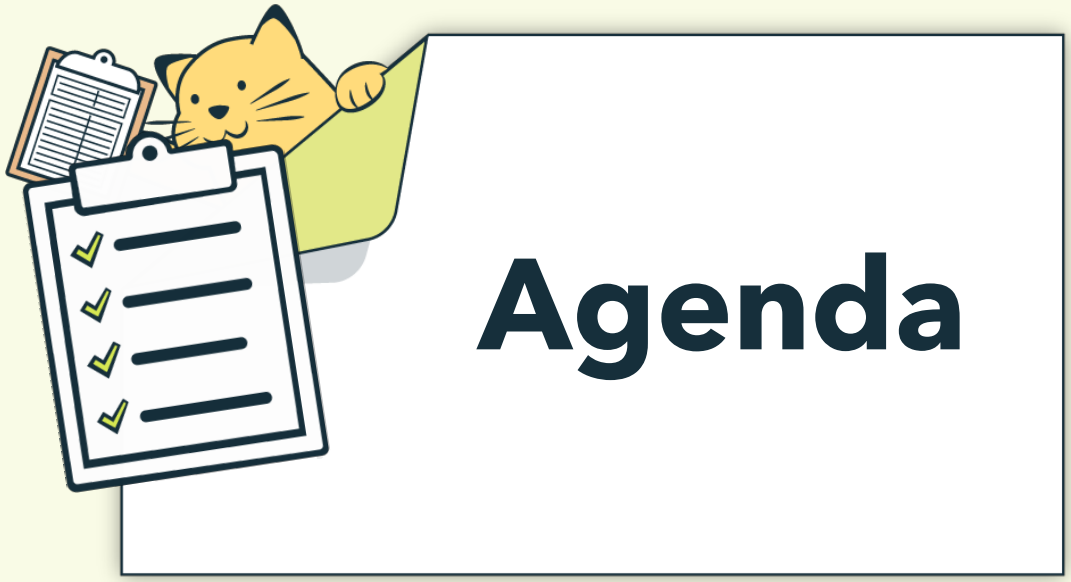
Get the Most Out of Your Data

John Heinz
VP, Strategic Accounts // EnergyCAP



Agenda

- ✓ Bringing utility bills and real-time interval data together
- ✓ Energy procurement
- ✓ Demand management
- ✓ Bill reconciliation
- ✓ Advanced energy management
- ✓ Communicate results

Value Areas of Both Applications

EnergyCAP UtilityManagement

- Monthly and yearly
- Detailed bill analysis and bill workflow
- Portfolio-level and aggregate rollups, common and global UOM
- Looking at the rear view, take action to correct for the future
- Focus on reporting, quick summaries, getting answers quickly

EnergyCAP SmartAnalytics

- Minutely, hourly, daily, monthly, yearly
- Advanced views of interval and time series data
- Point and meter tracking, equipment or zone areas
- Actionable now so don’t have surprises in the future
- Focus on analytics, simulations, what ifs, verifying performance

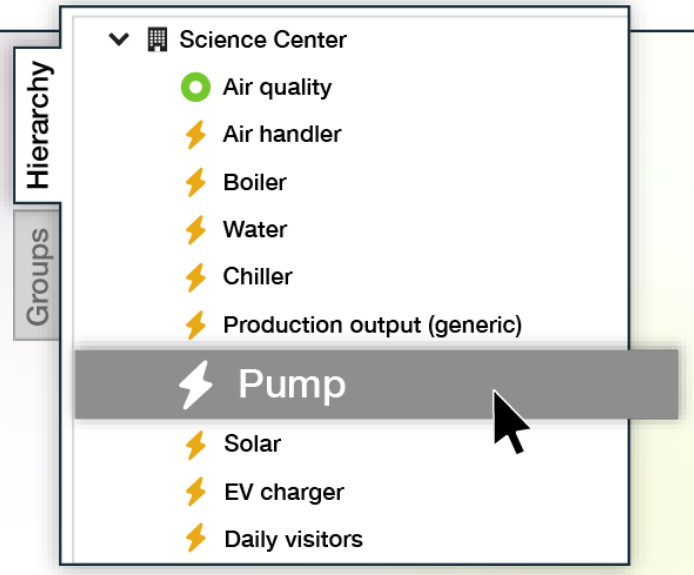
Might not be the same team members using each!

SmartAnalytics // Real-time energy and sustainability analytics

ENERGYCAP SmartAnalytics™

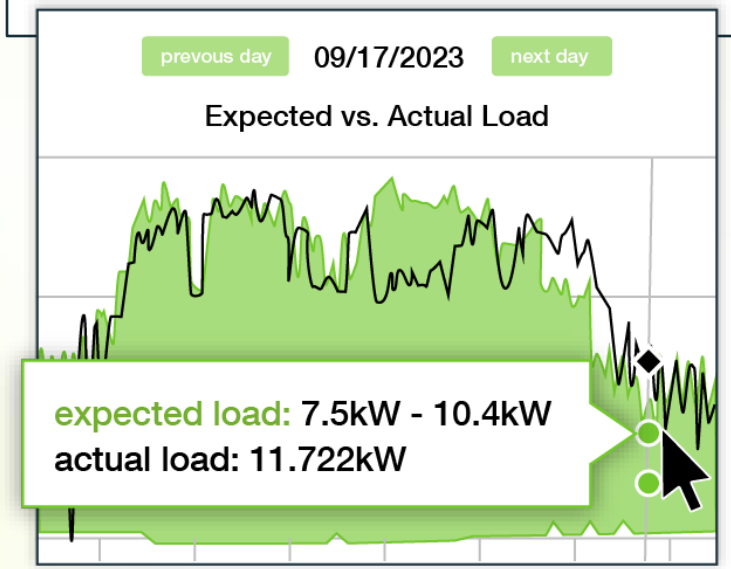
Capture

Capture real-time data from virtually any source and type of device.



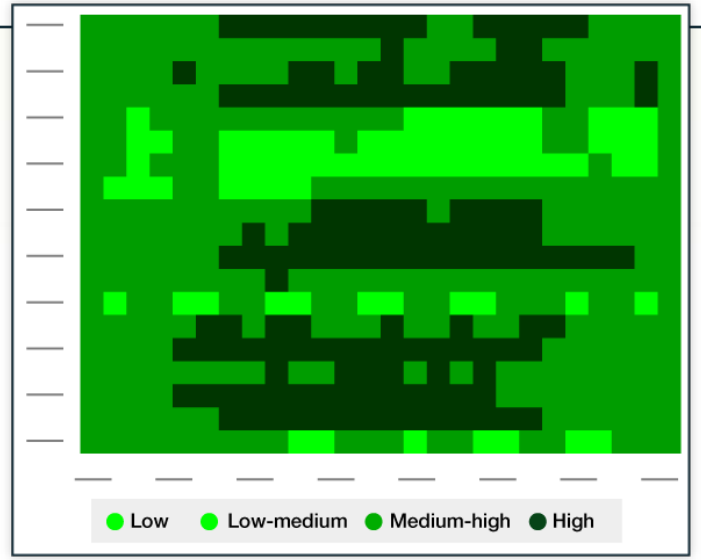
Monitor

Monitor data quality, detect outliers, and receive alerts and alarms.



Analyze

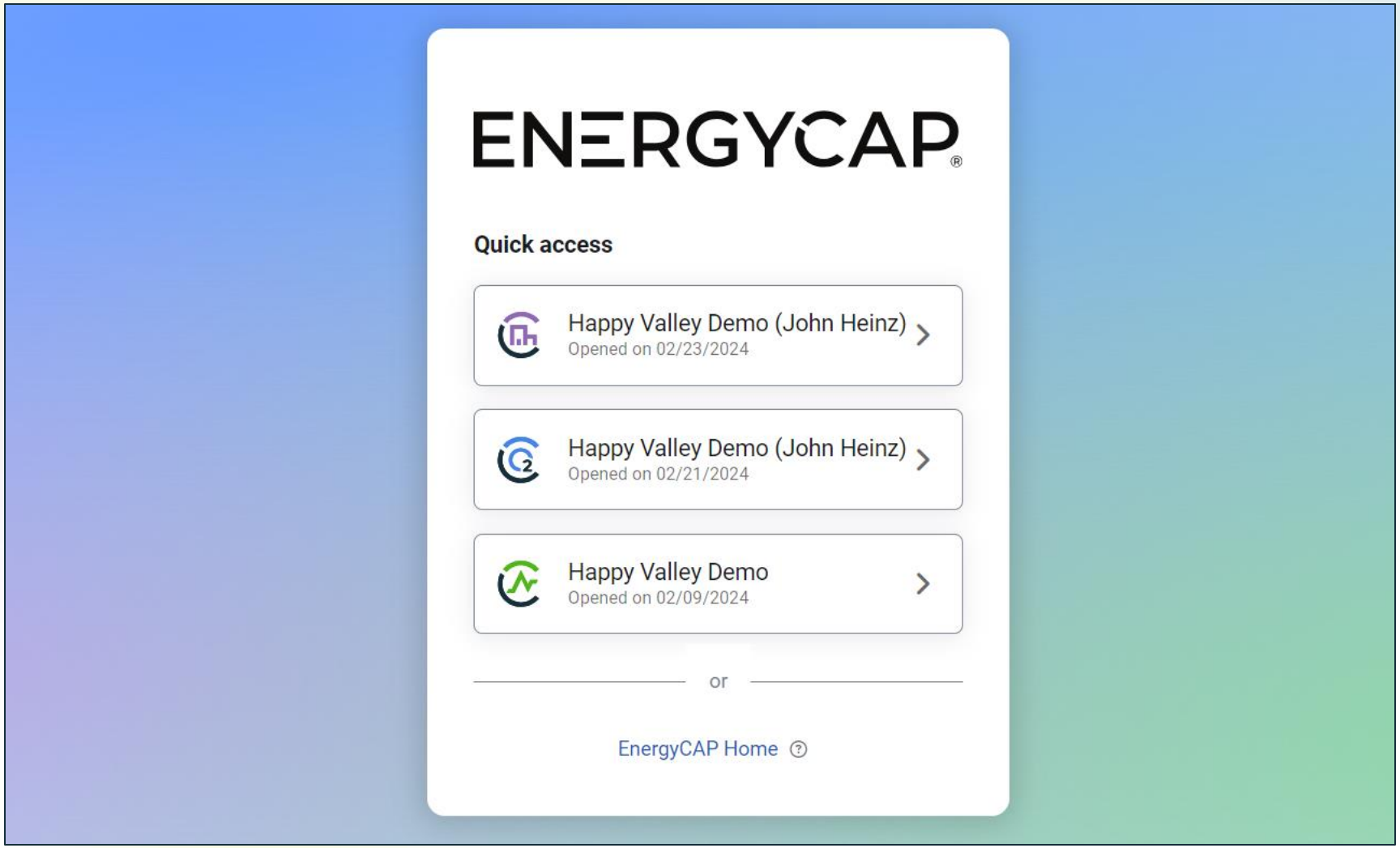
Access robust analysis and reporting functionality.



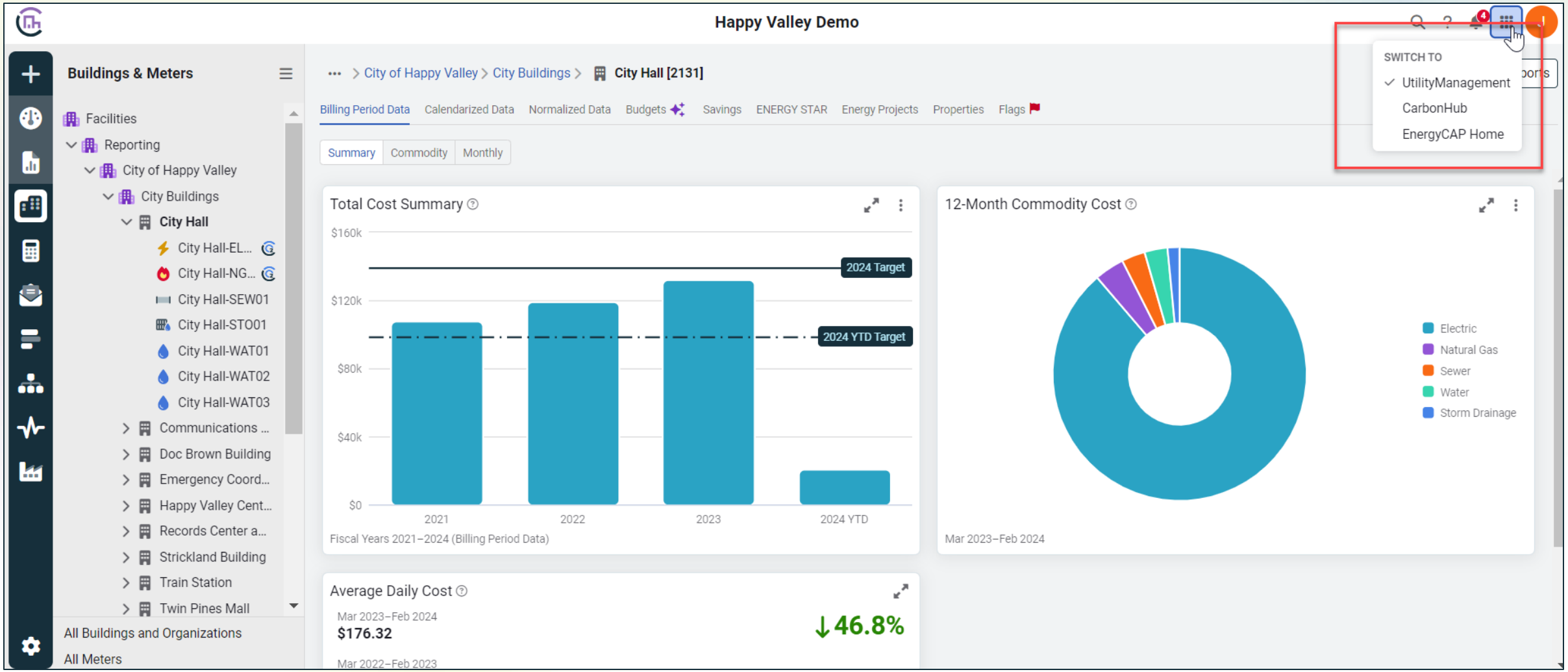
SmartAnalytics // Real-time energy and sustainability analytics

- API
- Data systems
- Files
- Gateways
- Meters
- Sensors
- Solar and PV
- Third-Party Integrations
- Utility Companies - UIDI

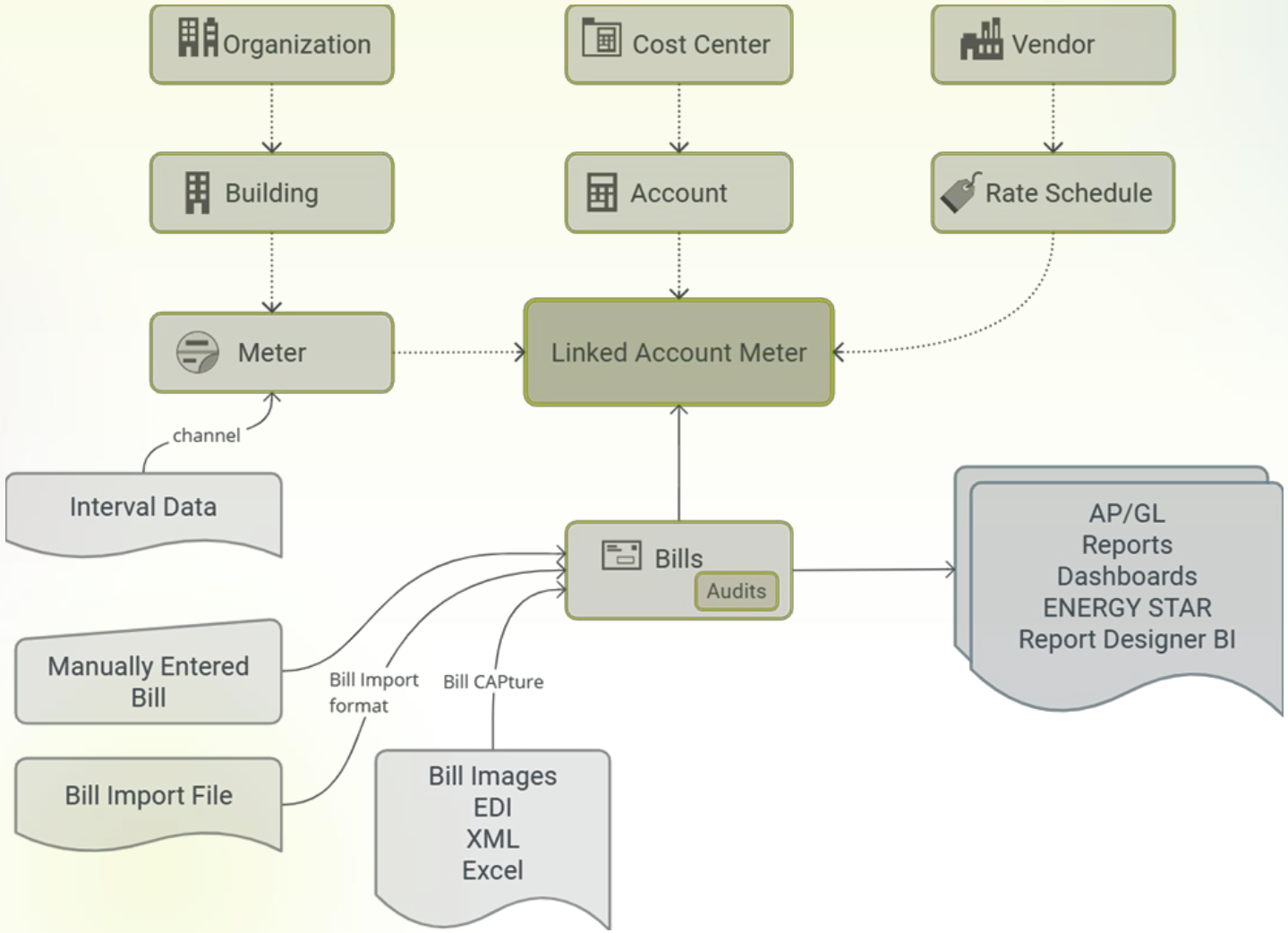
Single Login – Access All Applications



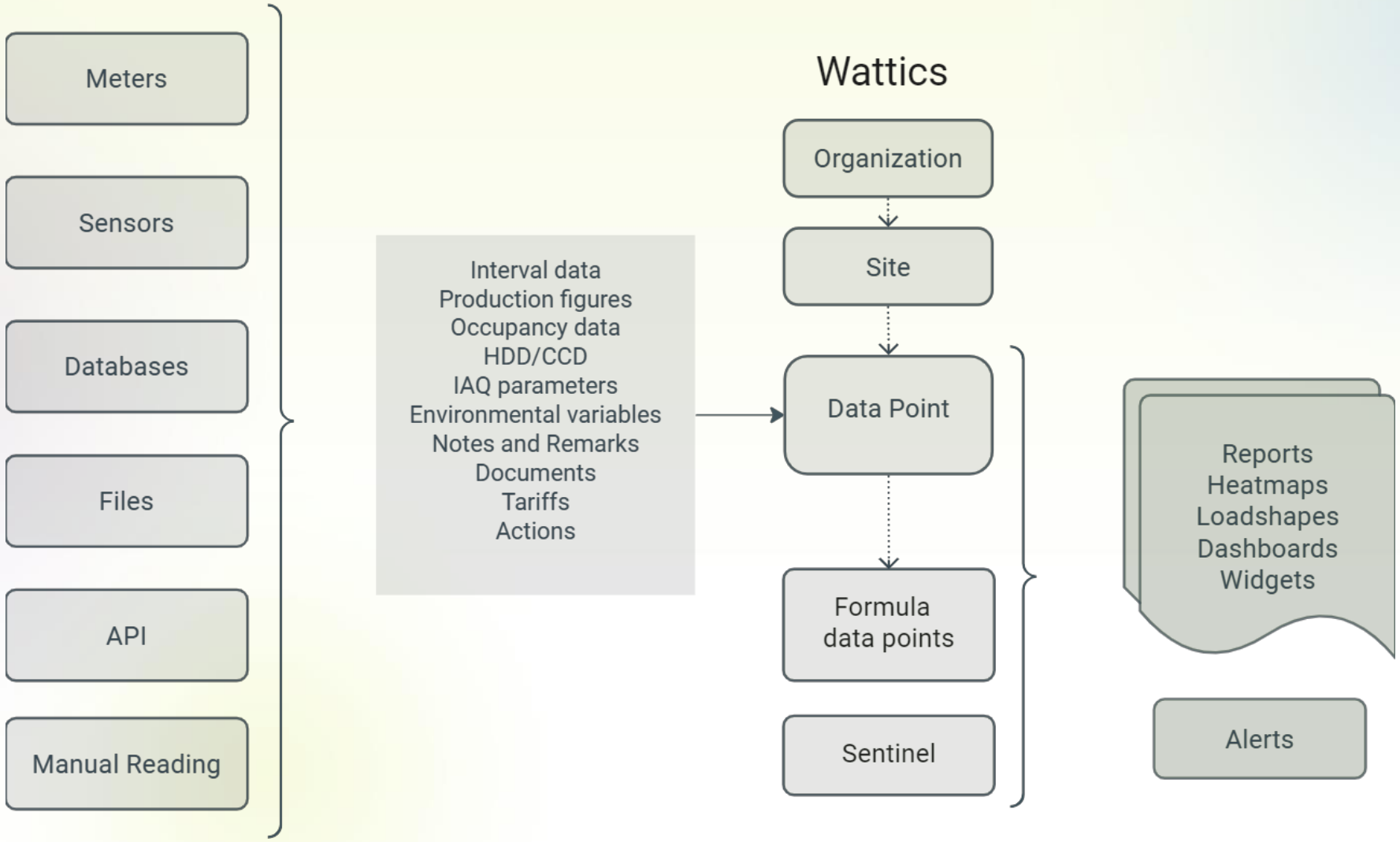
Single Login – Access All Applications



Data Elements // UtilityManagement

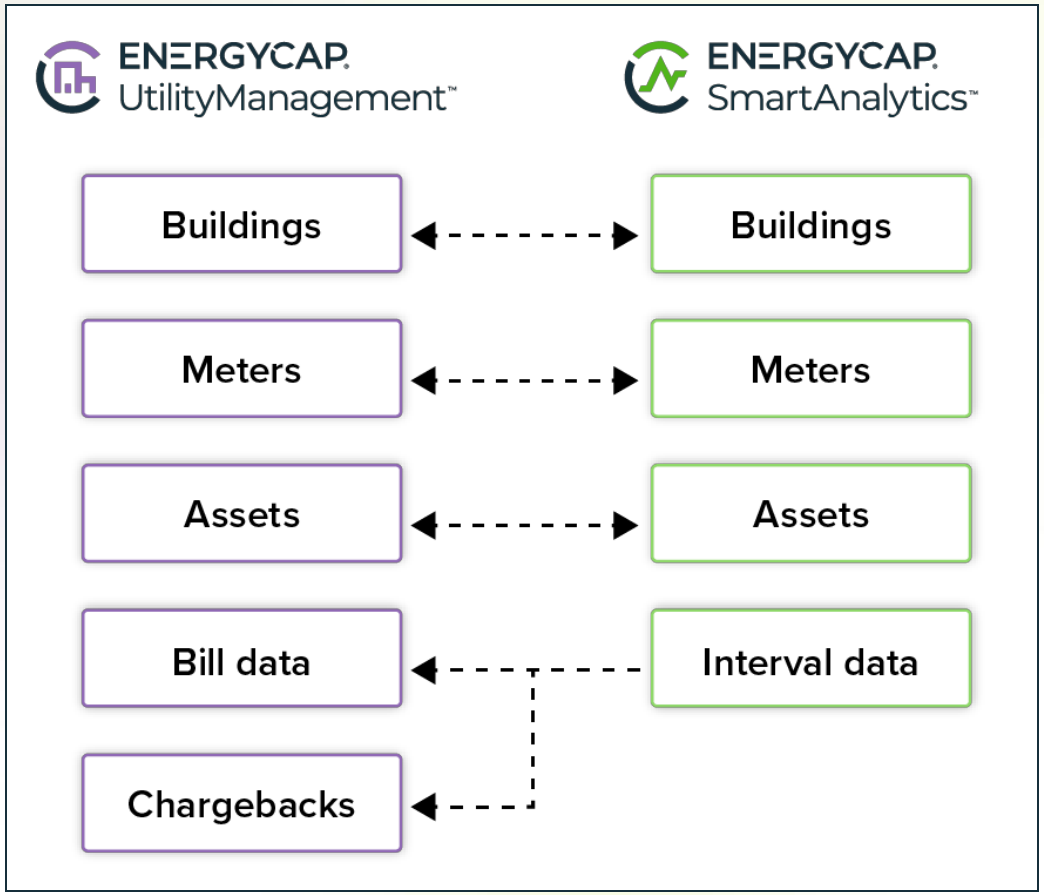


Data Elements // SmartAnalytics

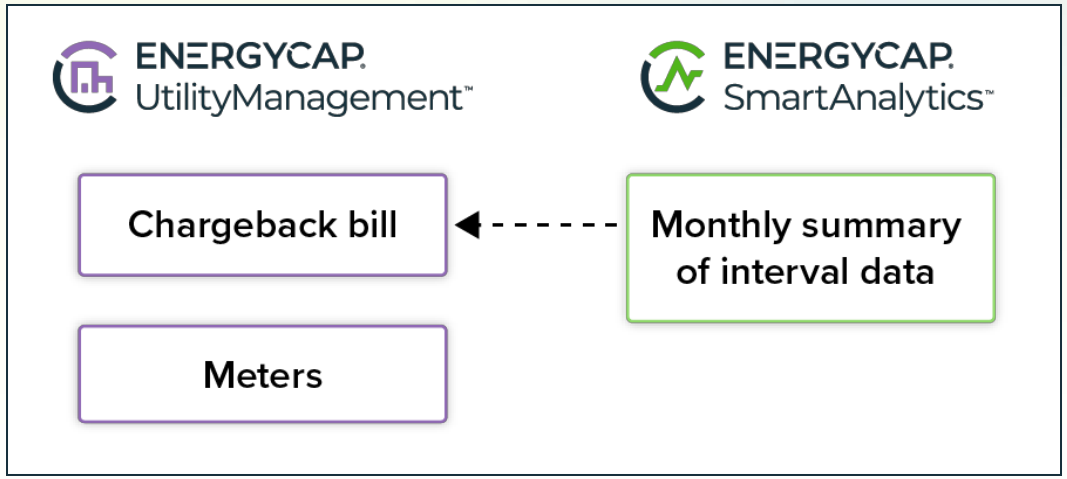


Share and Combine Objects

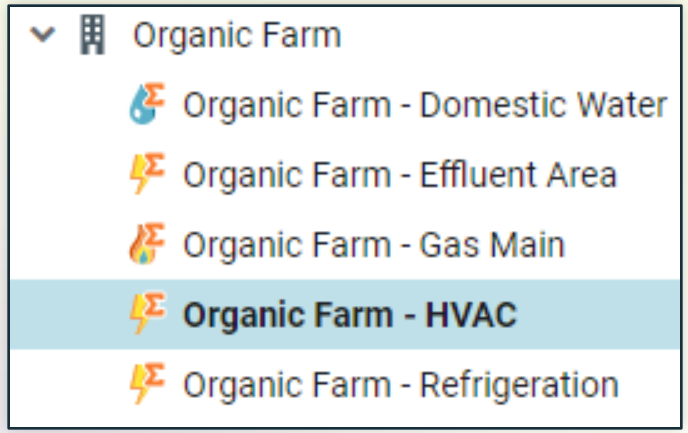
Share Buildings, Meters, Assets, and Interval Data

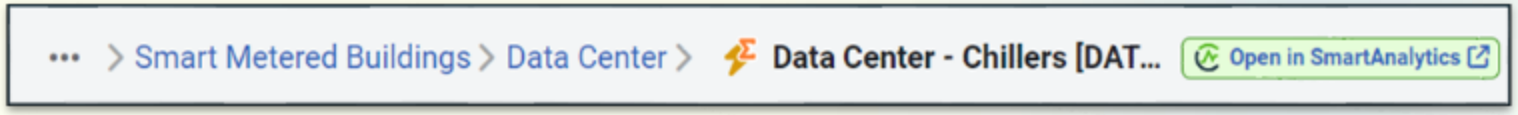


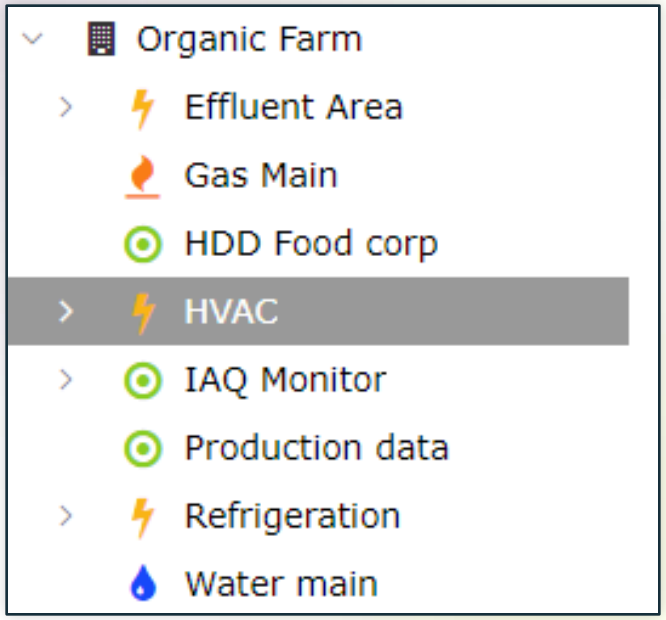
Create Monthly Bills from Interval Data

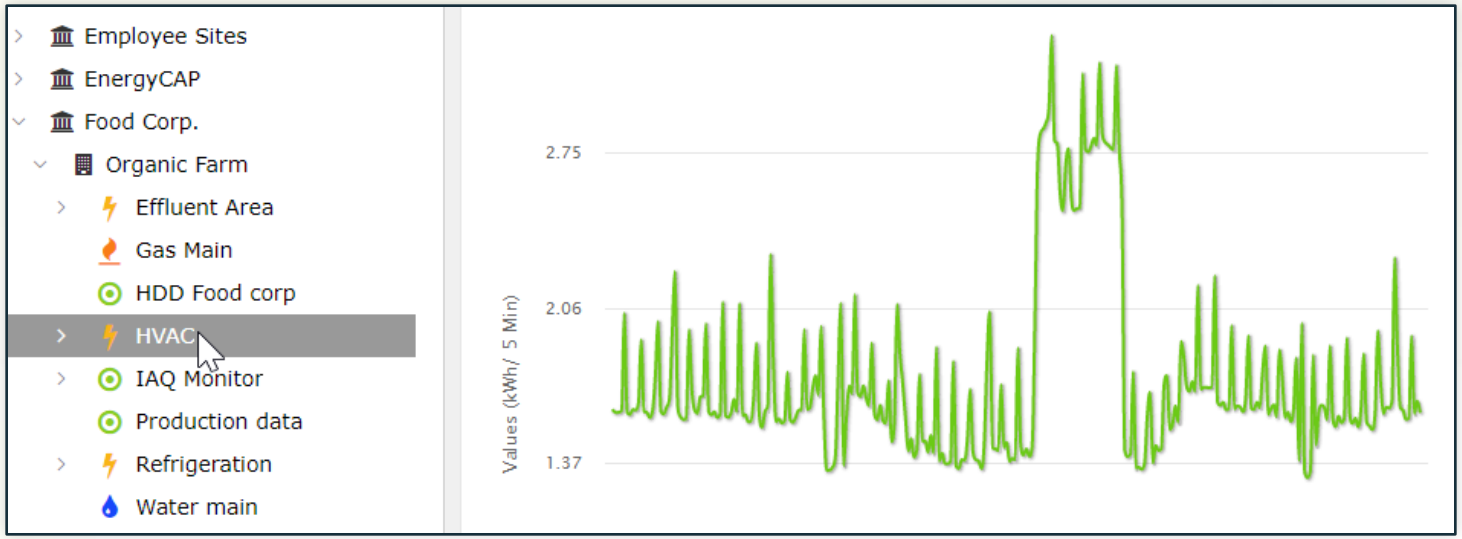


Link Meters to Share Data

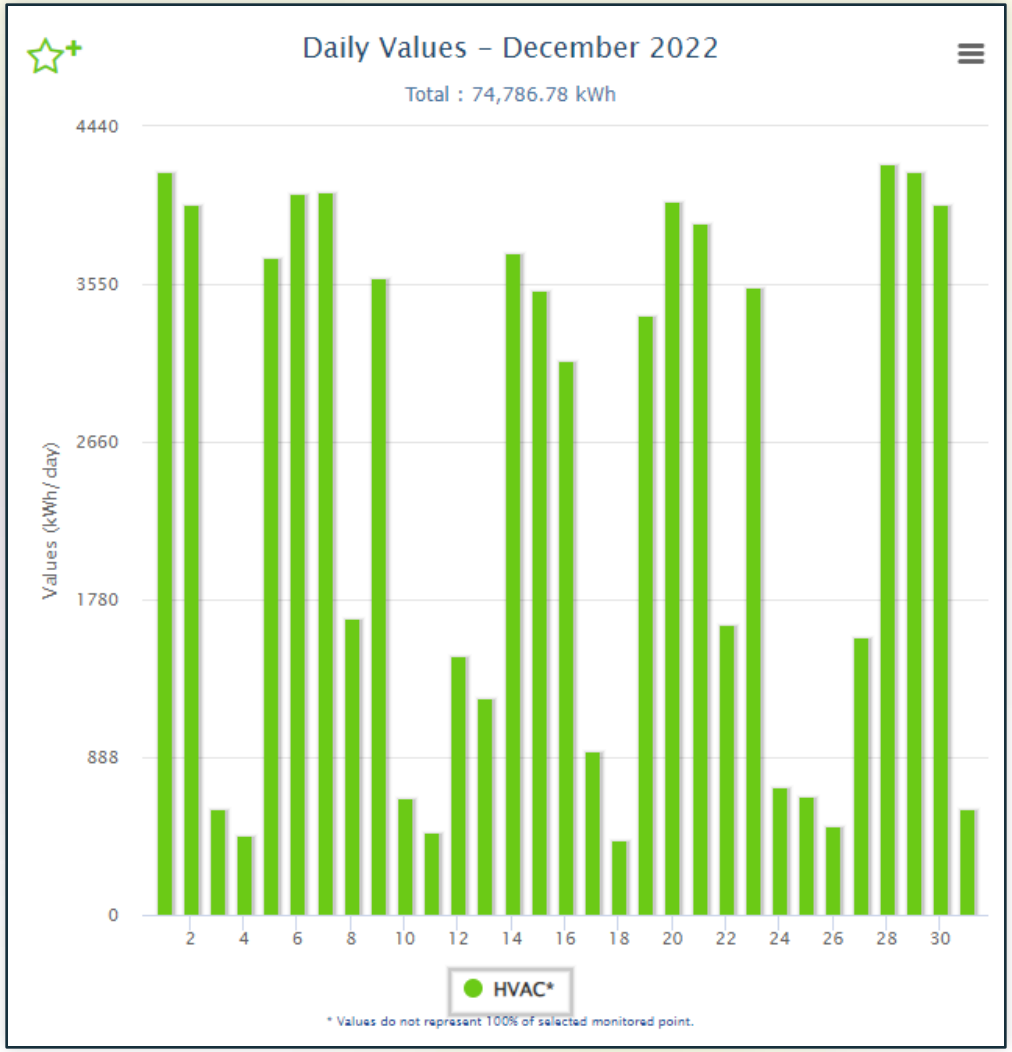


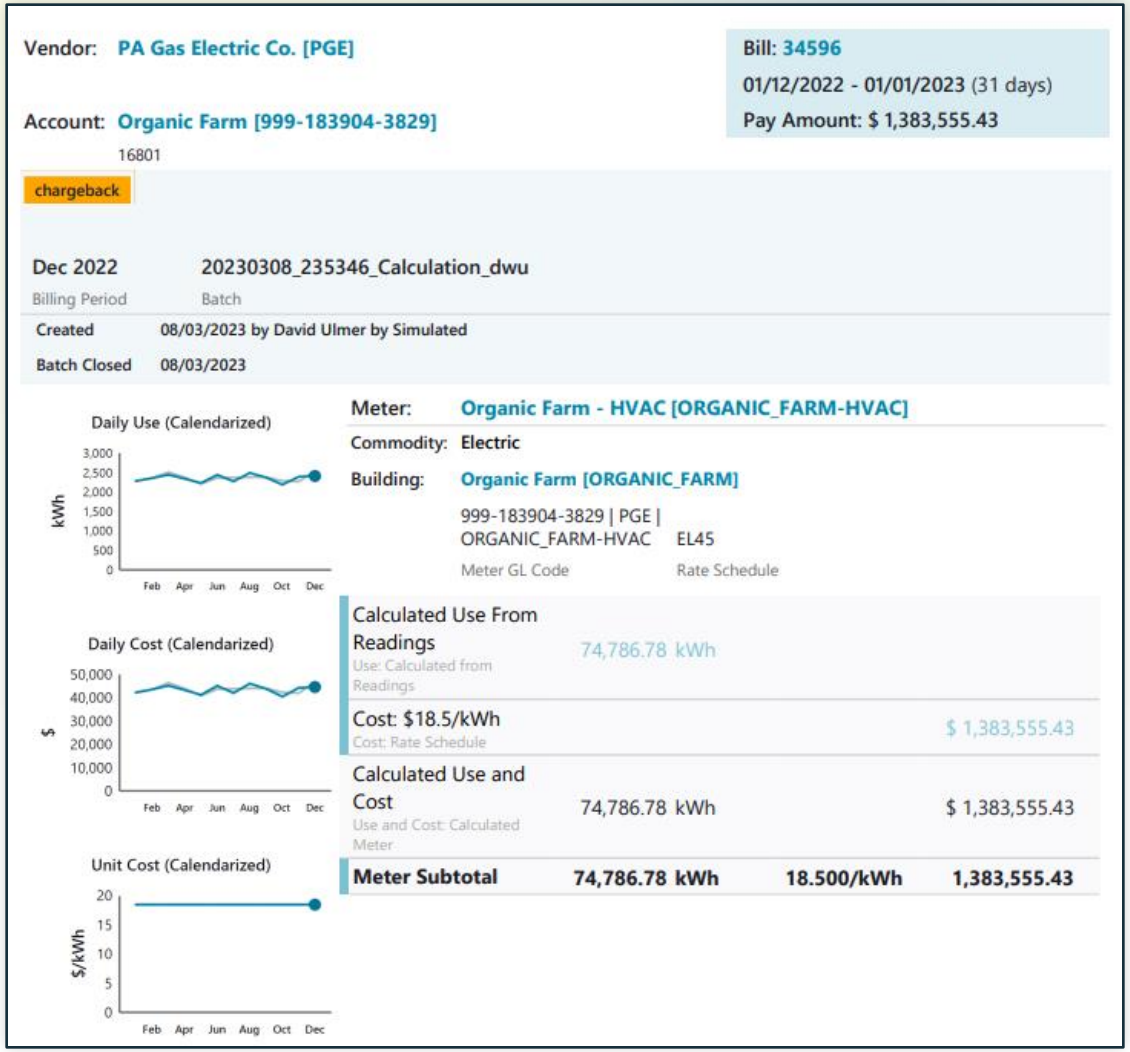






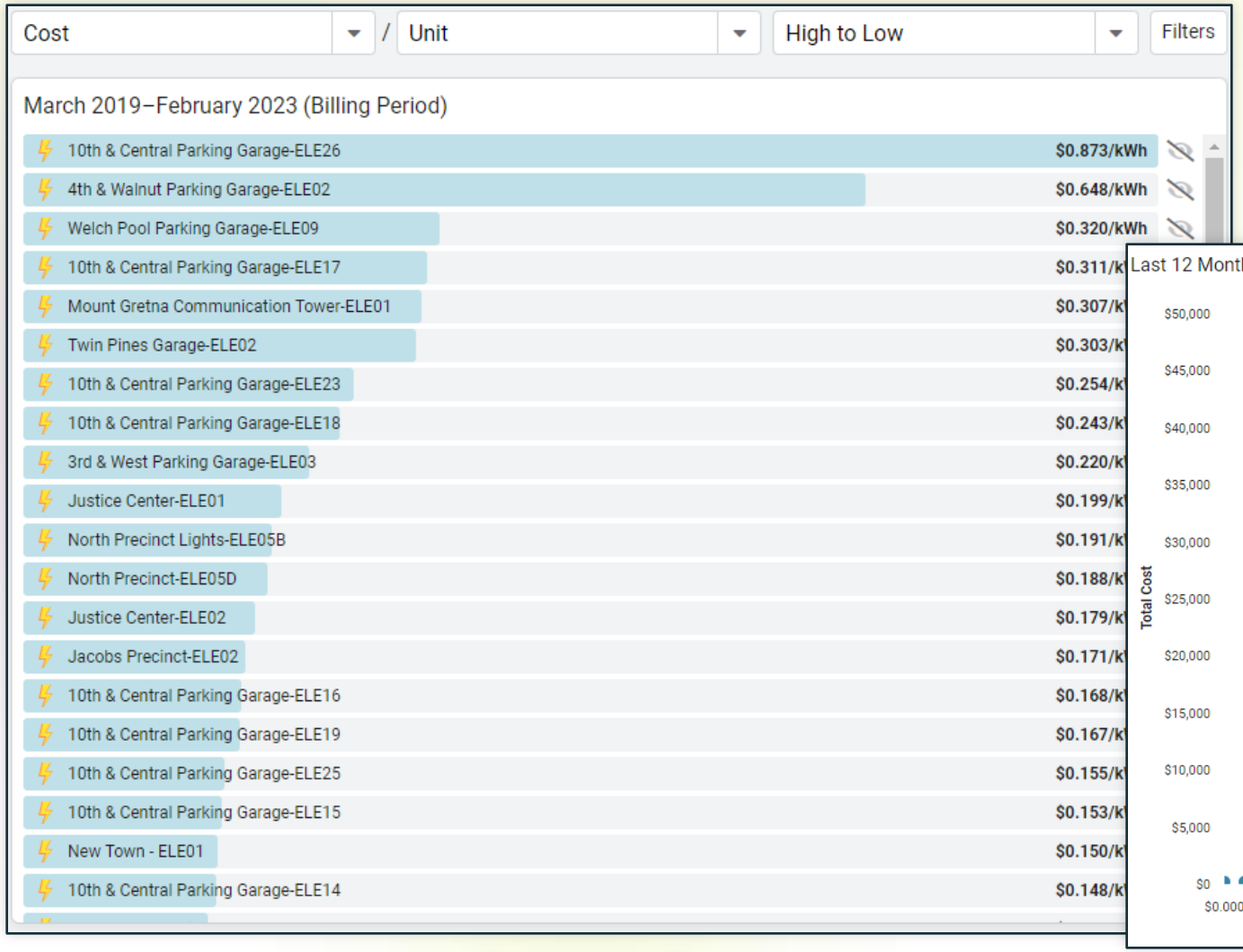
Convert Interval Data to Monthly Values

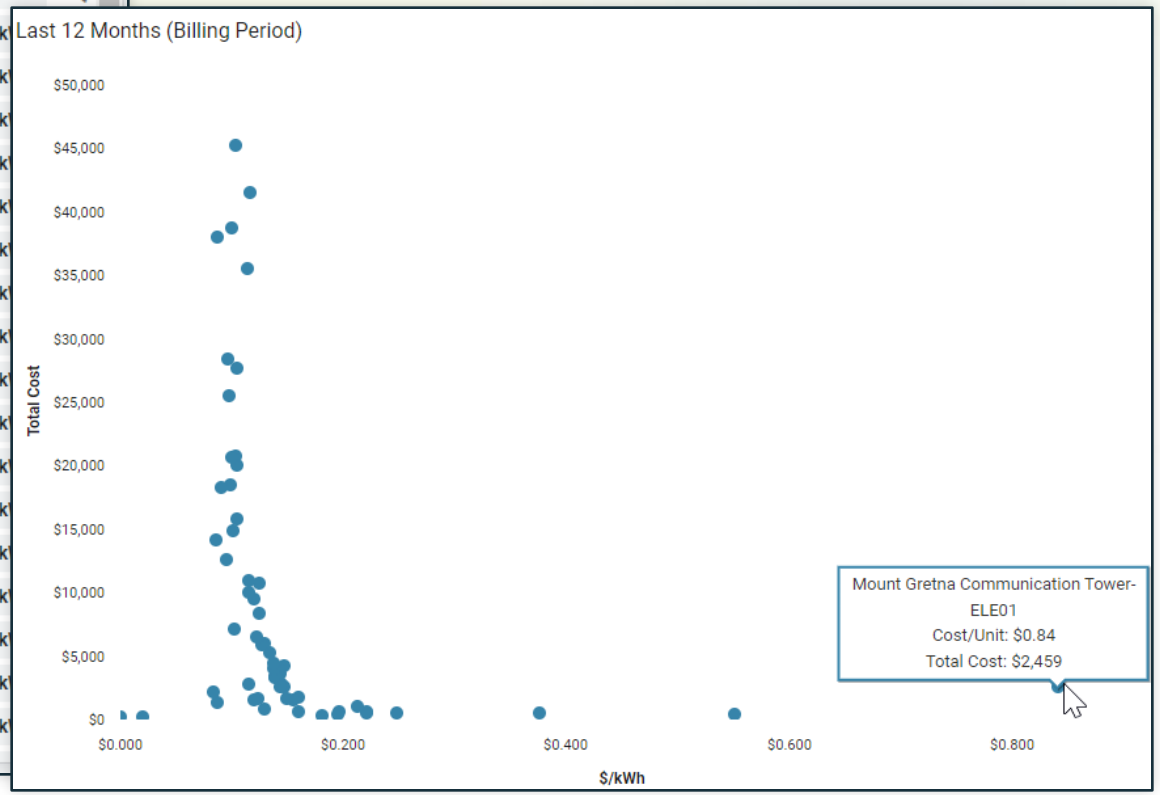




Powerful capabilities

Energy Procurement // Identify Targets Using Benchmarking





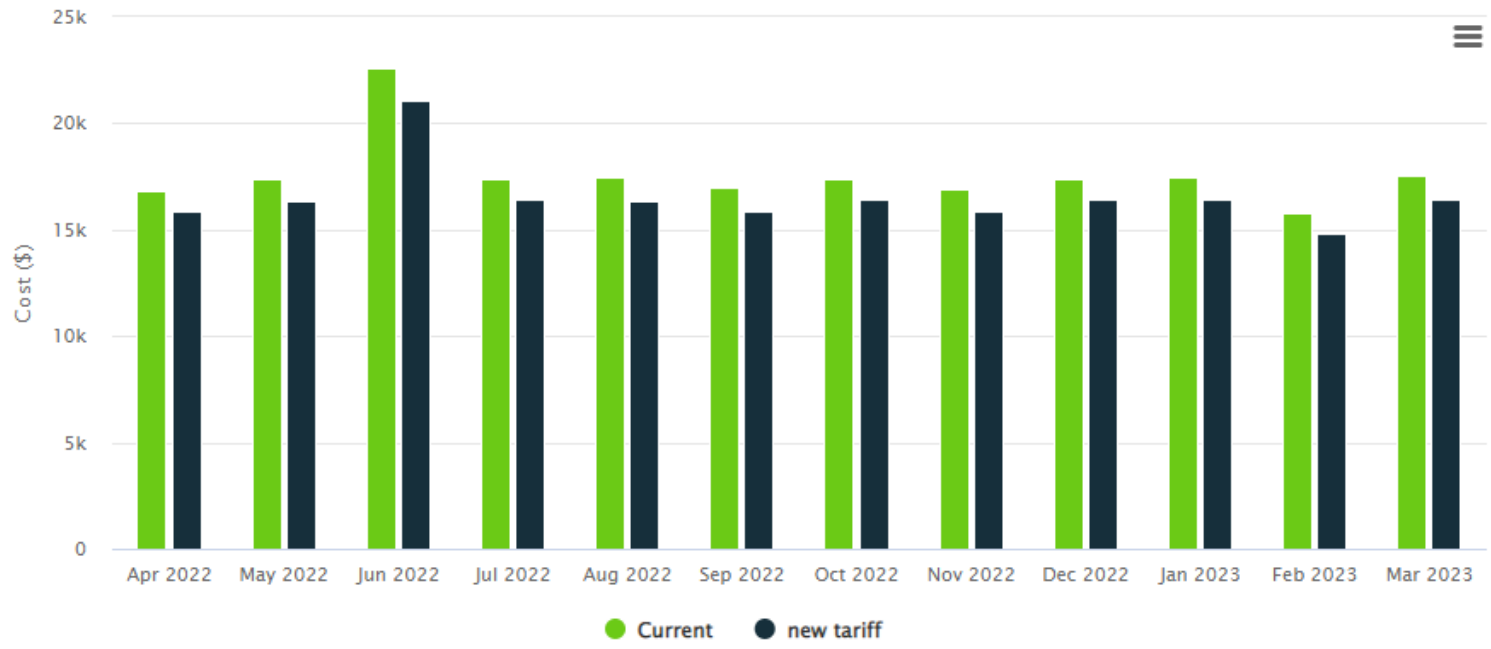
Energy Procurement // Build Tariffs and Run "What If" Scenarios

Alpha Hotel tariffs > electricity tariff analyser

Past 12 months cost analysis*

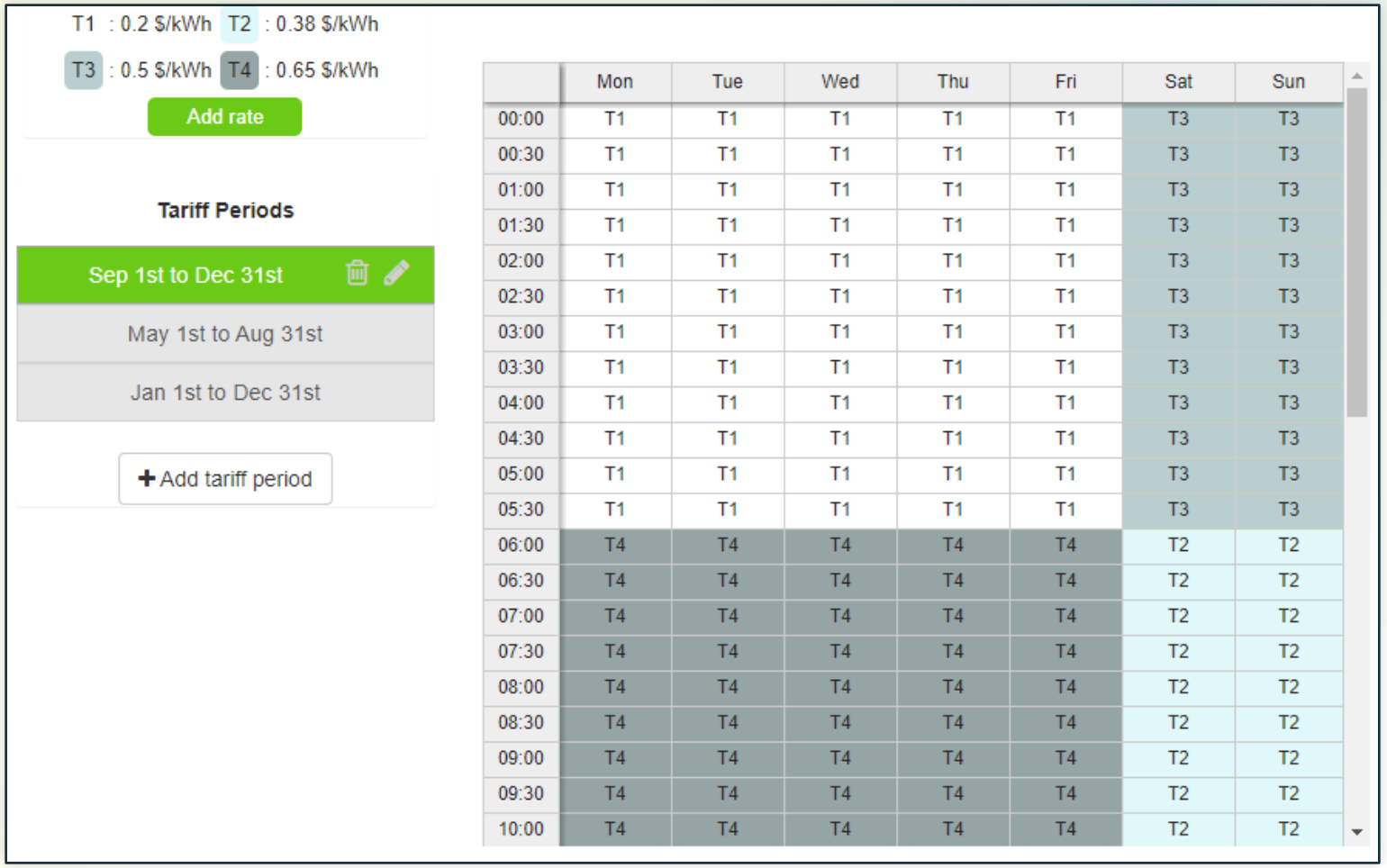
Add a new tariff to the analysis...

tariffs	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022	Sep 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	Mar 2023	Total
Current	*$16,798*	*$17,378*	*$22,557*	*$17,366*	*$17,473*	*$16,958*	*$17,382*	*$16,940*	*$17,415*	*$17,429*	*$15,760*	*$17,529*	***$210,986***
new tariff	$15,855	$16,358	$21,092	$16,452	$16,360	$15,888	$16,457	$15,884	$16,387	$16,421	$14,826	$16,416	**$198,396 (-6%)**



Energy Procurement // Rate Structures

- Time of use charges
- Seasonal rate structures
- Better visibility into times of day causing cost spikes



	Mon	Tue	Wed	Thu	Fri	Sat	Sun
00:00	T1	T1	T1	T1	T1	T3	T3
00:30	T1	T1	T1	T1	T1	T3	T3
01:00	T1	T1	T1	T1	T1	T3	T3
01:30	T1	T1	T1	T1	T1	T3	T3
02:00	T1	T1	T1	T1	T1	T3	T3
02:30	T1	T1	T1	T1	T1	T3	T3
03:00	T1	T1	T1	T1	T1	T3	T3
03:30	T1	T1	T1	T1	T1	T3	T3
04:00	T1	T1	T1	T1	T1	T3	T3
04:30	T1	T1	T1	T1	T1	T3	T3
05:00	T1	T1	T1	T1	T1	T3	T3
05:30	T1	T1	T1	T1	T1	T3	T3
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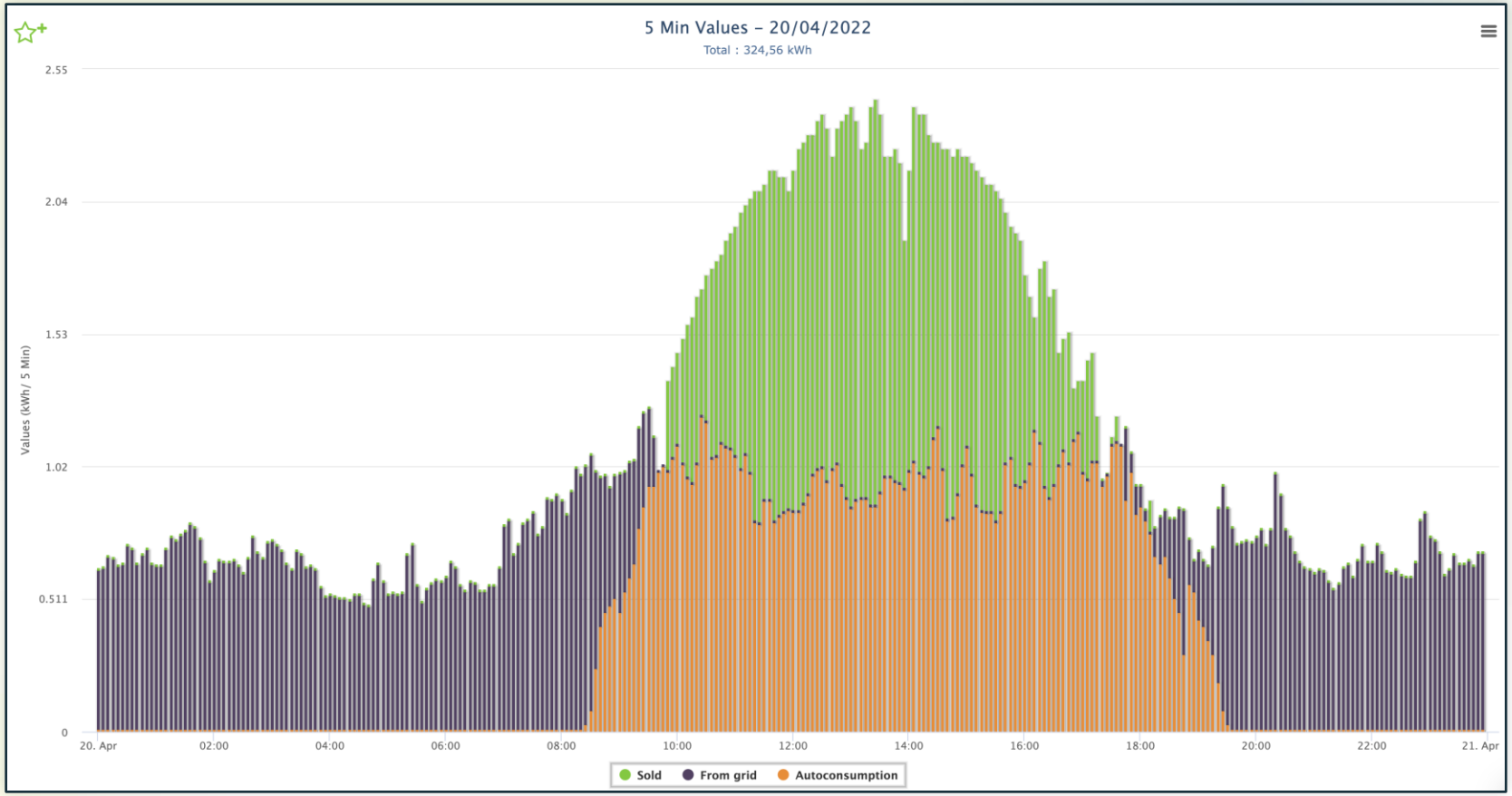
06:30	T4	T4	T4	T4	T4	T2	T2
07:00	T4	T4	T4	T4	T4	T2	T2
07:30	T4	T4	T4	T4	T4	T2	T2
08:00	T4	T4	T4	T4	T4	T2	T2
08:30	T4	T4	T4	T4	T4	T2	T2
09:00	T4	T4	T4	T4	T4	T2	T2
09:30	T4	T4	T4	T4	T4	T2	T2
10:00	T4	T4	T4	T4	T4	T2	T2

Energy Procurement // Understand Consumption Sources

- Report on sources in real-time
- Track generation and selling activities
- Apply CO2 in real-time to generation and consumption
- Track renewables

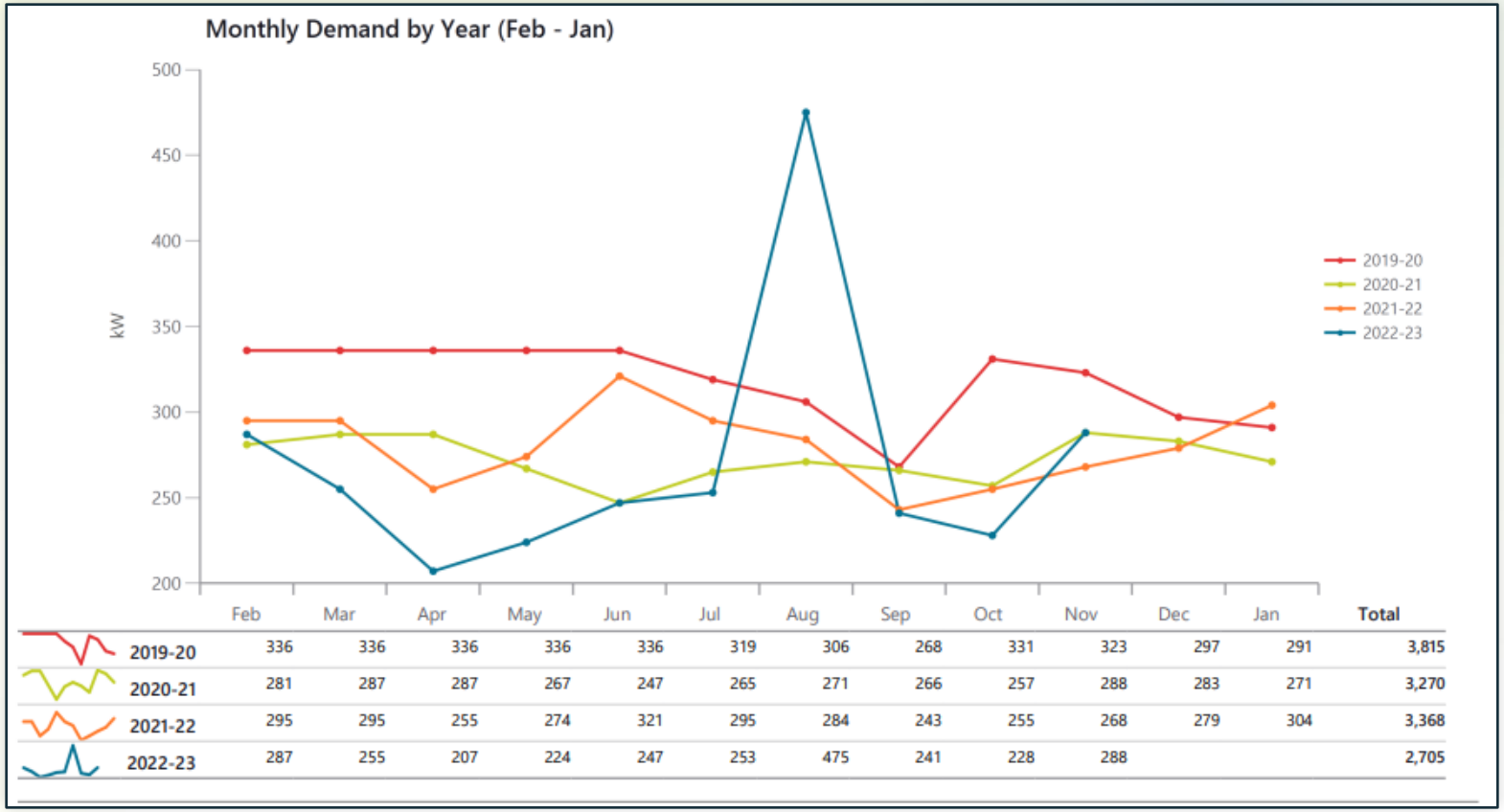


Demand Management // Overview

- Limiting demand can be greatest potential for savings opportunities on bills
- Some rates use highest demand for any point during a timeframe
- One ‘boo-boo’ sets rate for the year
- Can’t measure what you don’t monitor
- Limiting demand spikes make for more predictable and lower cost bills

Demand Management // Pinpoint Periods

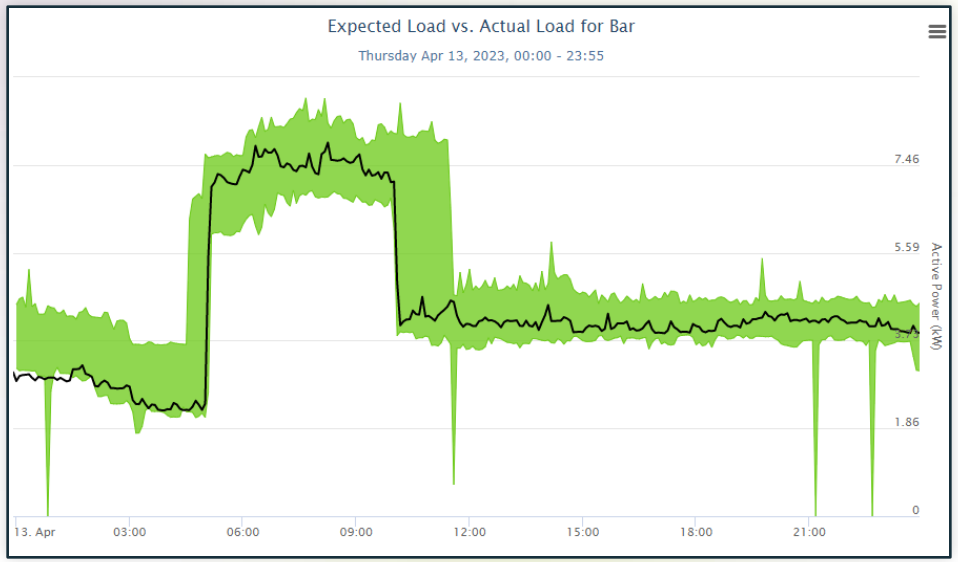
- Demand shows up on bills
- The 30-day snapshot provides no explanation of when or what was causing it
- Helpful to see reports of values
- How do you limit spikes like this from occurring which you might then be paying for throughout the entire year?

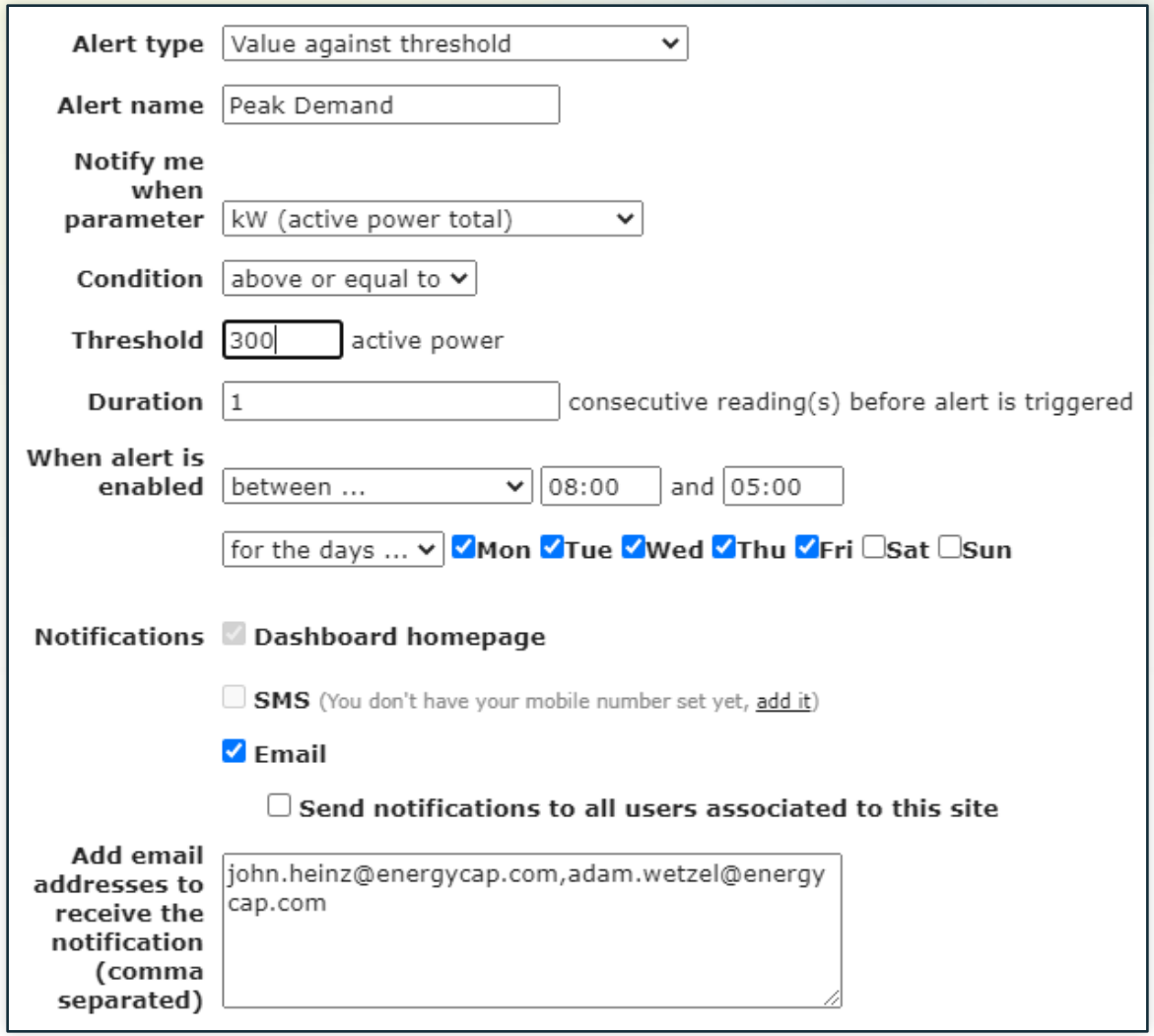


	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Total
2019-20	336	336	336	336	336	319	306	268	331	323	297	291	3,815
2020-21	281	287	287	267	247	265	271	266	257	288	283	271	3,270
2021-22	295	295	255	274	321	295	284	243	255	268	279	304	3,368
2022-23	287	255	207	224	247	253	475	241	228	288			2,705

Demand Management // Alerts, Thresholds, AI

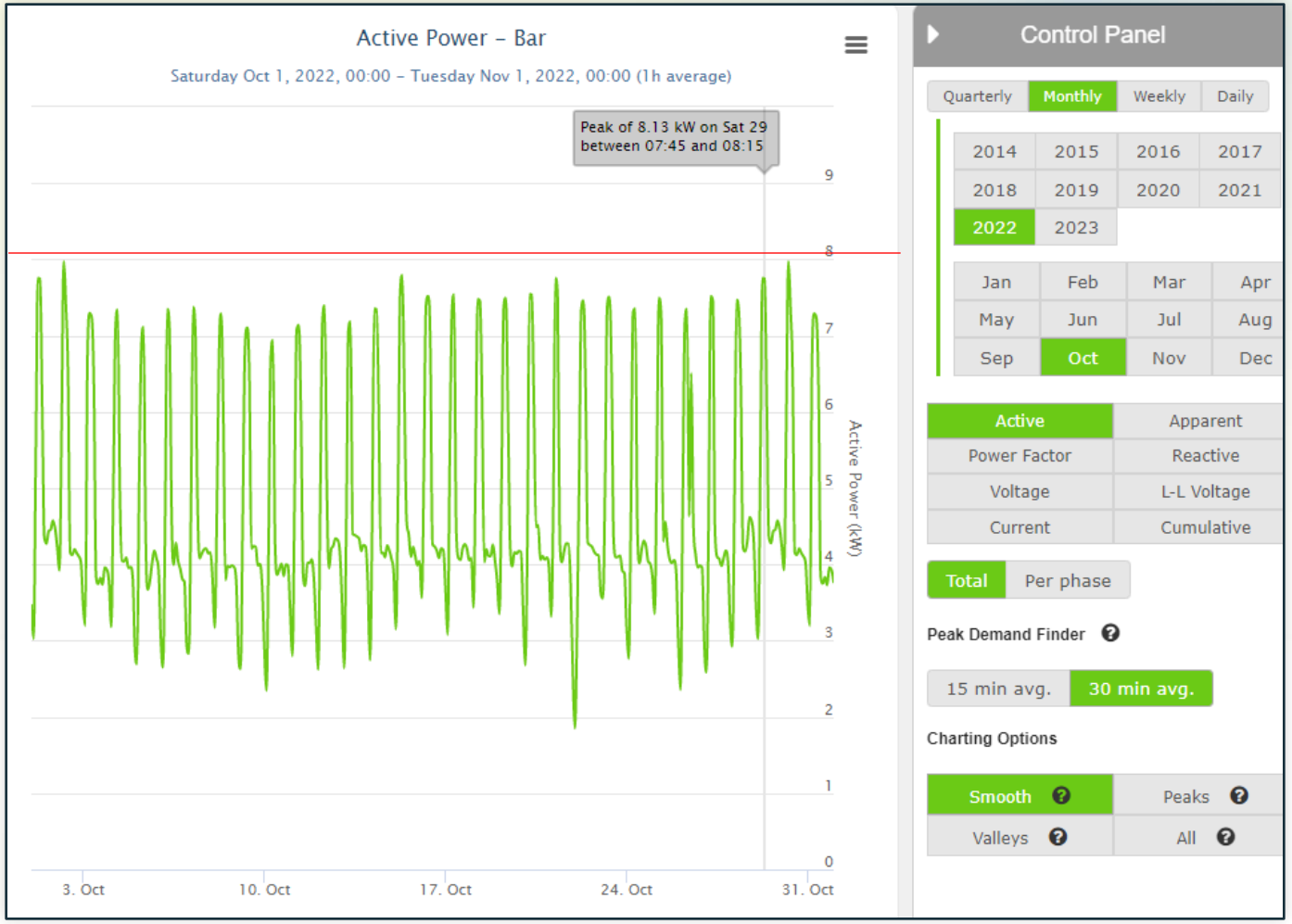
- Alarms and alerts provide informative and actionable insights
- Set thresholds to alert you of potential spikes
- Define when and how you want to receive notifications
- Fine tune based on AI predictive values





Demand Management // Monitor and Analyze

- Actively monitor and analyze demand in user-defined periods
- Determine time period with more intensive spikes during 15- or 30-minute averages
- Understand the exact time periods for billed demand, what activities are going on, and what equipment is causing spikes



Bill Reconciliation // Billed vs Metered

Find variances of billed vs metered use and demand

Aurora Public Schools — Report-35 - Bill Use Reconciliation Report

Electric

Meter Code	Place	Billing Period	Start Date	End Date	Billed Use	Metered Use	Unit	Variance	Variance %	Actual Demand on Bill	Billed Demand on Bill	Max Demand on Bill	Max Metered Demand	Unit	Variance	Variance %
300980468EL	Altura ES	201707	7/19/2017	8/17/2017	32,000.00	31,083.58	kWh	(916.42)	-2.86%	229.28	229.00	229.28	224.72	kW	(4.56)	-1.99%
300980468EL	Altura ES	201708	8/17/2017	9/18/2017	44,480.00	43,348.20	kWh	(1,131.80)	-2.54%	251.36	251.00	251.36	245.61	kW	(5.75)	-2.29%
300980468EL	Altura ES	201709	9/18/2017	10/17/2017	33,280.00	30,660.00	kWh	(2,620.00)	-7.87%	234.08	234.00	234.08	230.77	kW	(3.31)	-1.41%
300980468EL	Altura ES	201710	10/17/2017	11/15/2017	30,560.00	29,177.85	kWh	(1,382.15)	-4.52%	209.00	209.00	209.00	202.32	kW	(6.68)	-3.19%
300980468EL	Altura ES	201711	11/15/2017	12/18/2017	36,480.00	13,638.24	kWh	(22,841.76)	-62.61%	162.40	162.00	162.40	157.86	kW	(4.54)	-2.79%
300980468EL	Altura ES	201801	1/19/2018	2/20/2018	40,320.00	14,849.67	kWh	(25,470.33)	-63.17%	183.00	183.00	183.00	173.61	kW	(9.39)	-5.13%
300980468EL	Altura ES	201803	2/20/2018	3/21/2018	37,600.00	35,844.33	kWh	(1,755.67)	-4.67%	176.00	176.00	176.00	169.43	kW	(6.57)	-3.73%
300980468EL	Altura ES	201804	3/21/2018	4/19/2018	30,240.00	29,560.76	kWh	(679.24)	-2.25%	172.16	172.00	172.16	168.32	kW	(3.84)	-2.23%
300980468EL	Altura ES	201805	4/19/2018	5/18/2018	34,560.00	33,670.15	kWh	(889.85)	-2.57%	208.00	208.00	208.00	199.49	kW	(8.51)	-4.09%
300980468EL	Altura ES	201806	5/18/2018	6/19/2018	21,120.00	20,702.95	kWh	(417.05)	-1.97%	205.00	205.00	205.00	198.23	kW	(6.77)	-3.30%
300980468EL	Altura ES	201807	6/19/2018	7/19/2018	18,080.00	17,684.46	kWh	(395.54)	-2.19%	159.00	159.00	159.00	152.89	kW	(6.11)	-3.84%
300980468EL	Altura ES	201808	7/19/2018	8/17/2018	36,320.00	35,531.49	kWh	(788.51)	-2.17%	234.00	234.00	234.00	224.94	kW	(9.06)	-3.87%
300980468EL	Altura ES	201809	8/17/2018	9/18/2018	43,840.00	42,682.23	kWh	(1,157.77)	-2.64%	260.00	260.00	260.00	252.47	kW	(7.53)	-2.90%
300980468EL	Altura ES	201810	9/18/2018	10/17/2018	36,640.00	35,258.89	kWh	(1,381.11)	-3.77%	254.08	254.00	254.08	246.02	kW	(8.06)	-3.17%
300980468EL	Altura ES	201811	10/17/2018	11/15/2018	33,120.00	28,899.03	kWh	(4,220.97)	-12.74%	184.16	184.00	184.16	175.34	kW	(8.82)	-4.79%
300980468EL	Altura ES	201812	11/15/2018	12/18/2018	42,240.00	40,322.30	kWh	(1,917.70)	-4.54%	172.32	172.00	172.32	168.08	kW	(4.24)	-2.46%
300980468EL	Altura ES	201901	12/18/2018	1/21/2019	39,840.00	39,315.45	kWh	(524.55)	-1.32%	164.48	164.00	164.48	163.47	kW	(1.01)	-0.62%
300980468EL	Altura ES	201902	1/21/2019	2/20/2019	39,360.00	39,075.85	kWh	(284.15)	-0.72%	174.00	174.00	174.00	172.18	kW	(1.82)	-1.05%
300980468EL	Altura ES	201903	2/20/2019	3/21/2019	38,080.00	37,519.37	kWh	(560.63)	-1.47%	180.00	180.00	180.00	176.04	kW	(3.96)	-2.20%
300980468EL	Altura ES	201904	3/21/2019	4/19/2019	28,640.00	28,399.36	kWh	(240.64)	-0.84%	182.24	182.00	182.24	177.76	kW	(4.48)	-2.46%
300980468EL	Altura ES	201905	4/19/2019	5/20/2019	33,760.00	33,441.48	kWh	(318.52)	-0.94%	195.20	195.00	195.20	193.09	kW	(2.11)	-1.08%
300980468EL	Altura ES	201906	5/20/2019	6/19/2019	16,160.00	15,929.72	kWh	(230.28)	-1.43%	136.16	136.00	136.16	138.42	kW	2.26	1.66%
300980468EL	Altura ES	201907	6/19/2019	7/19/2019	14,720.00	14,483.25	kWh	(236.75)	-1.61%	197.12	197.00	197.12	186.85	kW	(10.27)	-5.21%

Bill Reconciliation // Interval Data & Tariff to Compare Costs

- Use the applied tariff to interval data to rollup monthly costs
- Compare time periods: monthly and annual costs, year-over-year

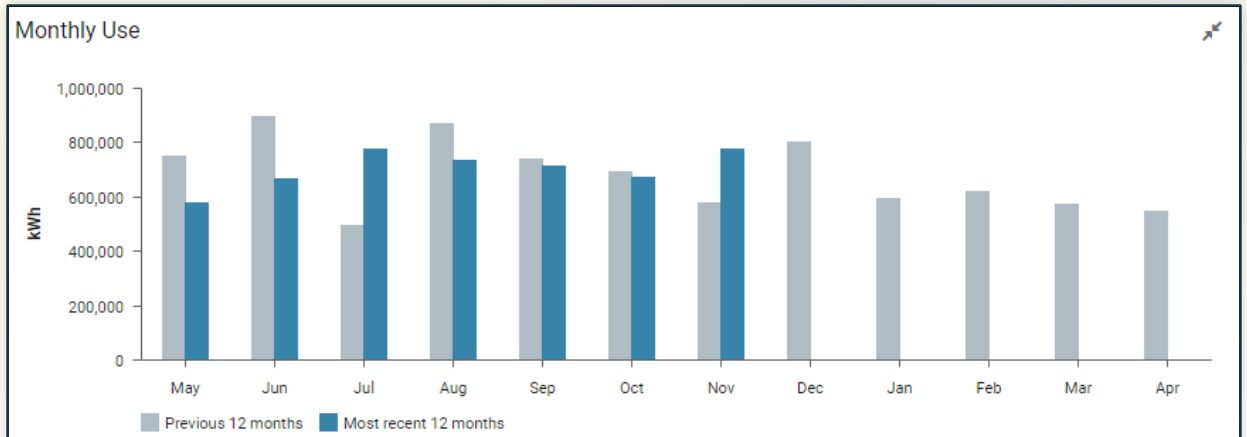
Advanced Energy Management // Overview

- Powerful tools for display of both real-time and monthly data
- Aggregate reporting for top-down views
- Pinpoint problems and outliers for targeted reduction strategies
- Perform simulated optimization activities to estimate savings
- Calculate the savings after implementing projects (simple & complex methods)
- Manage formulas to prove correlations, create targets, and more…

Advanced Energy Management // Data Status

Live status of data feeds

Monthly status feeds

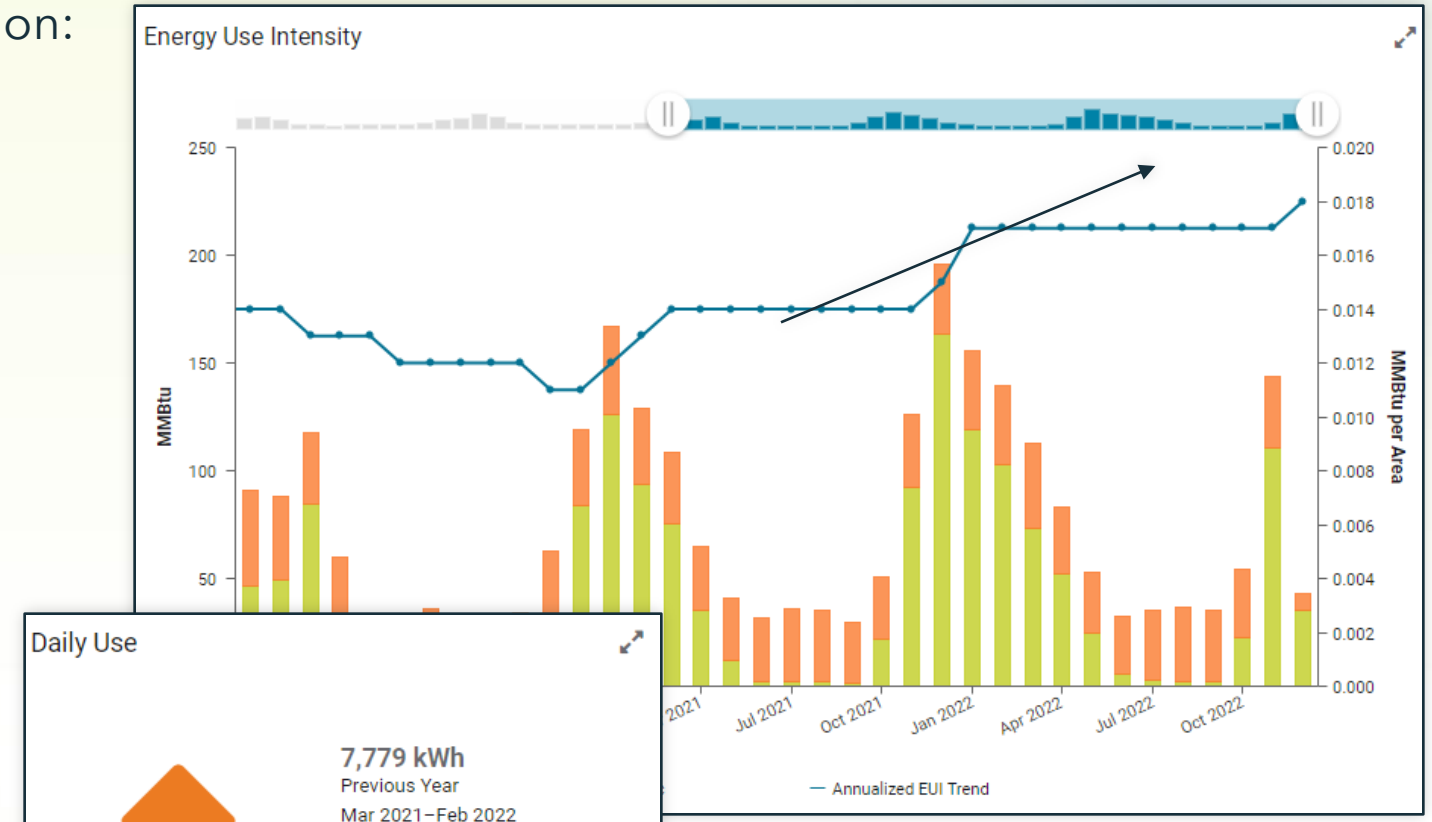


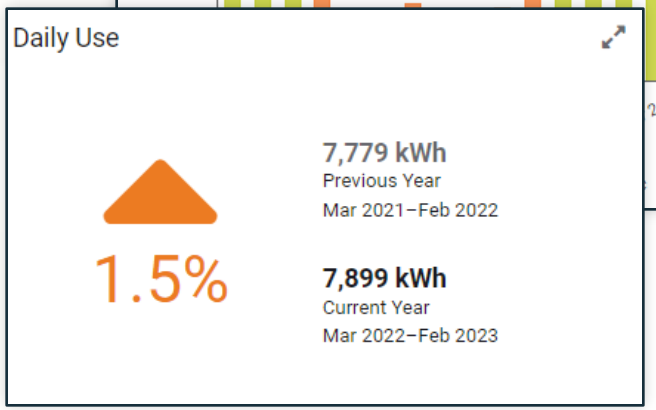
Month	Previous 12 months (kWh)	Most recent 12 months (kWh)
May	747,488	575,865
Jun	897,172	668,748
Jul	492,372	777,426
Aug	871,208	735,605
Sep	739,654	716,019
Oct	694,673	674,075
Nov	575,741	774,810

Advanced Energy Management // Identification

Identify buildings needing special attention:

- Increases in EUI: consider weather
- Higher demand charges
- Consumption spikes
- Cost might not be best metric to use



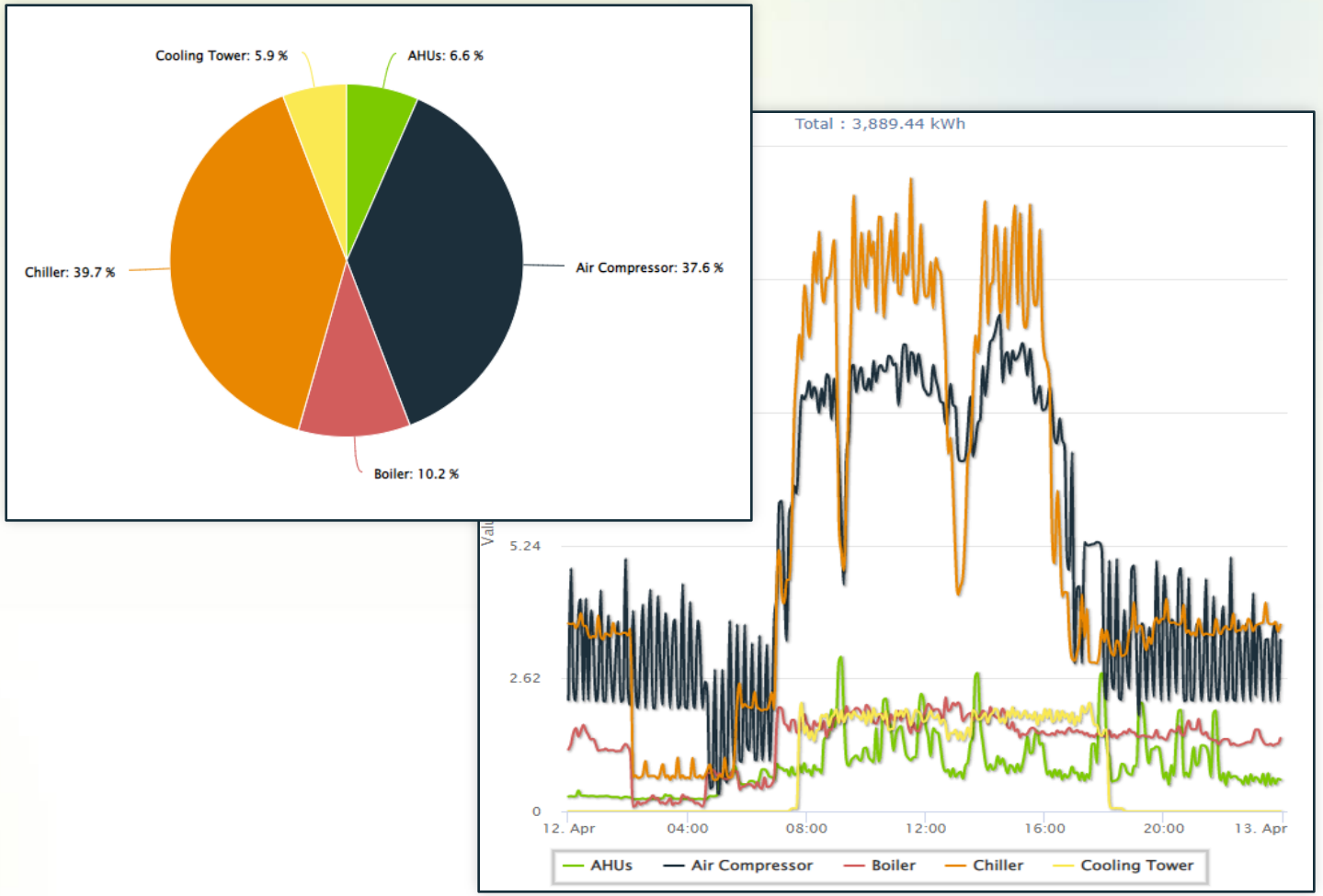


Advanced Energy Management // Identification

- Heatmaps to see usage patterns and trends
- Identify times when usage seems to be problematic, or schedules aren't being followed
- Understand intensive periods and how that impacts your utility bill based on time of use rates

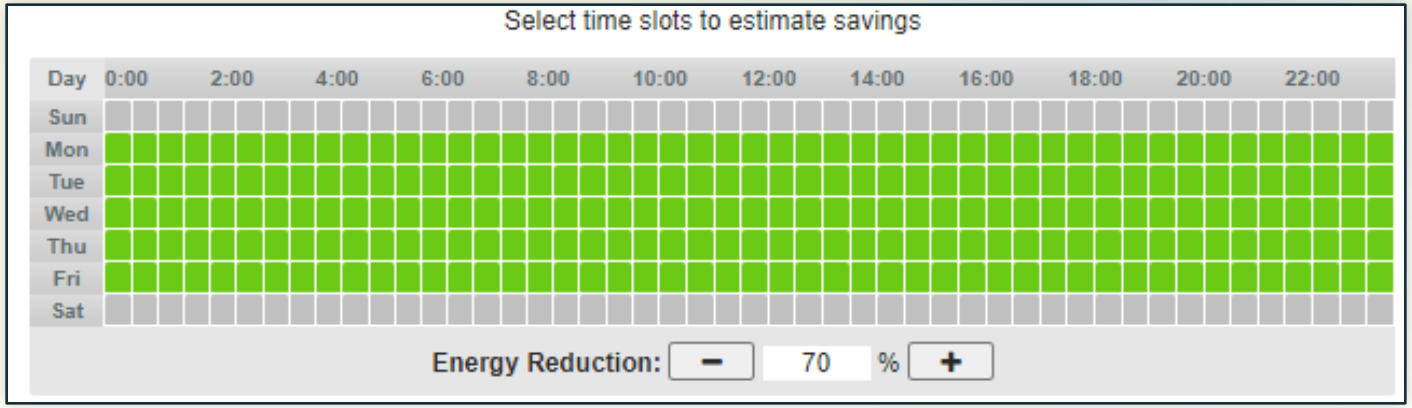
Advanced Energy Management // Isolate

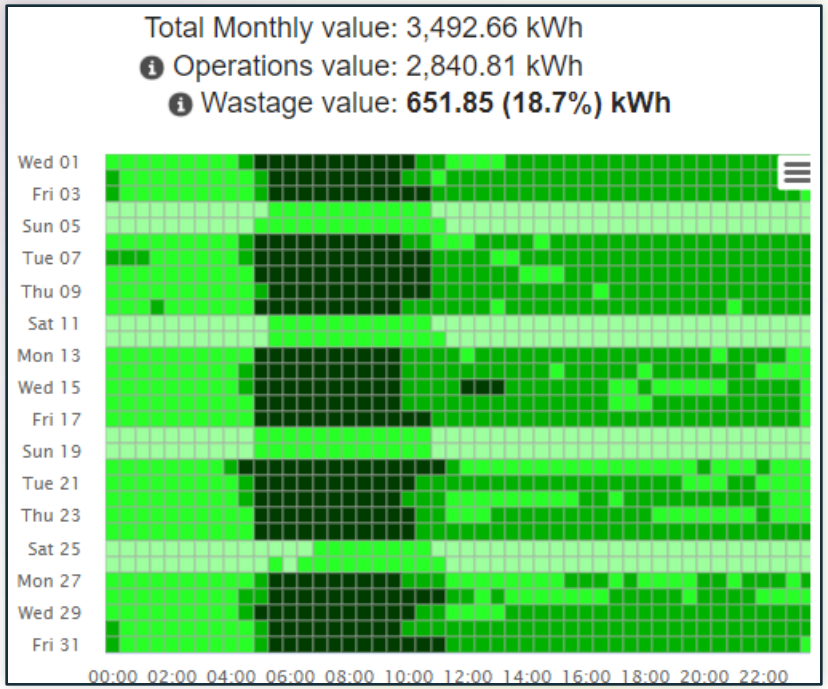
- Determine what zone, equipment, time of day, day of week is causing the spikes
- Depends on level of metering
- Overlay multiple points to compare, helpful when monitoring equipment (HVAC, Chillers, Refrigeration, etc.)



Advanced Energy Management // Optimize

Perform schedule optimization to target reduction strategies and most effective time periods





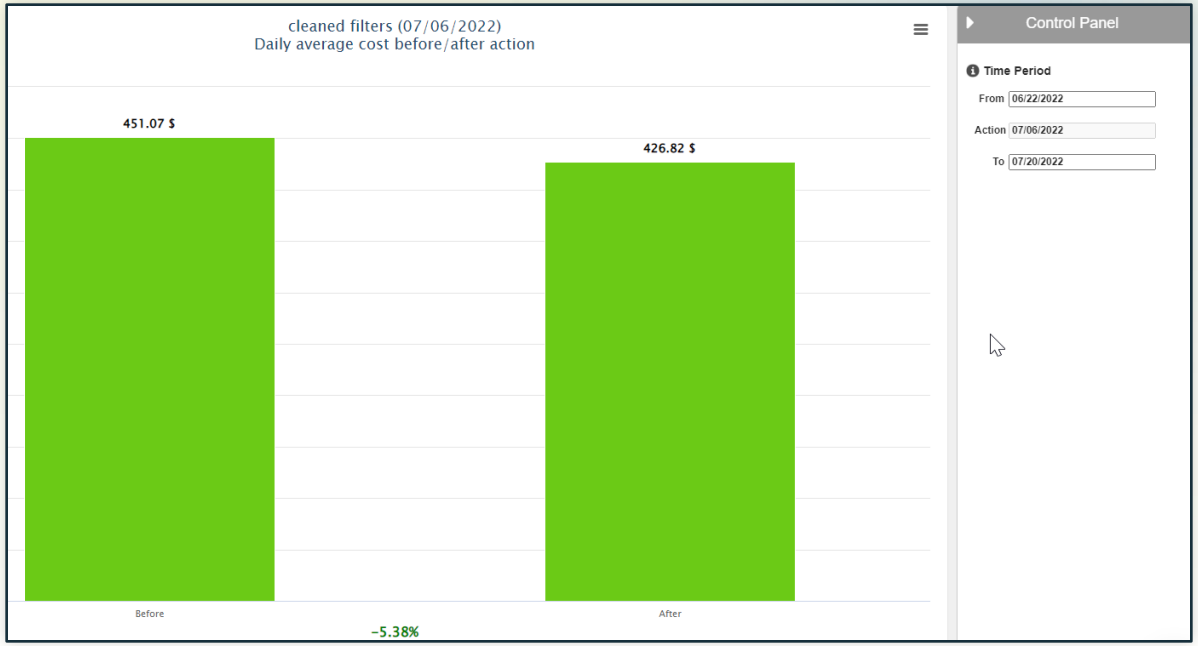
Heatmaps to simulate and visualize time periods of intensive usage and what the new schedule would look like

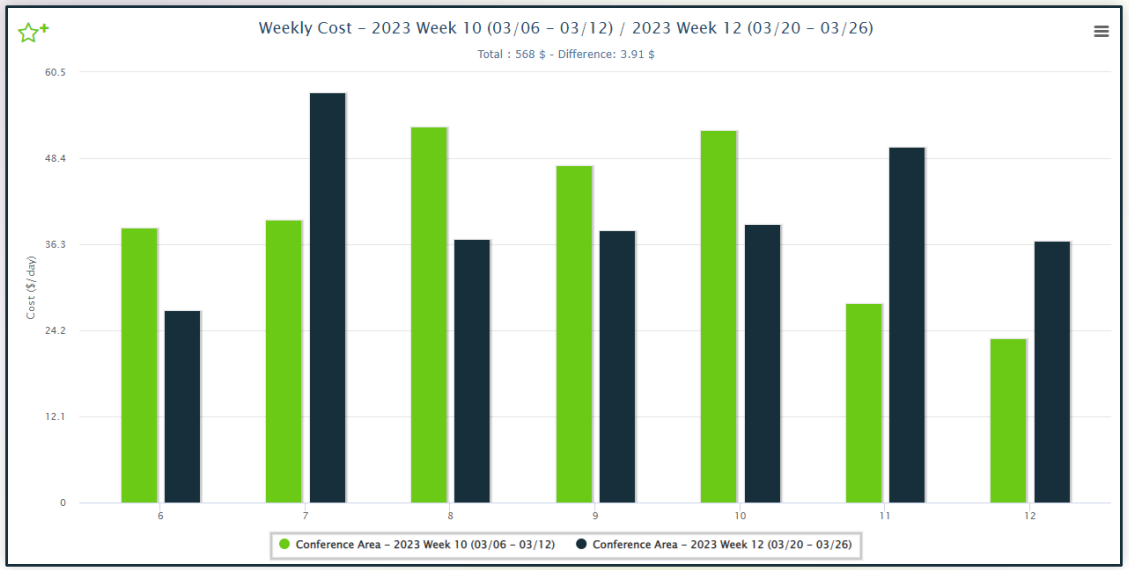
Calculate projected use and cost savings by making reduction changes

Advanced Energy Management // Measure: Simple Method

Actions Tracker on interval data

Compare two time periods and when an action was performed





Compare any time period and calculate the difference in use, cost, CO2

Advanced Energy Management // Measure: Simple Method

KPI on billing data

Compare two time periods to calculate savings on bills

Consider calendarized data

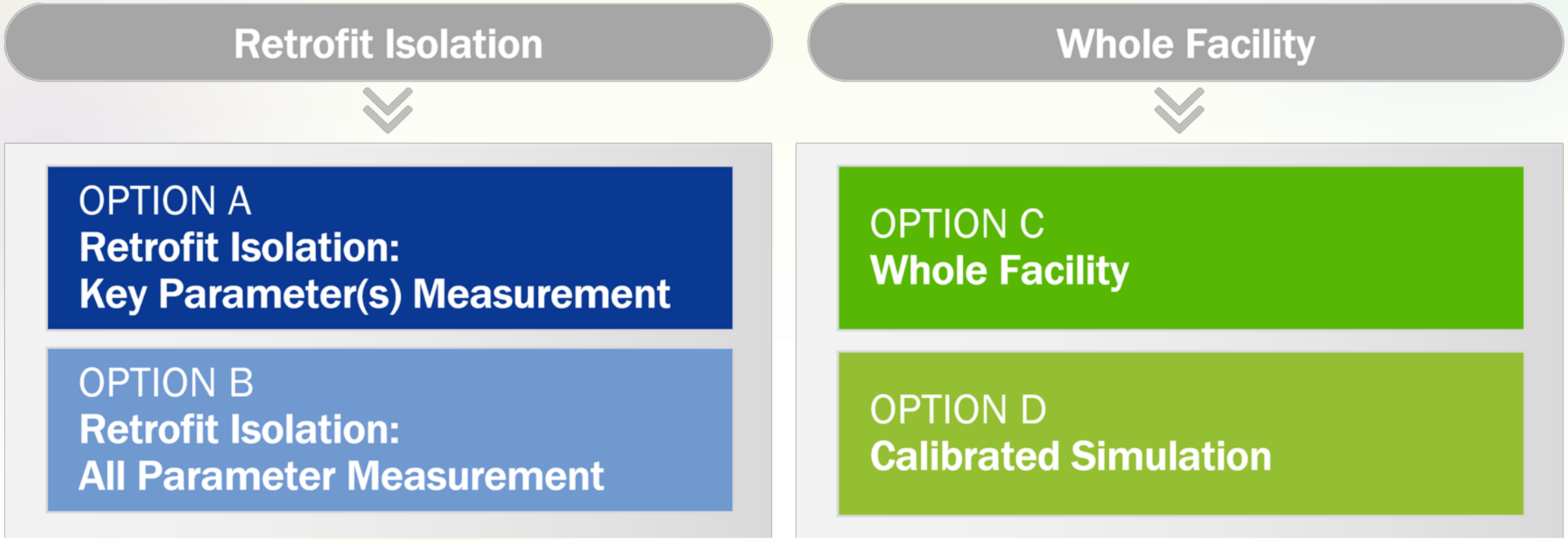
Meter Name	Meter Code	Calendarized Cost ($)	Jan 2021 - Dec 2021	Jan 2022 - Dec 2022	% Difference
City Hall-ELE01	CITY HALL-ELE01		$78,443	$78,094	-0.4 %
City Hall-NG01	CITY HALL-NG01		$15,565	$14,006	-10.0 %
City Hall-SEW01	CITY HALL-SEW01		$9,406	$2,949	-68.6 %
City Hall-WAT01	CITY HALL-WAT01		$5,789	$1,989	-65.6 %
City Hall-STO01	CITY HALL-STO01		$5,234	$2,664	-49.1 %
City Hall-WAT02	CITY HALL-WAT02		$1,831	$639	-65.1 %
City Hall-WAT03	CITY HALL-WAT03		$214	$75	-65.1 %
Total			$116,484	$100,417	-13.8 %

Year-over-year comparisons

Easily aggregate all commodity costs

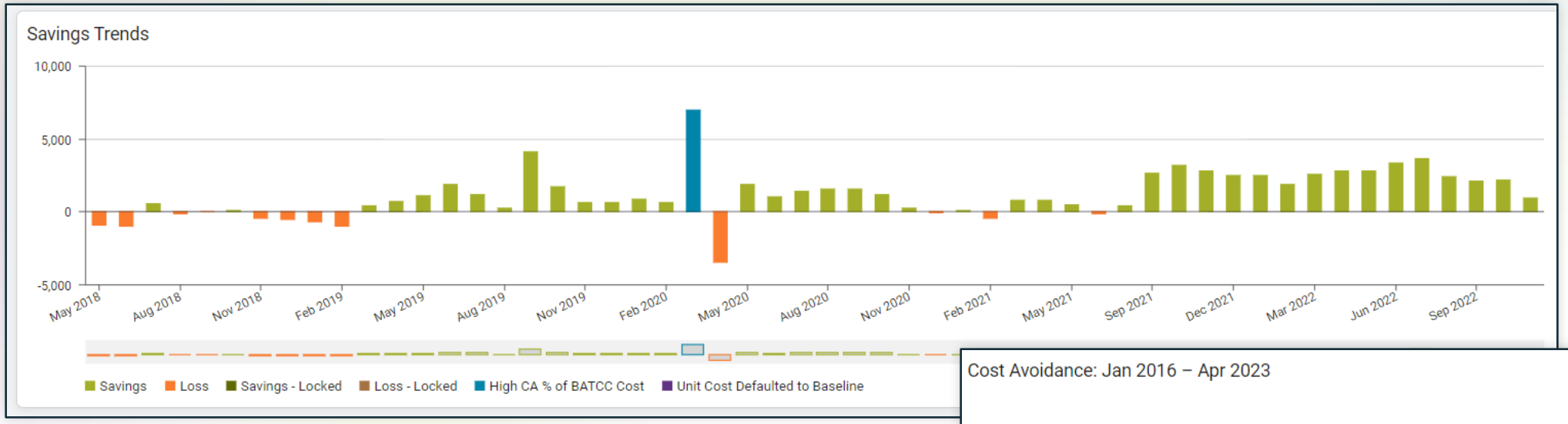
Advanced Energy Management // Measure: Complex Method

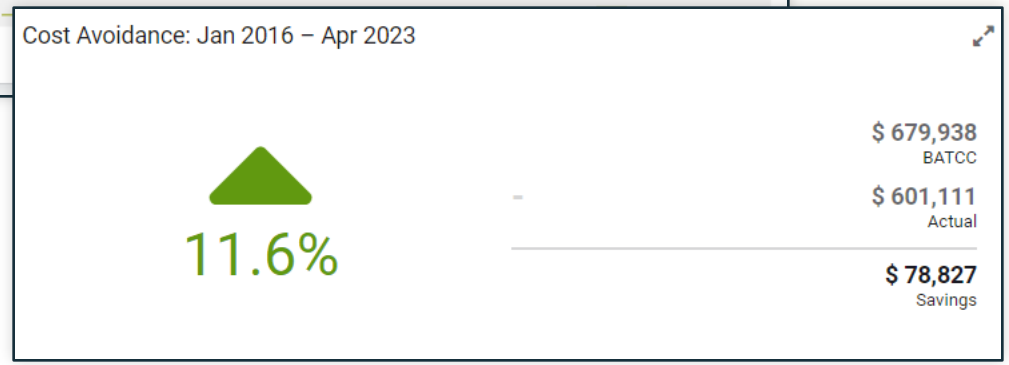
- IPMVP Compliant Measurement and Verification of Savings



Advanced Energy Management // Measure: Complex Method

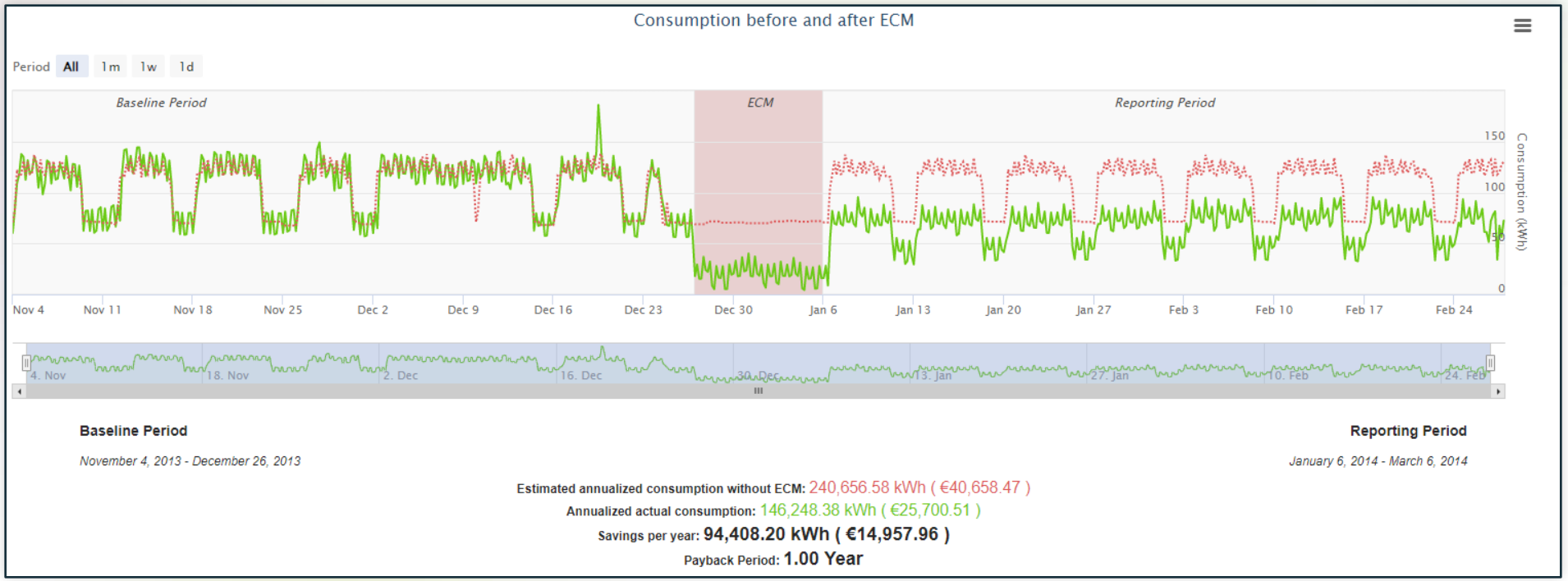
- IPMVP Option C – Whole Building
- Can't assume all savings are attributable to the project, adjust for base load and other factors





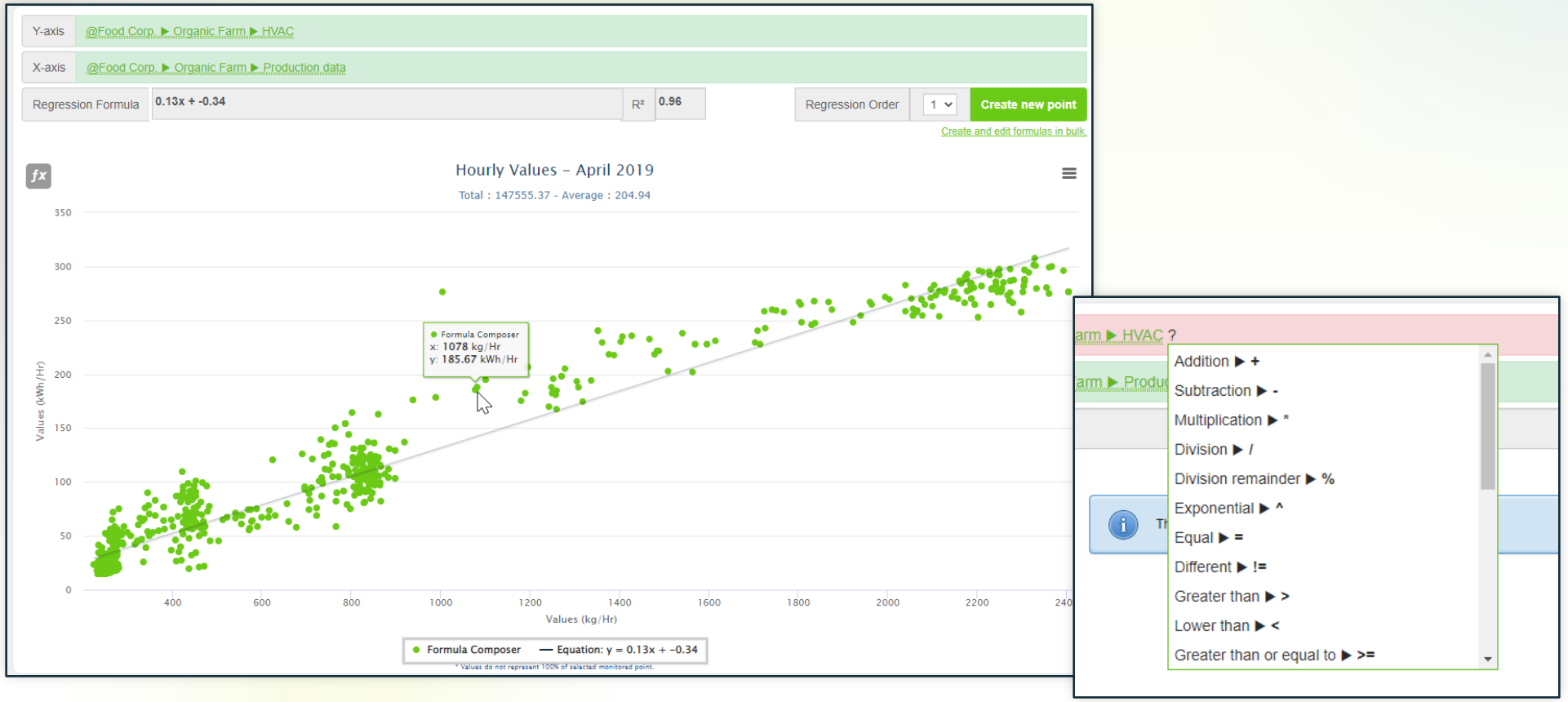
Advanced Energy Management // Measure: Complex Method

- IPMVP Option B – Retrofit Isolation
- Calculate the savings and payback period attributed to projects
- More accurate since it isolates and measures the direct usage



Advanced Energy Management // Formulas and Comparisons

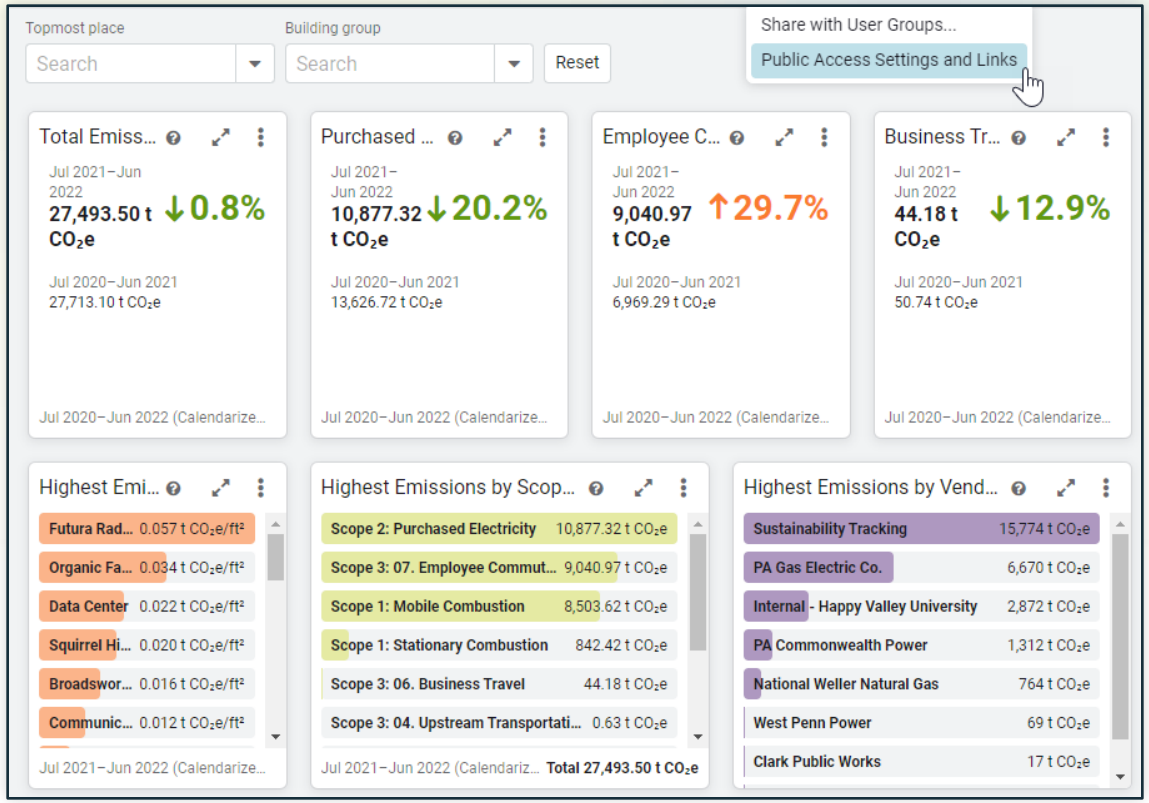
- Formulas to compare, aggregate, reduce, create targets, and more
- Formula points function like metered points, have sentinel, alarms, alerts, heatmaps, etc…



Communicate Results // Powerful Dashboards

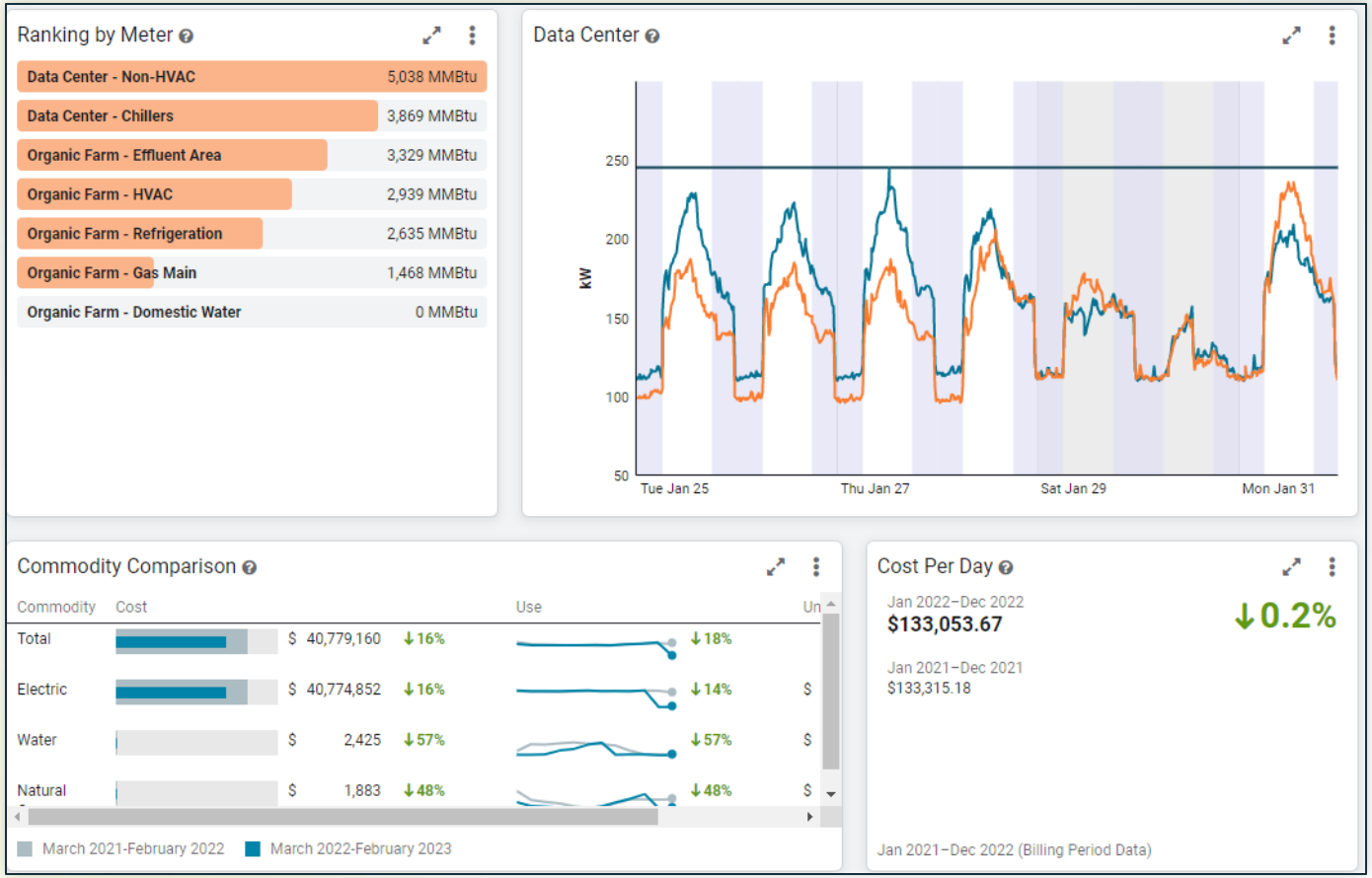
Live data feeds

Public links and embeddable



Communicate Results // Powerful Dashboards

Combine data from both systems to display both monthly and real-time



Questions?

CATALYST '24

Session survey