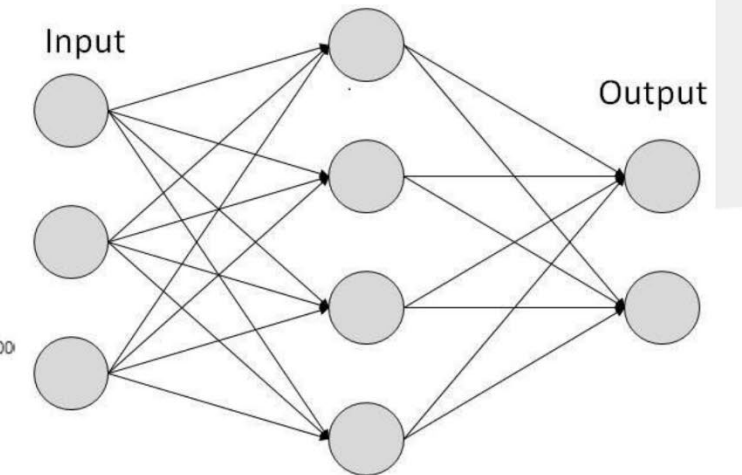
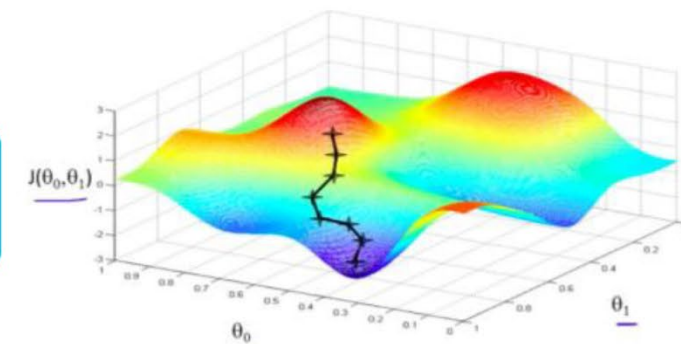
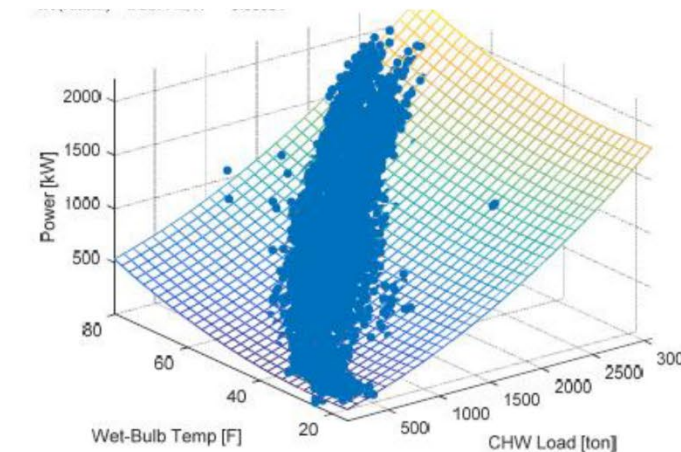
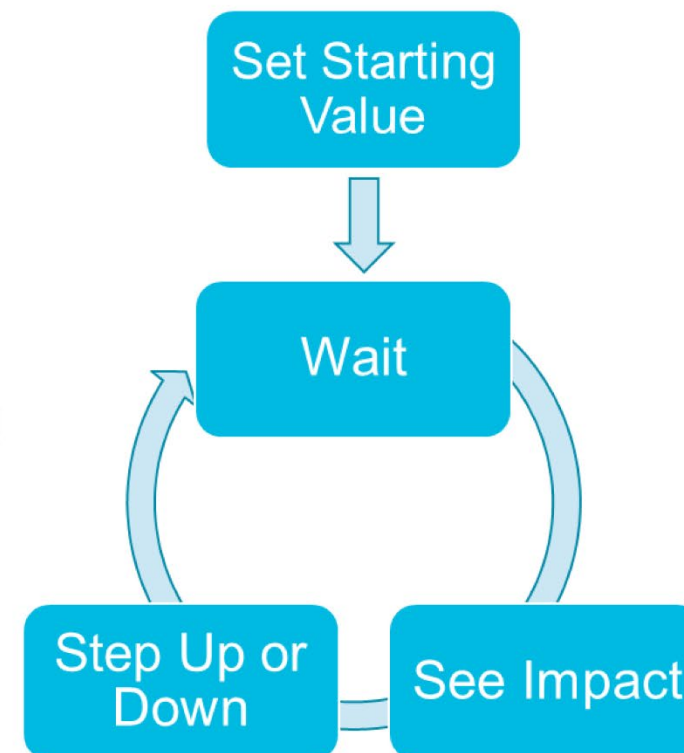
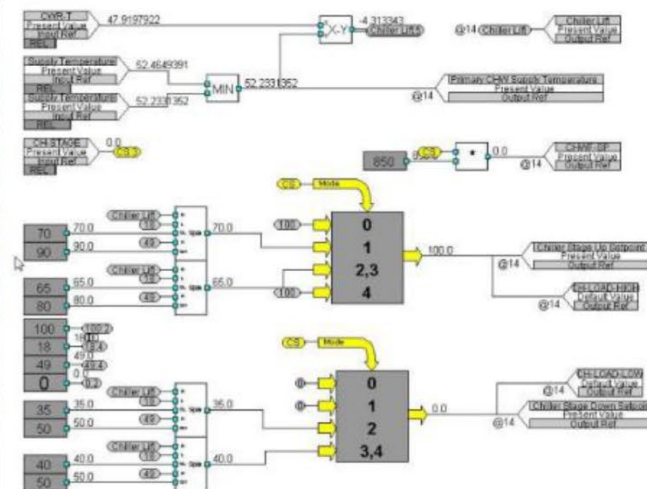
Variety of approaches used for minimizing central plant utility costs today

Manual Control
by Experts with
“tribal
knowledge”

Custom Logic/
Advanced
Sequences in
Plant Automation
System

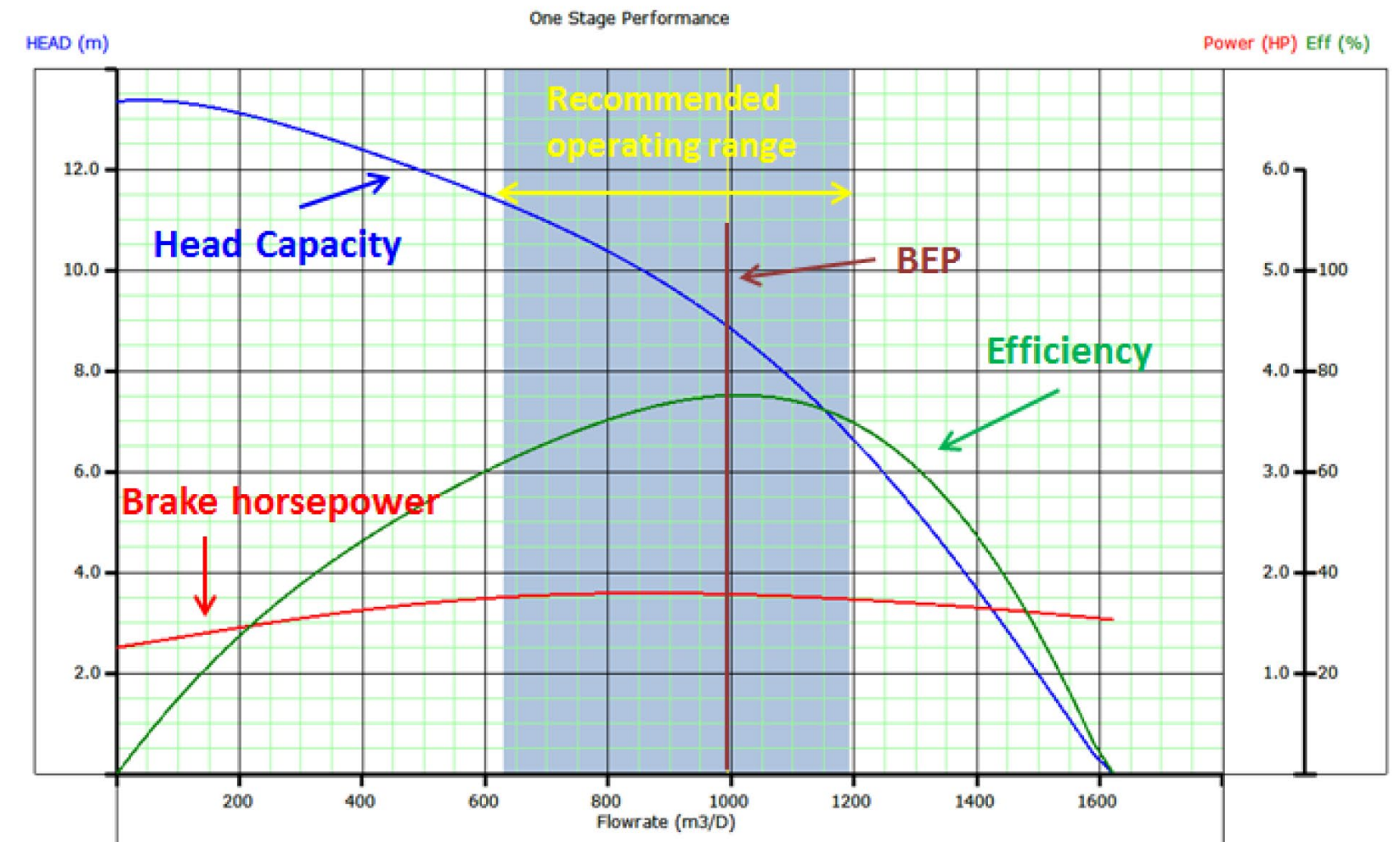
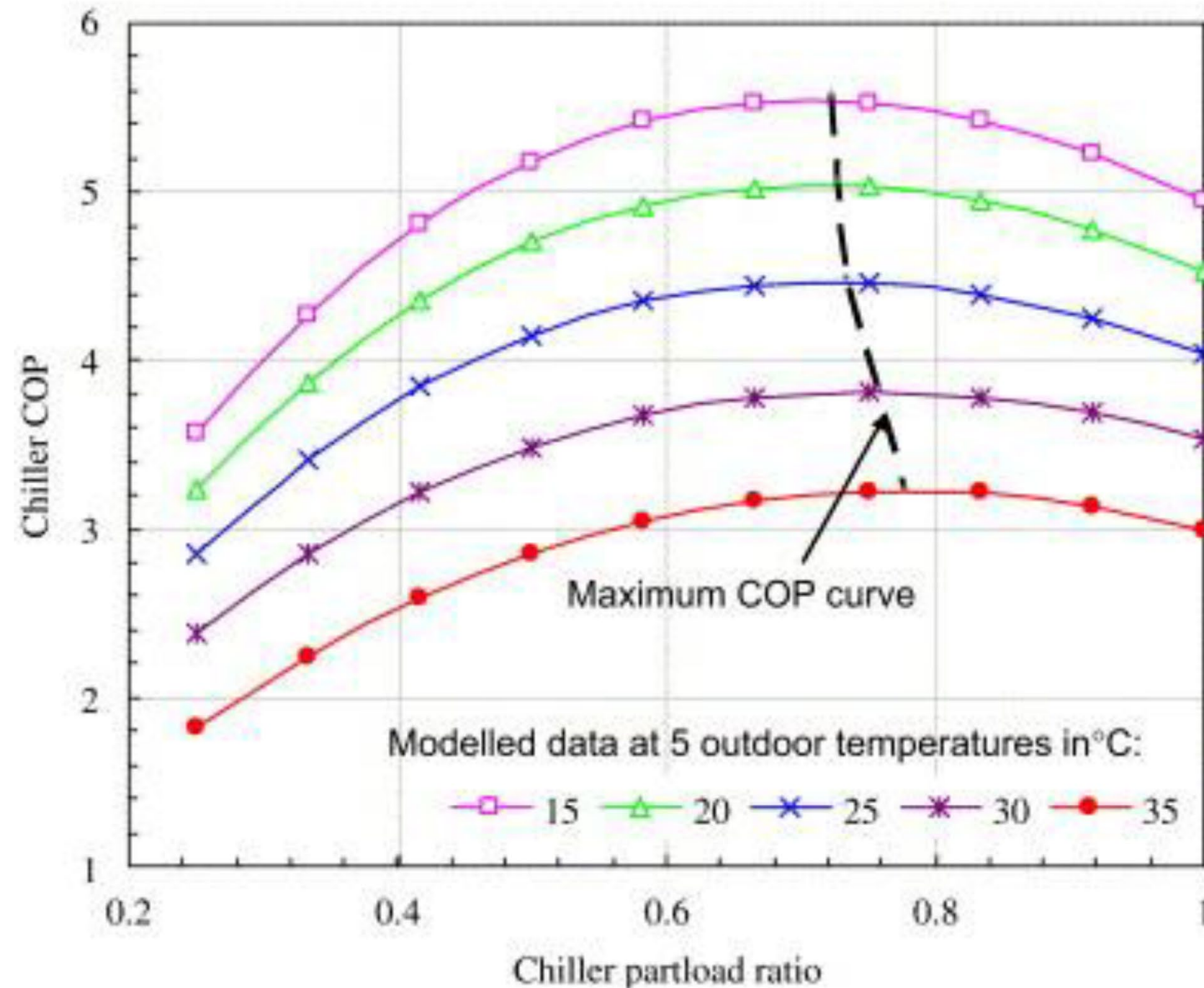
Step and Wait
Auto-Adaptive
Processes

Model-Based Mathematical
Optimization
with Machine Learning
+ Fault Detection & Diagnostics



*JCI – OpenBlue CUP

Chiller and Pump Performance Curves



Now think about managing these when your plant has 4, 5, 6, 7, or 8 chillers!

Current balance due
\$6,058.27

Pay By
01/04/21

MINA MILLER

Account Number: 99-9999-9999-9999-9

Service delivered to: 25-257 PEARL STREET

Next meter reading date: Monday, Jan 11, 2021

Your Bill Breakdown

\$

Last billing period

Avoid estimated bills - please give us access to read your meter.

Your billing summary as of Dec 10, 2020

Your previous charges and payments

Total charges from your last bill

Payments through Dec 8, thank you

Balance from previous bill

None

Your new charges

Billing period: Nov 05, 2020 to Dec 09, 2020

Electricity charges - for 34 days

\$6,058.27

Total from this billing period

\$6,058.27

Total amount due

\$6,058.27

Payment is due upon receipt of this bill. To avoid a late payment charge of 1.5%, please pay the total amount due by Jan 4, 2021.

Name: MINA MILLER

Account number: 99-9999-9999-9999-9

Page 2 of 2

Your electricity breakdown

Rate: EL9 General Large

Electric Meter Detail - billing period from Nov 05, 2020 to Dec 09, 2020 (34 days)

Meter #	New Reading	Reading Type	Date	Prior Reading	Reading Type	Date	Reading Diff	Multiplier	Total Usage
007250955	83853	Estimated	Dec 09, 20	83403	Estimated	Nov 05, 20	450	80	36,000 kWh
Total Estimated Demand Use									62.40 kW

Your Supply Charges

Energy supply 36,000 kWh @4.5558¢/kWh

\$1,640.10

Demand supply 62.4 kW @\$8.1713/kW

\$509.89

Merchant function charge

\$40.29

GRT & other tax surcharges

\$52.71

Total supply charges

\$2,242.99

Your total electricity supply cost for this bill is 6.2¢ per kWh. You can compare this price with those offered by energy services companies (ESCOs). For a list of ESCOs, visit [PowerYourWay.com](#) or call 1-800-780-2884.

Your Delivery Charges

Energy delivery 36,000 kWh @4.1941¢/kWh

\$1,509.89

Demand delivery 62.4 kW @ \$24.8136/kW

\$1,548.37

System Benefit Charge @0.5000¢/kWh

\$180.00

Billing and payment processing charge

\$1.28

GRT & other tax surcharges

\$81.90

Total delivery charges

\$3,321.44

Sales tax @8.8750%

\$493.84

Total sales tax

\$493.84

Your electricity total

\$6,058.27

Understanding your bill

Billing and payment processing charge:

This charge may be avoided by switching to an energy services company (ESCO).

Billing charges:

These charges are for the electricity you need (supply) and getting the electricity to you (delivery). Rates are based on a 30 day period. When your billing period is more or less than 30 days, we prorate your bill accordingly.

Demand/Energy delivery:

Charge for maintaining the system through which Con Edison delivers electricity to you.

Demand Supply:

Charge for the electricity supplied to you by Con Edison.

Energy Supply:

Charge for the electricity supplied to you by Con Edison.

GRT & other tax surcharges:

Taxes on Con Edison gross receipts from sales of utility services and other tax surcharges.

Merchant Function Charge (Electric):

Charge associated with procuring electricity, credit and collection related activities and uncollectible accounts.

Monthly rate adjustment:

Adjustment for miscellaneous costs and credits, and from October through May, for the effect of variation from normal weather.

Sales tax:

Tax collected on behalf of New York City.

System Benefit Charge (Electric):

The System Benefits Charge recovers costs associated with clean energy activities conducted by the New York State Energy Research and Development Authority (NYSERDA) and energy efficiency programs implemented by the Company.

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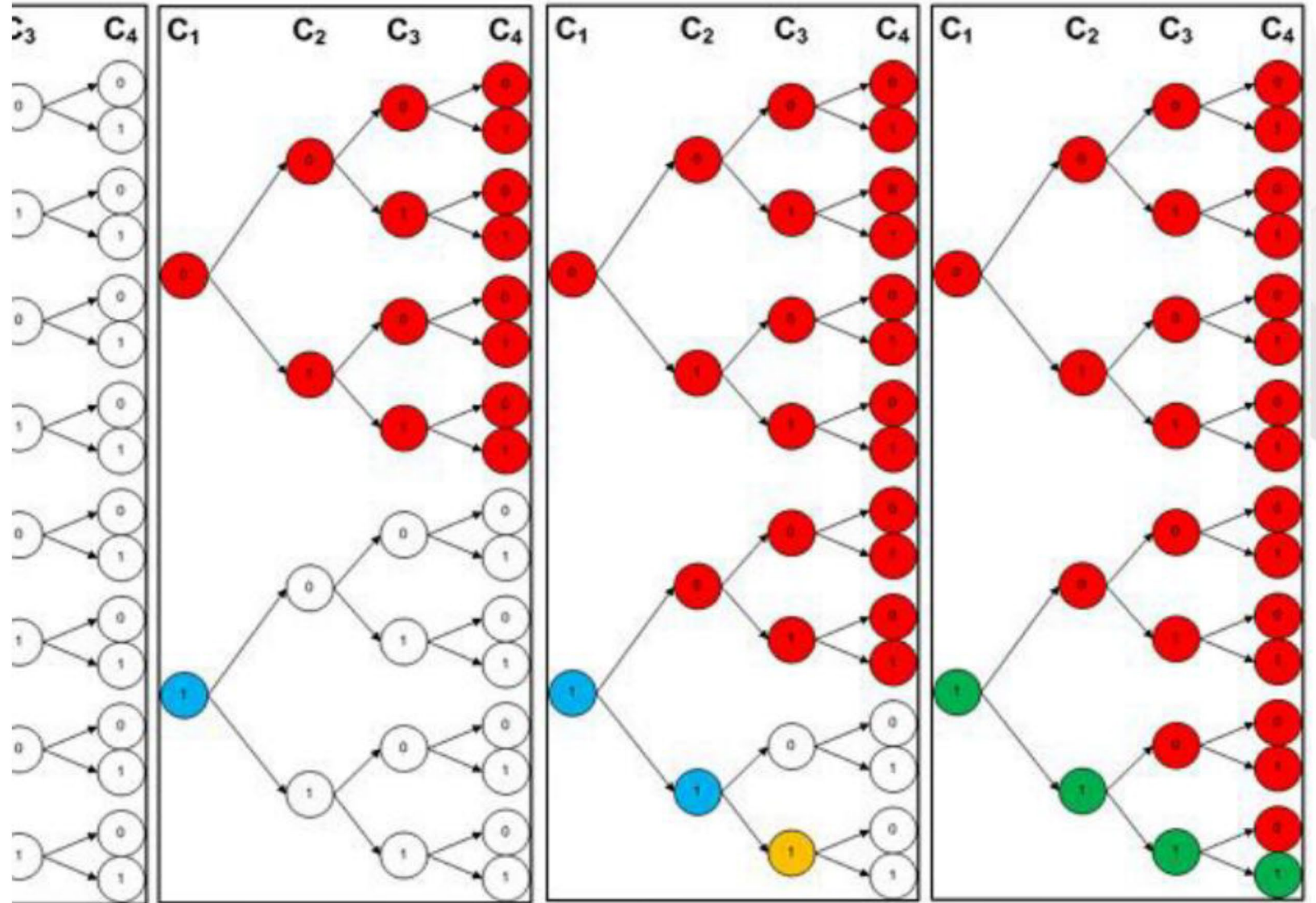
\$493.84

Your electricity total

\$6,058.27

Information Informing Central Plant Operations

- Required Cooling Load
- Required Heating Load
- Outdoor Air Temp
- Indoor Air Temp
- Chiller Constraints
- Pump Constraints
- Cooling Tower Constraints
- Chiller Performance Curves
- Pump Performance Curves
- Electric Utility Rates
- Natural Gas Utility Rates
- Equipment Availability
- Set point requirements
- Free Cooling
- Flow
- And more...

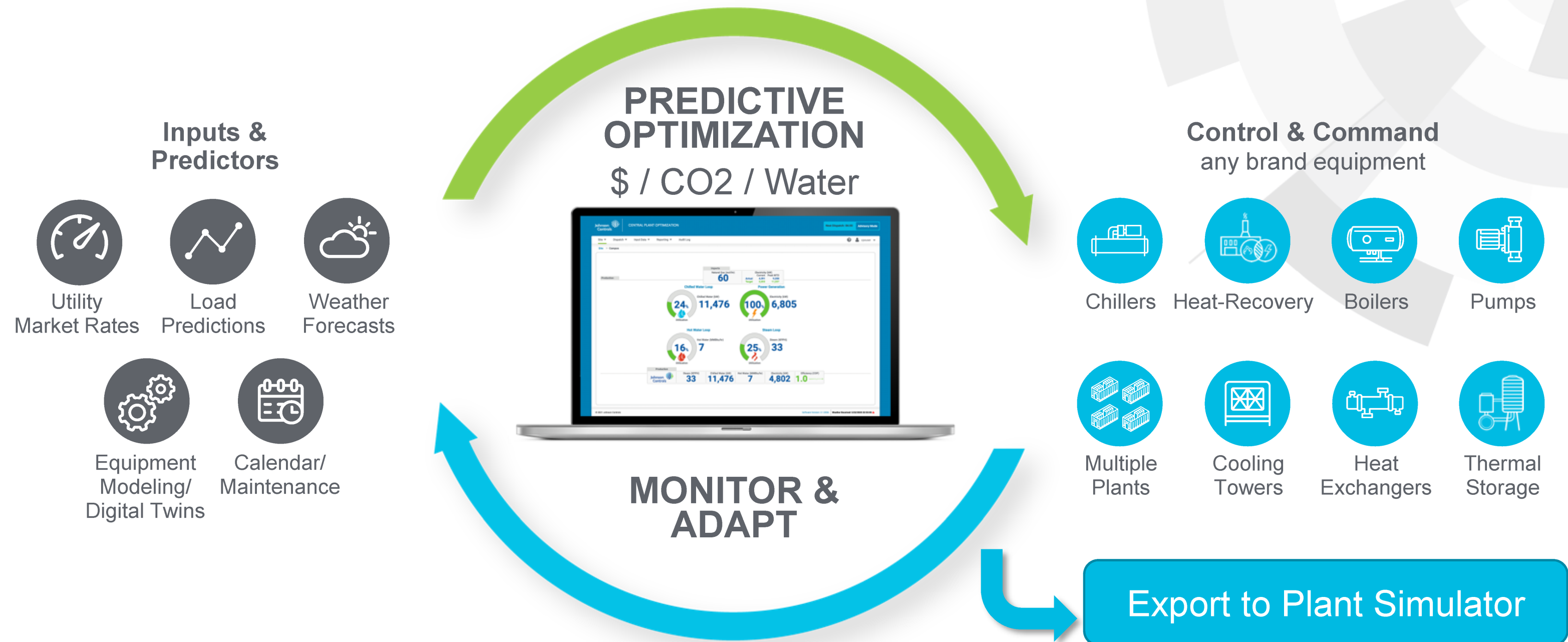


What is OpenBlue Central Utility Plant (CUP)?

- A **software application** that complements existing plant automation systems
- Collects **up-to-the-minute data** from meters, weather forecasts, and utility markets
- Determines best combination of equipment and set points to achieve **our Customer's Desired outcome** over a future time horizon

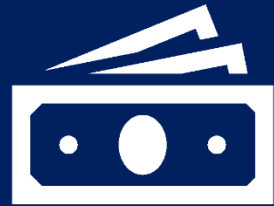


How Model-Based Optimization works



Predictive, real-time control and machine learning make the difference.

Optimize your Central Plant the way YOU Choose... as often as you want



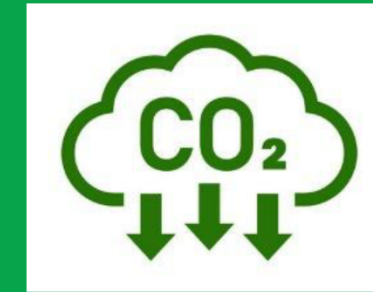
Minimum Operating Cost

Takes complex utility rates structures, evaluates all possible EQPT and Set point combinations to solve for the lowest \$/hr possible



Combo

The Central Plant Optimizer can do a combination of both minimizing operating costs and minimizing carbon emissions

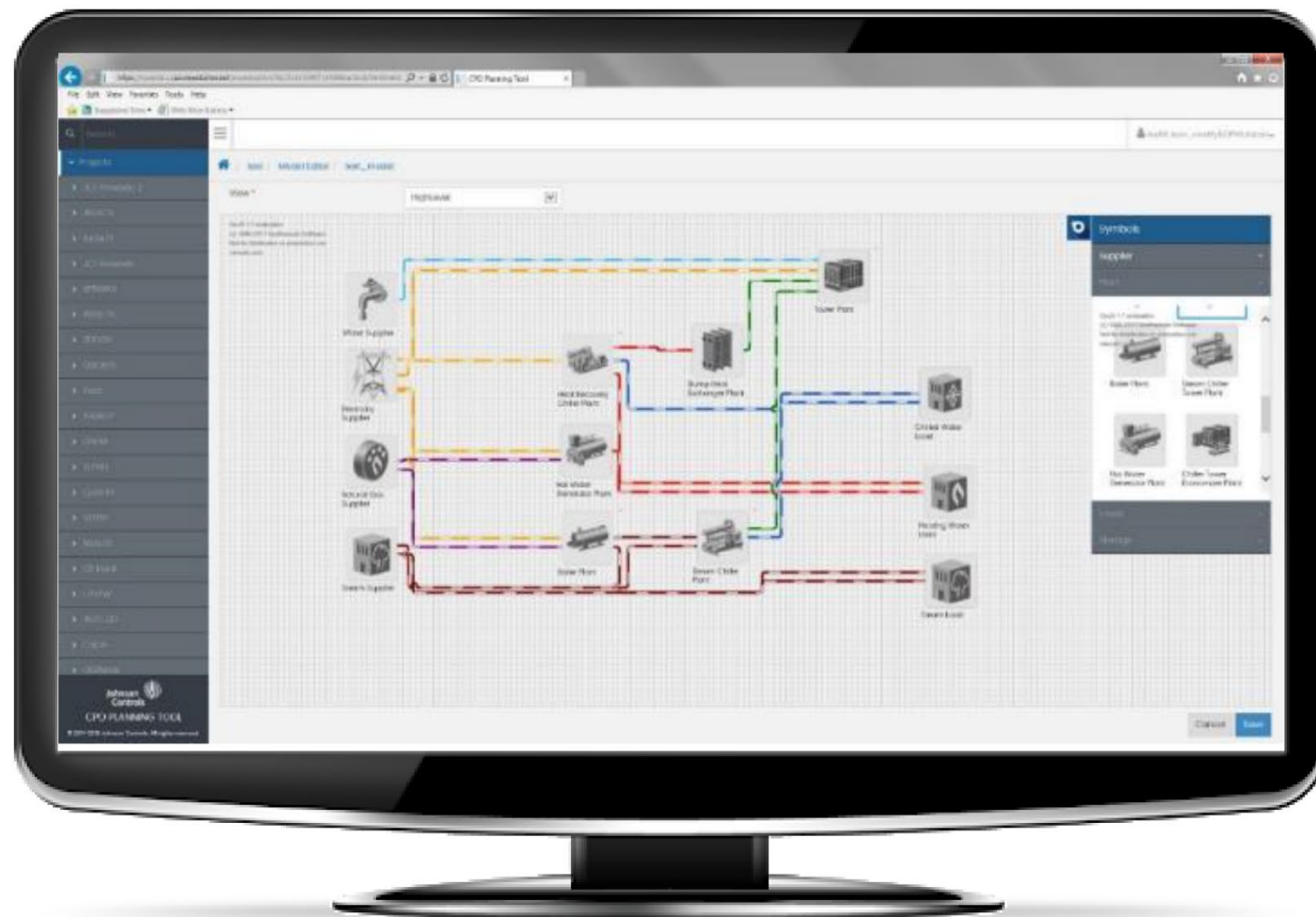


Minimum Carbon Emissions

Meet your Sustainability goals for Net Zero Carbon by responsibly managing Central Plant resources.

Two tools with one goal: Minimize utility lifecycle costs in central plants

Plant Simulator used in Design Phase



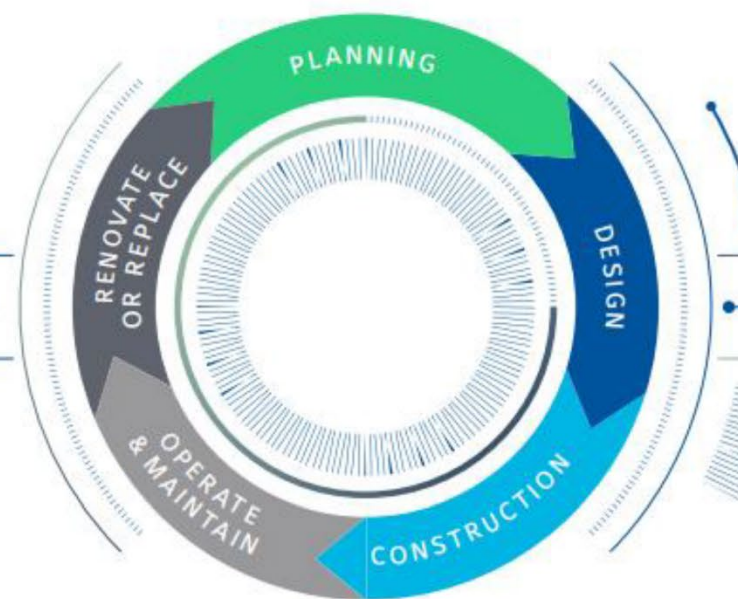
« Shared Plant
Energy Model »

Plant Optimizer in Operate & Maintain Phase



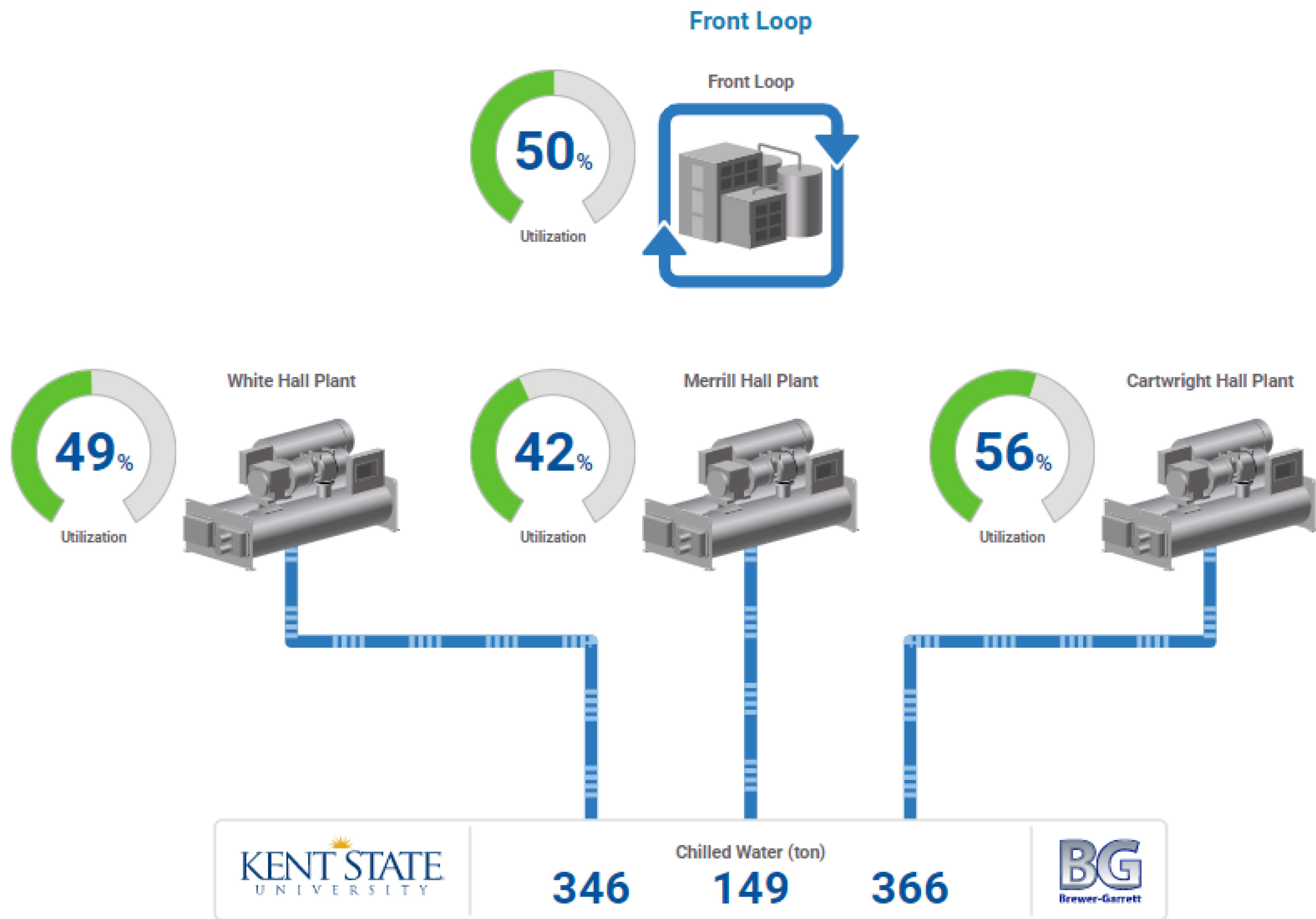
A live **digital twin** virtual representation of plant
“Flight simulator” tool Azure cloud-based app on
OpenBlue Central Utility Plant

**What-if scenarios to estimate cost savings &
capital asset planning**

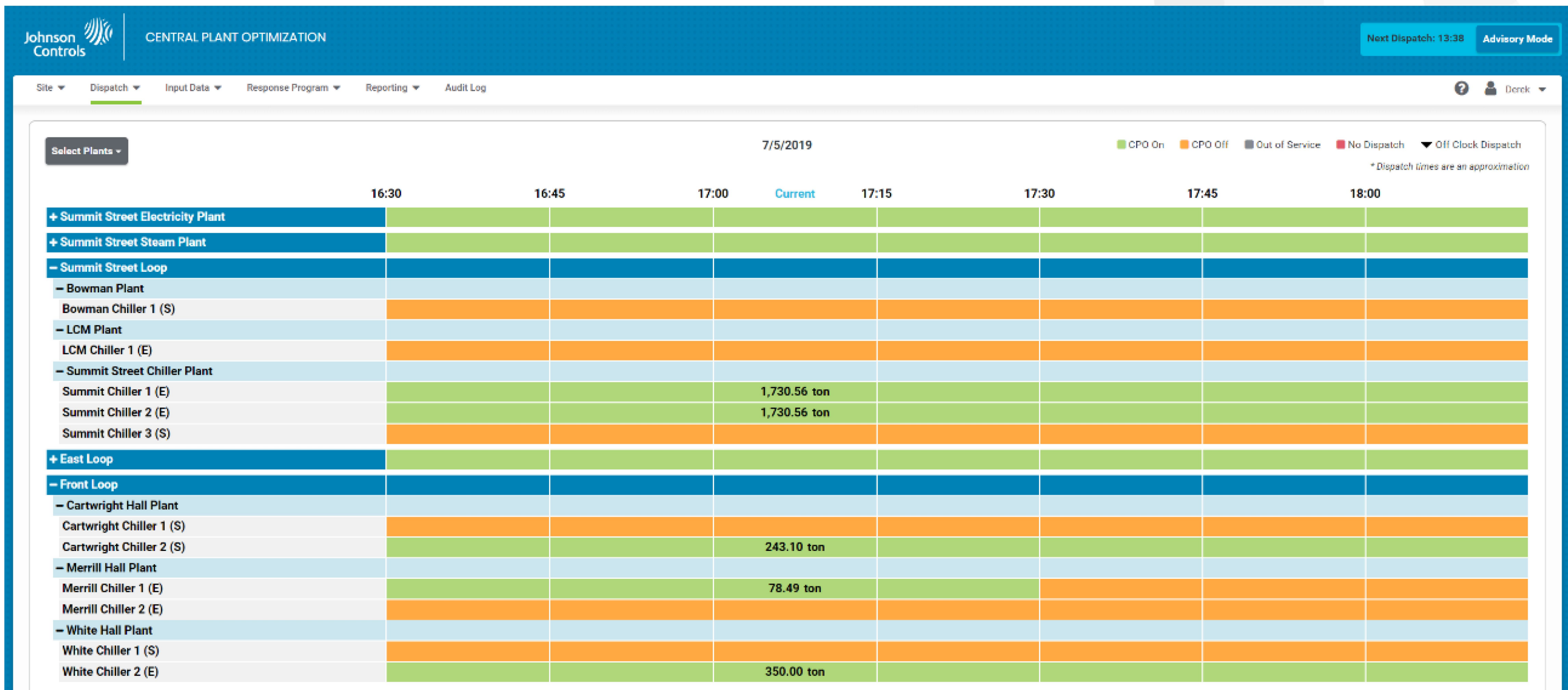


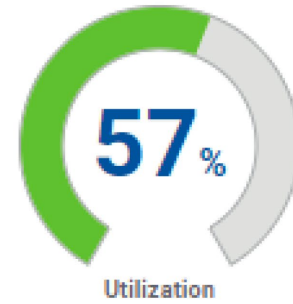
Real-time monitoring and control application
“flight-assist for energy savings” (Not auto-pilot)
On-premise, virtual server application

Setpoint commands every 15 min



Advisory Mode & Auto Mode



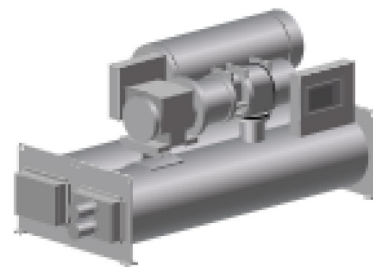
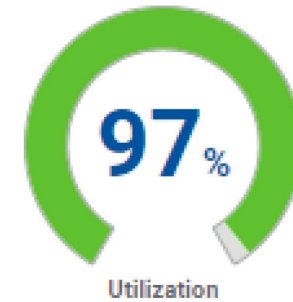


Cooling Production
3,606 ton

Supply Water Temperature
55 °F

Return Water Temperature
67 °F

Summit Chiller 1 (E)

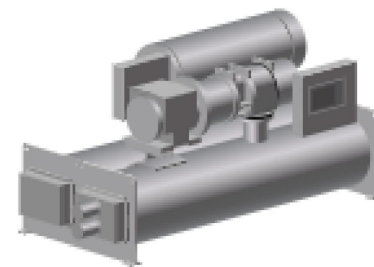
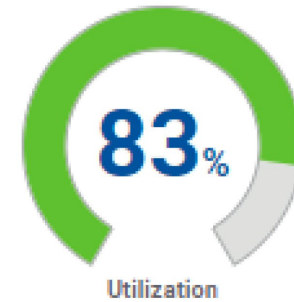


Efficiency
4.69 COP
0.75 kW/Ton

Cooling Production
1,946 Actual ton **1,805** Target ton

Rate of Electric Consumption
1,460.4 Actual kW **1,414.6** Target kW

Summit Chiller 2 (E)

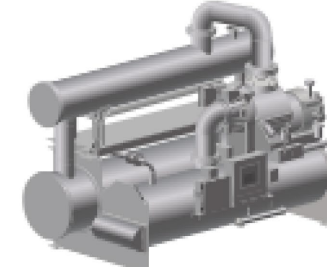
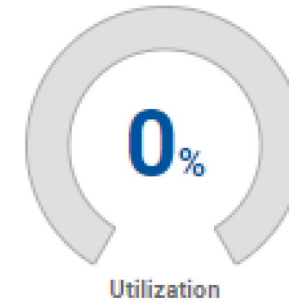


Efficiency
4.08 COP
0.86 kW/Ton

Cooling Production
1,659 Actual ton **1,805** Target ton

Rate of Electric Consumption
1,431.5 Actual kW **1,414.6** Target kW

Summit Chiller 3 (S)



Efficiency
0.00 COP
0.00 PPH/Ton

Cooling Production
0 Actual ton **0** Target ton

Rate of Steam Consumption
0.0 Actual KPPH **0.0** Target KPPH

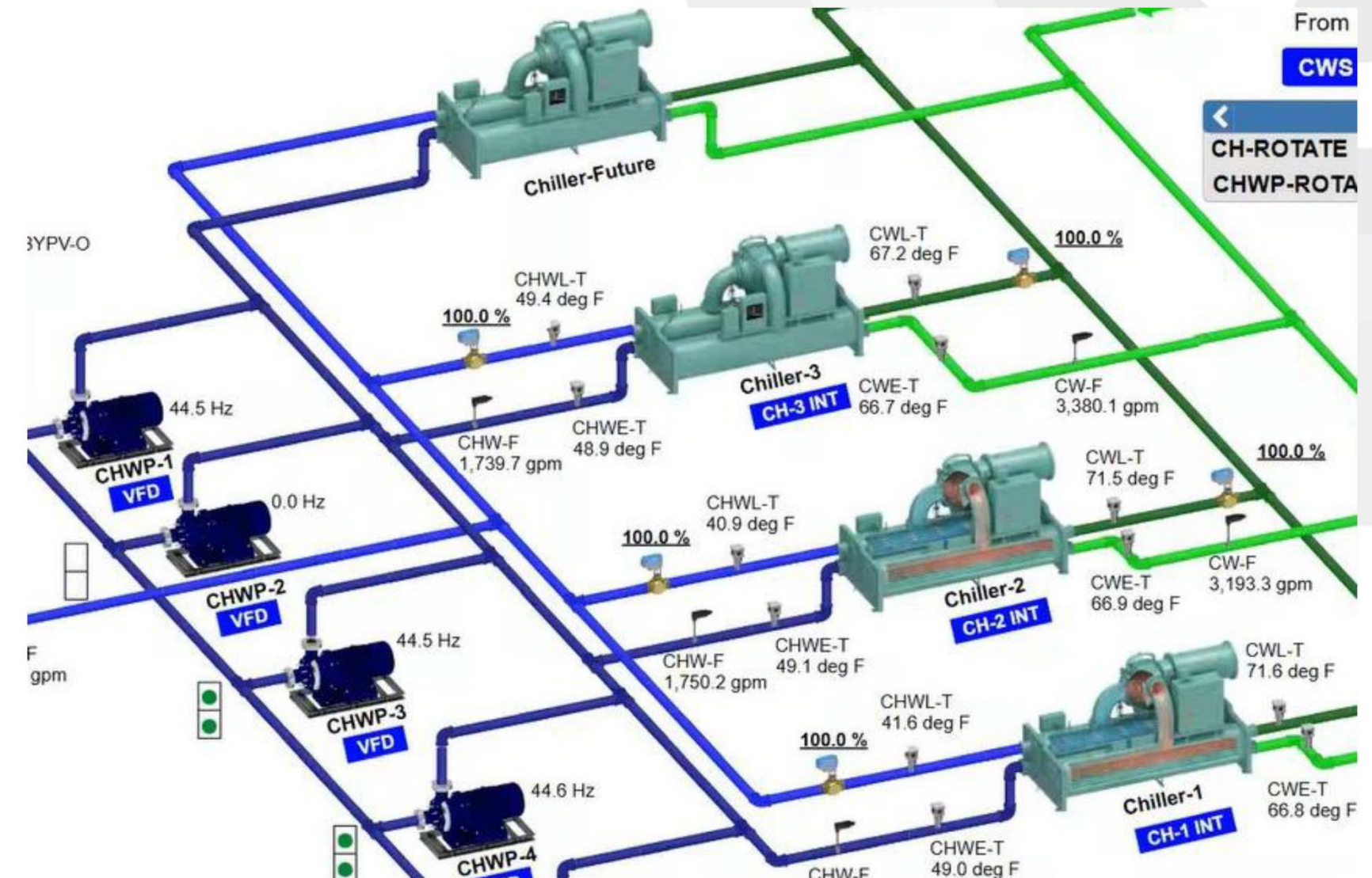
University of Tampa Campus Profile

- Private University
- Student Enrollment: >11,000
- Urban Campus with **110 acres**
- A residentially-based campus with 12 residence halls
- High-performance insulating windows allow appropriate day light while reflecting solar radiance
- Majority of the building has individual and centralized controllable LED lighting.



Problem Statement: Central Plant Sequences

- The project lacked an effective **sequence** of operations that would allow both central plants to operate **simultaneously and efficiently**.
- This uncertainty **presented risks** to the reliability, performance, and energy efficiency of the university's critical chilled water systems.



Project Goals for the University of Tampa

Mechanically connect the legacy central plant with the new central plant & **save energy**

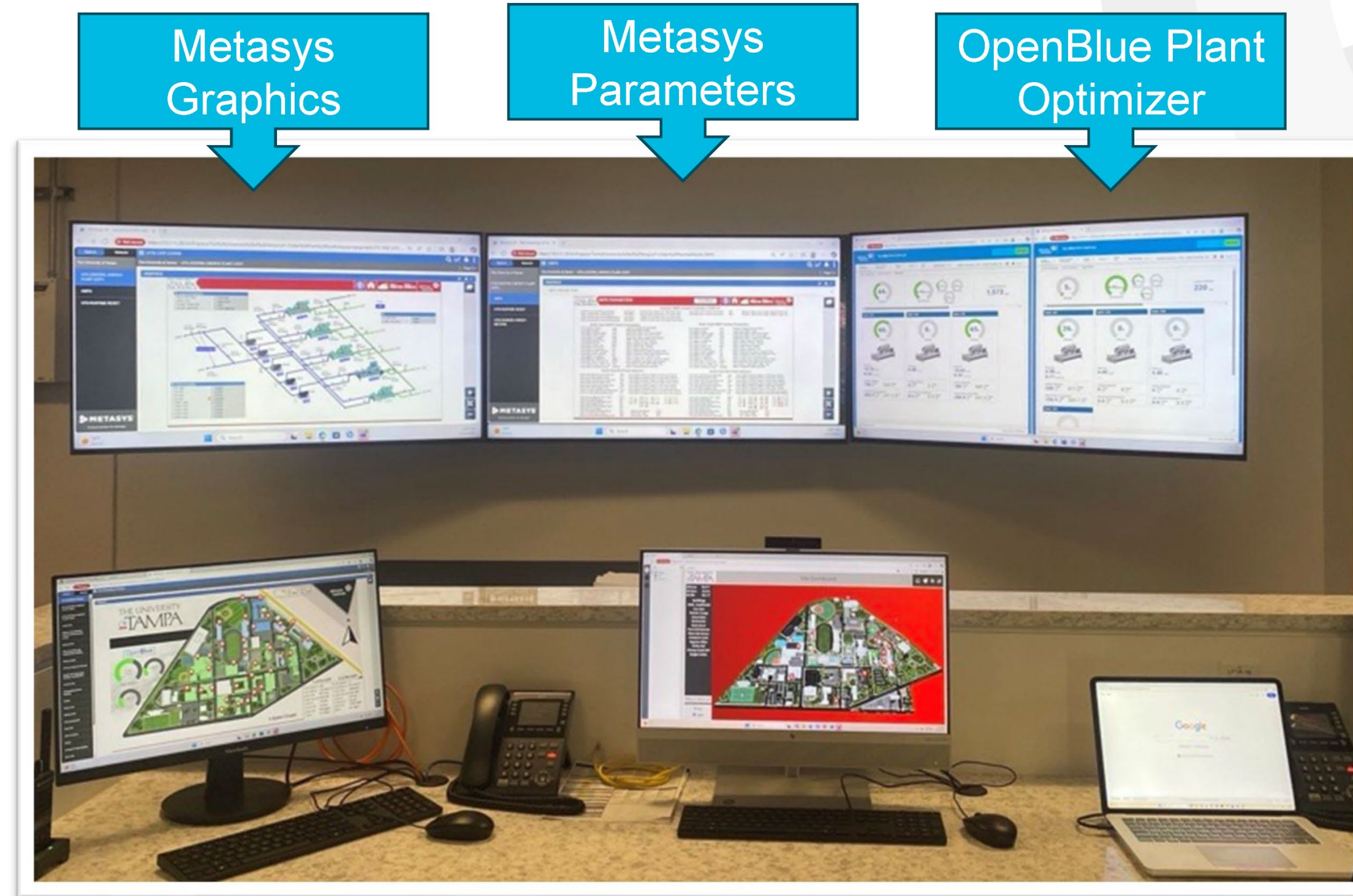
Legacy CHW Plant

- (3) 1200-ton chillers
- (1) 1000-ton chillers
- (5) Headered Variable Speed CHWP
- (5) Headered Variable Speed CWP
- (4) Cooling Towers (2 Cells Each)

New North CHW Plant

- (3) 1200-ton chillers
- (4) Headered Variable Speed Primary CHWP
- (3) Headered Variable Speed CWP
- (2) Cooling Towers (3-Cells Each)

Solution: Central Plant Optimization Software

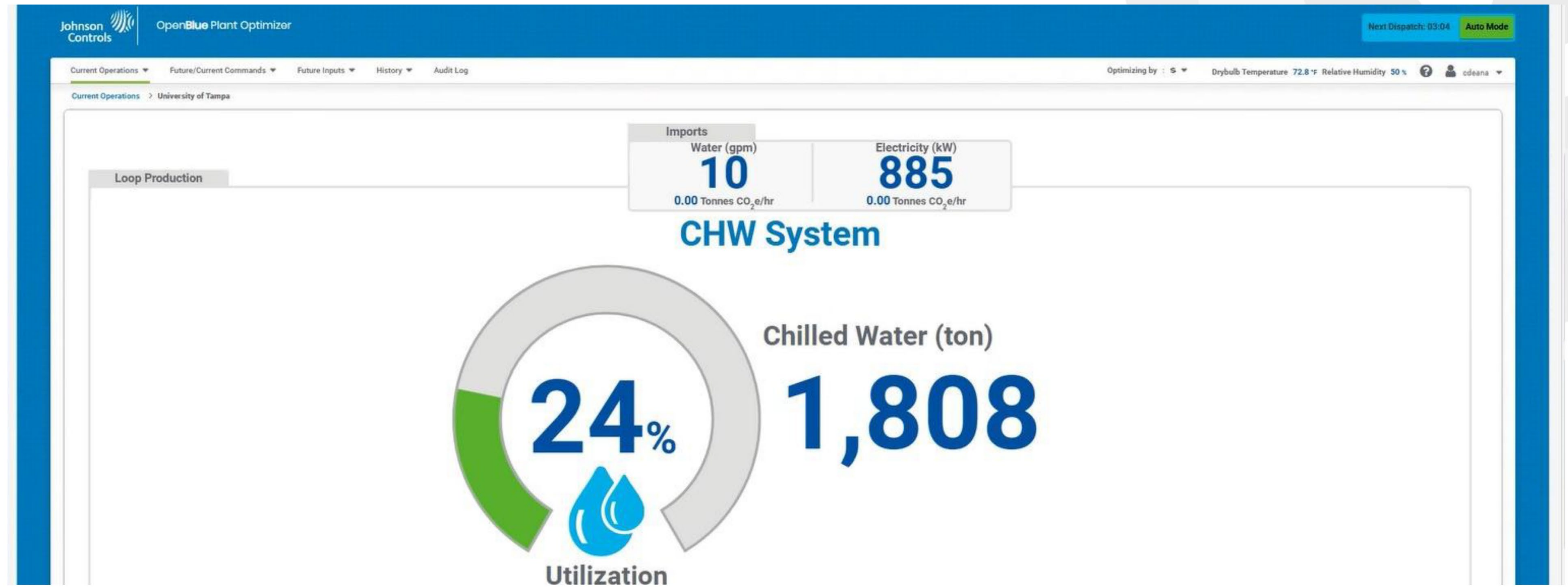


Solution: Optimization

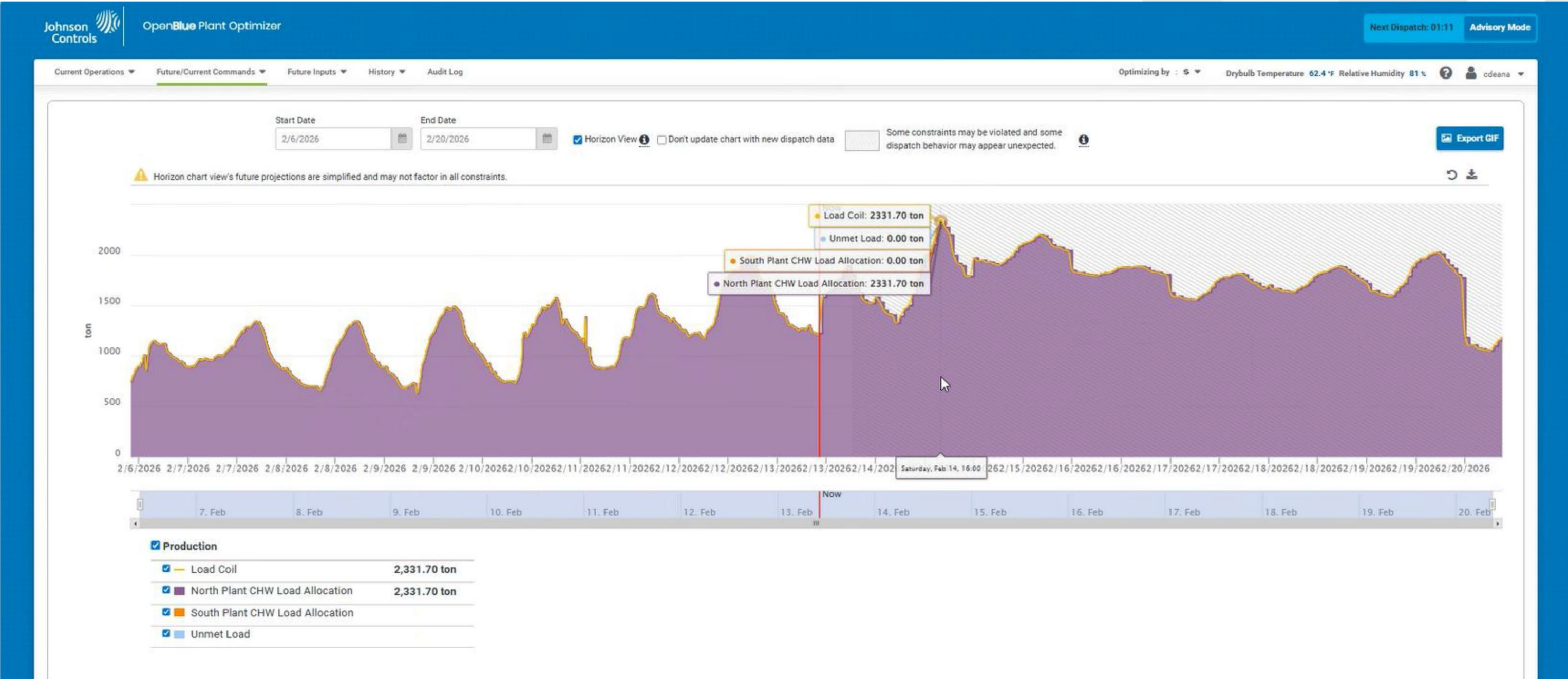
- ***“Auto Mode” is great for Optimizing multiple Chiller Plants on the same headered water loop for the best overall kW per ton combined.***
 - Anthony Oelsner, BAS Manager of Facilities, University of Tampa



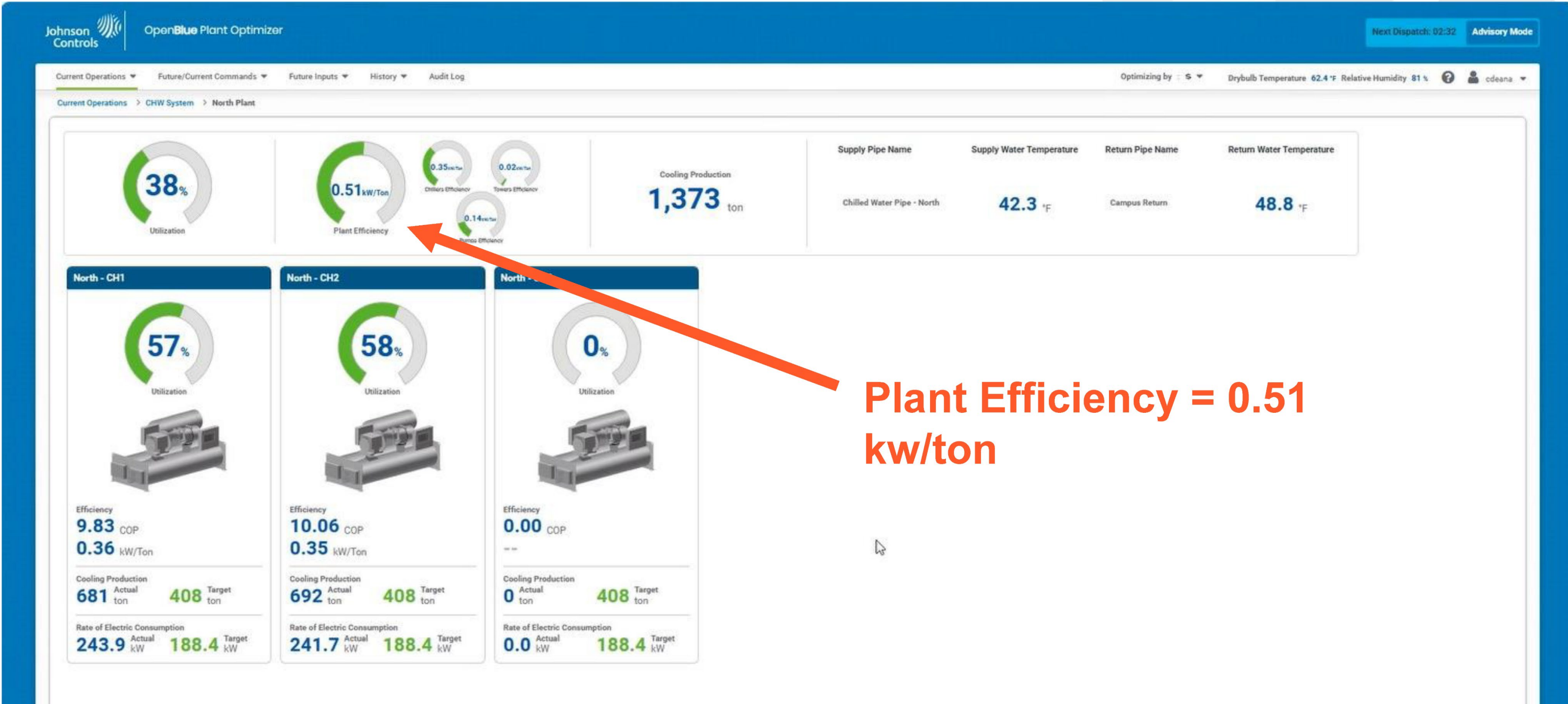
University of Tampa Optimization North Plant



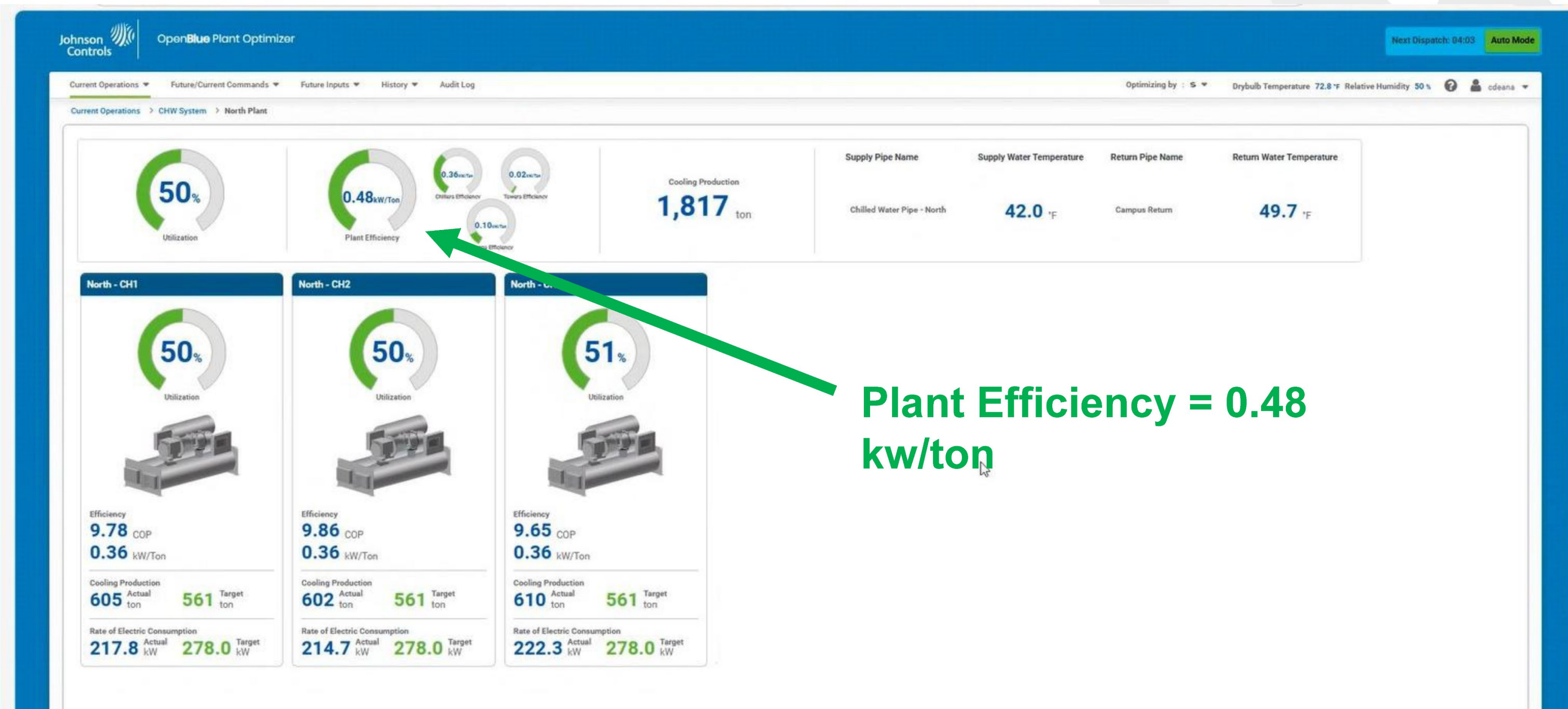
University of Tampa Plant Horizon View



UTampa North Plant Efficiency in Advisory Mode



UTampa North Plant Efficiency in **Auto** Mode



Solution: Optimization

	Combined Plant Projected Savings		
Annual Electric Savings (kWh/yr)	841,500	to	1,039,500
Annual Utility Cost Savings (USD/yr)	\$67,320	to	\$83,160
Utility Cost Savings %	8.5%	to	10.5%
Annual Non-Utility Cost Value (USD/yr)	\$17,070	to	\$20,863
GHG Emissions Savings (lb CO2e/yr)	744,054	to	919,126
Total Savings (USD/year)	\$84,390	to	\$104,023

High Savings Levels



Is your building electrically heated?



Are your cooling towers running in the winter?

If yes, you have great opportunities for savings.

Optimization

- For facilities with 2+ chillers investigate **optimization** because it will allow you to:
 - Reduce Scope 1 & 2 Emissions
 - Lower O&M Costs
 - Gain More Data, Precision & Control
 - And Get Better Sleep At Night!

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