



ANALYTIKA USERS FORUM

November 2020

Analytika for COVID-19 response

AGENDA

- 1. Introduction to Analytika Users Forum**
 - What is Cimetrics Analytika?
 - Why a users forum?
- 2. Focus Topic: Analytika for COVID-19**
 - Cost analysis
 - Schedule tracking
 - AFDD faults
 - Room condition & equipment monitoring
- 3. Fun With Graphs!**
 - Outdoor air sensor evaluation
- 4. Q&A / Open Forum**
- 5. What's Next?**

What is Cimetrics Analytika?



Analytika services

- **Continuous data monitoring**
- **Ongoing commissioning** (CCx / MBCx) using **automatic fault detection & diagnostics** (AFDD)
- **Engineering consulting**
- **Analytika Portal SaaS**



Solve owner challenges

- Help building owners, managers, vendors and partners **run their facilities more efficiently and effectively**
- Targeted recommendations for **energy savings & optimization opportunities** and **insidious equipment faults**
- **Task prioritization, vendor management, & KPI tracking**
- **Regulatory & ESG compliance tracking & reporting**
- **Minimize shutdowns** through reliability improvements & early fault detection
- **M&V to insure energy efficiency investments**



Create better buildings

- **Save energy costs**
- **Reduce GHG emissions**
- Improve **comfort & safety**
- **Prioritize & streamline** maintenance tasks
- Achieve **sustainability goals**

Why an Analytika Users Forum?



Learn

Learn how to achieve your goals from Cimetrics experts and Analytika power users



See

See best practices, techniques, tips & tricks demonstrated live



Ask

Ask questions and get guidance on resolving challenges



Share

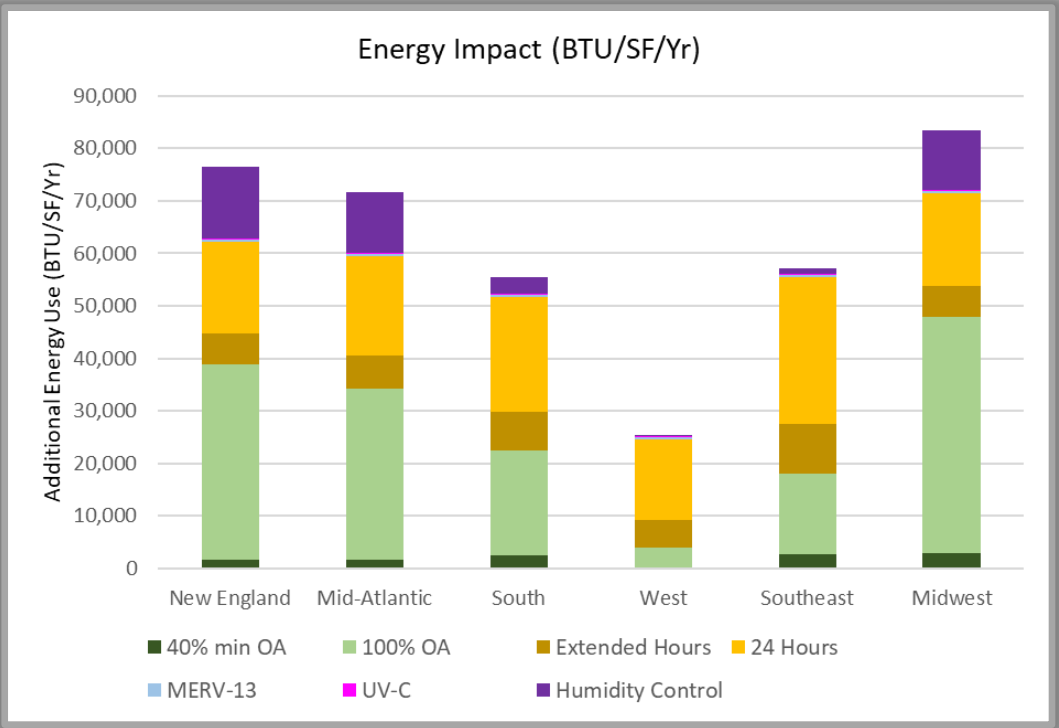
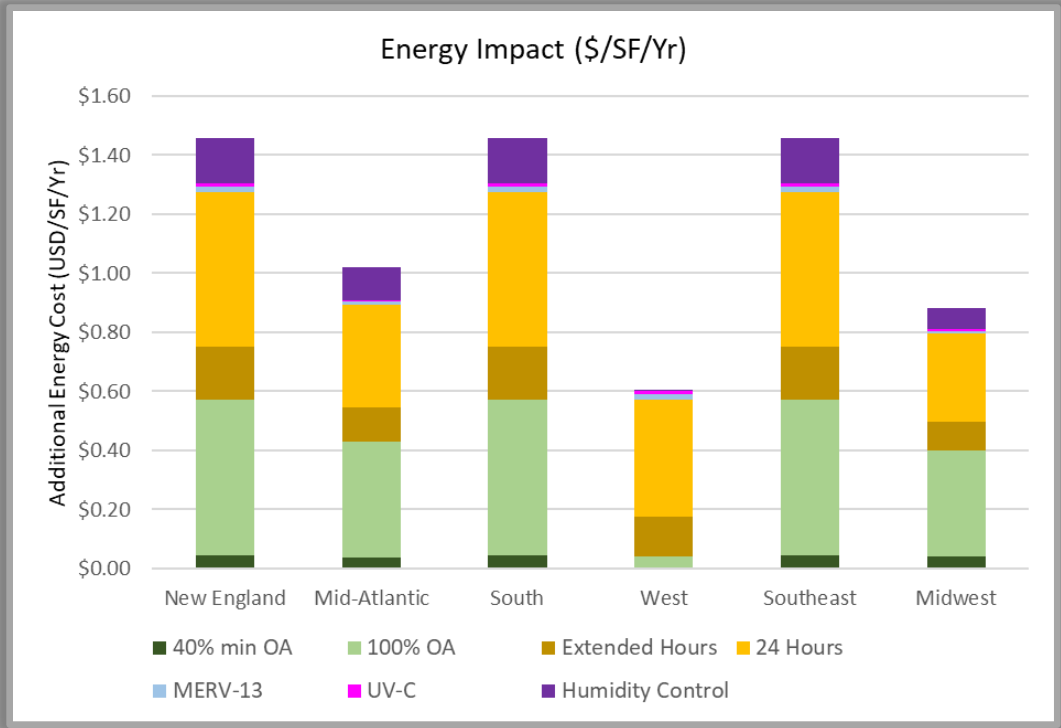
Share your unique cases and experiences to help others get the most out of Analytika

Learn how to get the most out of Cimetrics Analytika to create safe, reliable, energy-efficient buildings!

Focus Topic: Analytika for COVID-19 Response

- Analytika cost analysis
- Utility manager for energy use tracking
- Faults:
 - Schedule tracking
 - Insufficient outside airflow
 - Capacity issues e.g. CHW, heating
- Space conditions:
 - Monitoring unoccupied spaces
 - Monitoring occupied room conditions – RH, CO₂, etc.

COVID-19 Response Cost Analysis



Example Cost Analysis: evaluating measures at a 380,000 square foot lab building



Condition	Equipment Affected	Square Footage Affected (Total conditioned square feet: 388,000)	Cost/ sqft/yr	BTU/ sqft/yr	Additional Annual Operating Cost	Additional Annual Operating MMBTU
Base: 10% min OA, M-F 5am-5pm	N/A	N/A	\$0.41	13,250	N/A	N/A
Increased outside air: 40% min OA	Mixed air units: AHUs 5–15	48%	\$0.45	19,680	\$7,403	1,198
Increased outside air: 50% min OA			\$0.52	25,571	\$19,687	2,295
Increased outside air: 60% min OA			\$0.59	32,127	\$33,728	3,516
Increased outside air: 70% min OA			\$0.67	38,996	\$48,486	4,795
Increased outside air: 80% min OA			\$0.75	46,021	\$63,516	6,103
Increased outside air: 90% min OA			\$0.84	53,197	\$79,024	7,440
Increased outside air: 100% OA			\$0.92	60,465	\$94,752	8,793
Additional run hours: M-F 4am-8pm	All non24/7 units: AHUs –05 thru –10, AHUs –13 thru –15, RTU–01	43% Assumes AHU-20 (boiler room) can still be turned off during summer, and AHU-22 & -23 can remain OFF during summer	\$0.51	18,373	\$16,785	855
Additional run hours: M-F 24 hours			\$0.71	28,620	\$50,356	2,564
MERV-13	AHUs without MERV-13 filters	0%	\$0.42	13,445	\$0	0
In-duct UVGI	Mixed air units: AHUs 5–15	48%	\$0.42	13,428	\$1,032	33







Let's look at March 2020 energy use...

... and compare it to the previous month

ANALYTIKA

HOME UTILITY MANAGER FAVORITES GRAPHS EQUIPMENT ADMIN

View:  Plants Timespan:  Sun, 1 Mar, 2020 to Wed, 1 Apr, 2020

Building	Total	Electricity	Chilled Water	Hot Water	Steam	Ther
	Million BTU	kWh	Million BTU	Million BTU	Million BTU	Ther
	No Comparison	Comparison vs. Previous Month	Comparison vs. Previous Month	Comparison vs. Previous Month	Comparison vs. Previous Month	No C
	Show Trend	Show % Difference	Show % Difference	Show % Difference	Show % Difference	Show
AC	187 MMBTU 	-17% ↓	275% ↑	-46% ↓	-49% ↓	17 T
ANI	83 MMBTU	0% →	2			
BE	410 MMBTU 	-11% ↓	110% ↑			
BI	0 MMBTU	0% →	0%		0% →	
BIO	677 MMBTU	-3% →	792% ↑	-32% ↓		
CHEM	1,798 MMBTU 	0% →	0%	-52% ↓	0% →	3
CO	0 MMBTU	0% →	0%		0% →	
CP	935 MMBTU	44% ↑	61% ↑	7		
DA	2 MMBTU	0% →	4			
EL	1,049 MMBTU 	-31% ↓	10% ↑	0% →	-35% ↓	
GR	136 MMBTU	-21% ↓		-48% ↓	-28% ↓	
HU	80 MMBTU 	-20% ↓	197% ↑			
KL	230 MMBTU	0% →	0%		0% →	
MA	343,927 MMBTU	-15% ↓	345% ↑		-27% ↓	
MC	0 MMBTU	0% →	0%		0% →	
OL	307 MMBTU	-16% ↓	120% ↑	-42% ↓		
OR	81 MMBTU 		0% →		0% →	
RO					0% →	2

Electricity use decreased, as expected

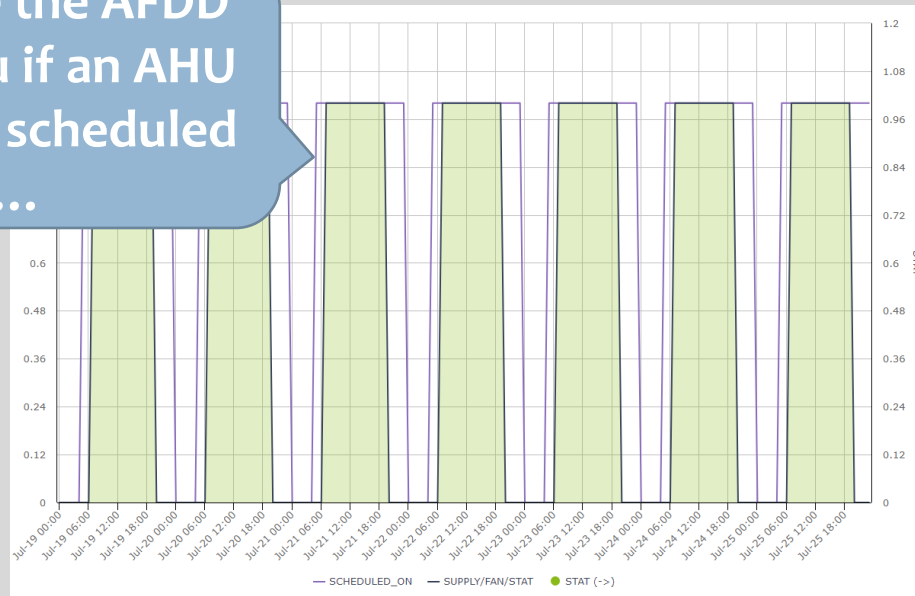
But why did CHW use increase?

ANALYTIKA UTILITY MANAGER FOR COVID-19 ENERGY USE TRACKING

The AHU Schedule Display provides a quick visual confirmation of equipment shutdown

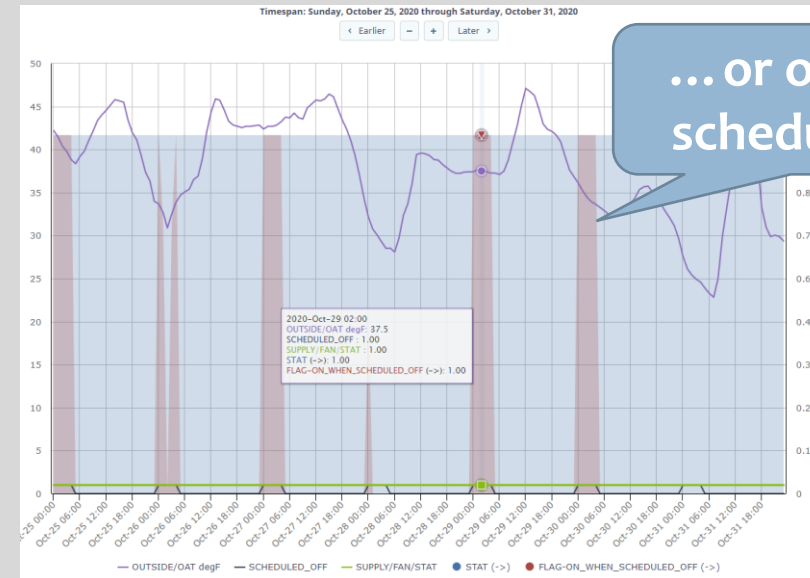


Meanwhile the AFDD notifies you if an AHU is off when scheduled on...

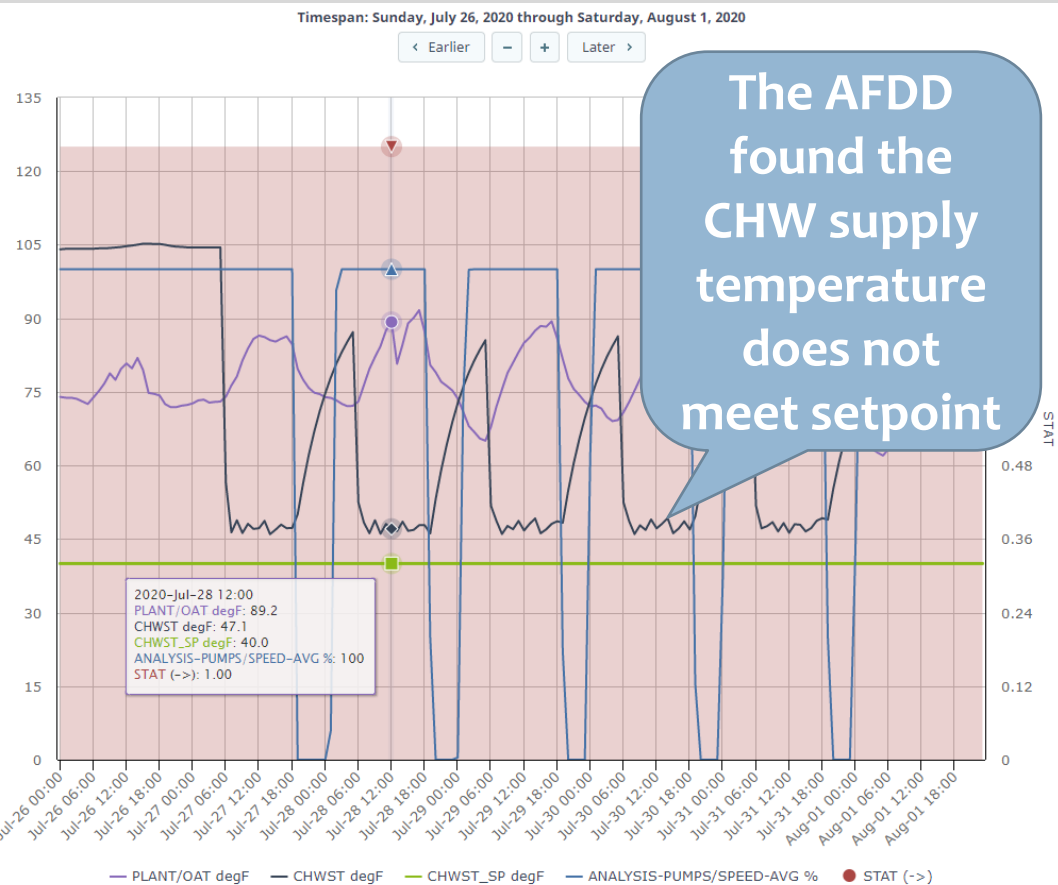


Equipment Scheduling

...or on when scheduled off



Capacity Limits



The AFDD found the CHW supply temperature does not meet setpoint

AFDD Flags Insufficient CHW Flow

<input type="checkbox"/>	Issue Name ▾	Description ▾	Cimetrics Recommendations ▾	Diagnostic Priority ▾	Management Type ▾	Date Opened ▾	Latest Update Date ▾
<input type="checkbox"/>	Insufficient Flow in BLDG- /CHW	Equipment is operating at full capacity (starved).	Investigate why the setpoint is not being maintained.	Medium	MECHANICAL	04/01/2016	08/12/2020



Description	Evidence	Impact	Resolution	Notes	Related Issues...
Evidence Tree Identifies Root Cause & Symptoms					
Diagnostic Engine	Symptom/Fault	Target	Fault Days	Fault Percent	2020-04-26 Events 2020-11-08
1	Insufficient Flow	CHW			
2	Control Value Above Setpoint	CHWST_SP_ERR			
3	Setpoint Too High	CHWST_SP			
4	Setpoint Too Low	CHWDP_SP			
5	Equipment At Capacity	P_V-A	48.55	43.21	
6	Equipment At Capacity	AHU-RM_102/SA/CC_CHW	3.48	1.97	
7	Equipment At Capacity	AHU-MAU/SA/CC_CHW	61.01	38.01	
8	Equipment At Capacity	AHU-RM_201/SA/CC_CHW	5.85	6.46	
9	Control Value Above Setpoint	CHWST_SP_ERR	50.85	25.39	
10	Control Value Above Setpoint	AHU-MAU/SA/DAT_SP_ERR	1.49	27.10	



POINTS LIST				
BAS Devices involved in graph				
Device ID	Name	Description	Vendor	MAC Address
523	UM-NCE16- /	null	JCI	0x0A04A505BAC0
BAS Points involved in graph				
Equipment	Point Name	BAS Object Name	BAS Object ID	
BLDG- /PLANT/CHW	CHWDP	UM-NCE16- /FCB.Local Application.CHILLED WATER DIFFERENTIAL PRES	(D,523),((analog-input,3000258)) present-value	
	CHWST	UM-NCE16- /FCB.Local Application.CHWSUPPLY-TEMP	(D,523),((analog-value,3000277)) present-value	
	CHWST_SP	UM-NCE16- /FCB.Local Application.CHILLED WATER TEMP SETPOINT	(D,523),((analog-value,3000273)) present-value	
	P_V-A/SIG	UM-NCE16- /FCB.Local Application.CHILLED WATER PUMP-A VFD OUTPUT	(D,523),((analog-output,3000261)) present-value	
	P_V-A/STAT	UM-NCE16- /FCB.Local Application.CHILLED WATER PUMP-A STATUS	(D,523),((binary-input,3000264)) present-value	
BLDG- /PLANT	PLANT/OAT	UM-NCE16- /FCB.Local Application.OUTDOOR AIR TEMP	(D,523),((analog-input,3000262)) present-value	

BUILDING PAC - FLOOR ZONE EQUIPMENT FAULT SUMMARY TABLE



Timespan: November 2020

< Earlier - + Later >

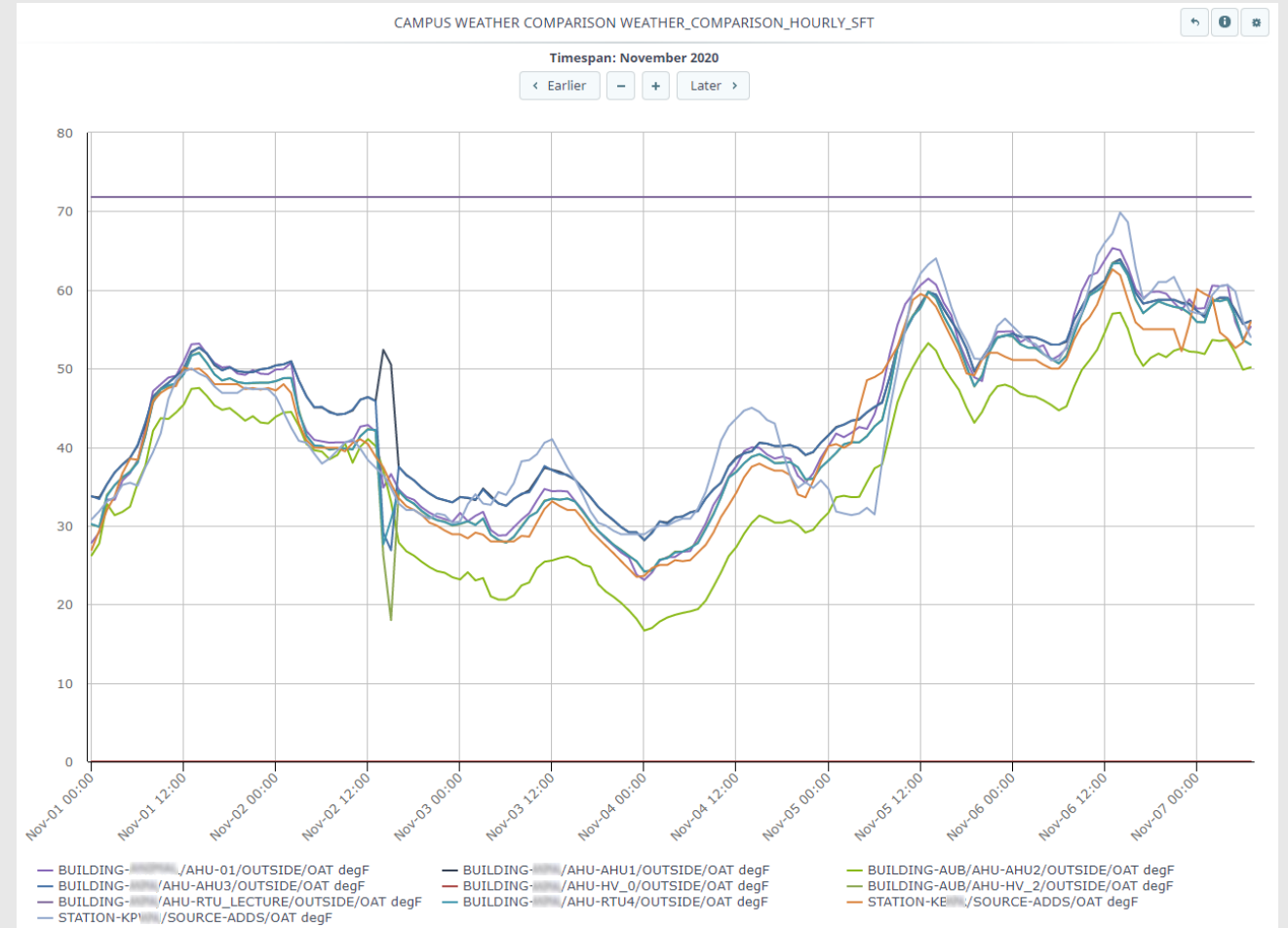
AHU	Terminal Unit	Zone Temp (deviation from setpoint highlighting) degF	Zone Temp Spt (unexpected value highlighting) degF	Zone Relative Humidity (unexpected value highlighting) %RH	Discharge Airflow (deviation from setpoint highlighting) cfm	Discharge Airflow Spt cfm	Discharge Air Temp (unexpected value highlighting) degF	Damper Position (starved damper highlighting) %	Leaking Heating Valve Evidence (severity highlighting) %	Heating Control Valve Position (starved valve highlighting) %	CO2 (unexpected value highlighting) ppm
AHU-3	ZONE-1246_CHORUS_TU_3_1_06/VAV	70.1	70.4	43.4	66	59	53.9	6.2			430.01
AHU-3	ZONE-1246_CHORUS_TU_3_1_07/VAV	70.3	71.4	41.8	1,201	1,200	77.1	40.4	0.0	53.3	427.00
AHU-3	ZONE-1251_CAST_TU_3_1_13/VAV	68.1	72.0		17	0	53.9	0.0			
AHU-3	ZONE-1255_CAST_TU_3_1_15/VAV	68.0	69.0		47	0	53.9	0.0			
AHU-3	ZONE-1260_STAGE_TU_3_1_01/VAV	72.8	72.0		40	37	59.4	11.5	0.0	0.7	
AHU-3	ZONE-1261_PROD_TU_3_1_16/VAV	69.8	68.8		26	22	53.9	13.4			
AHU-3	ZONE-1263_TECH_TU_3_1_17/VAV	69.5	72.0		5	0	53.9	0.0			
AHU-3	ZONE-1264_CREW_TU_3_1_18/VAV	70.0	70.2	46.4	20	1	53.9	0.2			0.51
AHU-3	ZONE-1286_SHOP_PROP_TU_3_1_23/VAV	67.9	71.0		7	0	53.9	0.0			
AHU-3	ZONE-1286_SHOP_PROP_TU_3_1_27/VAV	68.8	72.0		0	150	90.7	100.0	1.3	21.9	
AHU-3	ZONE-1292_STORAGE_TU_3_1_26/VAV	69.7	72.0		153	150	75.6	32.9	0.6	99.3	
AHU-3	ZONE-C110_LOBBY_TU_3_1_30/VAV	68.8	68.0		97	94	53.9	23.5			
AHU-	ZONE-										

Room Equipment & Space Conditions

- Monitor **unoccupied spaces** for **unusual conditions** that would normally be reported by the occupants
- Monitor **occupied space conditions** such as **temperature, humidity, and CO₂ levels**
- Customizable fault summary tables** can be tailored to highlight important parameters while minimizing nuisance alerts

Fun With Graphs!

Outdoor Air Sensor Evaluation



QUESTIONS?



WHAT'S NEXT



Next Analytika Users Forum session:

- February 2020

Future topics:

- Analytika for Process
- Resource deployment & task tracking for efficient issue resolution
- Collaboration between multiple internal & external parties

Learn more:

- Sign up to be notified about future events:
<https://www.analytika.com/analytika-users-forum/>
- Learn more about Analytika:
<https://www.analytika.com/>
- Contact me! hwebb@cimetrics.com