REPORTS AND DASHBOARDS FOR CAMPUS ENERGY MANAGERS

As a campus energy manager, you're probably familiar with these four mission-critical rules:

ENERGY IS NOT A FIXED COST

Energy is a variable and controllable expense; it's often an organization's largest non-payroll expense.

PLAN FOR THE LONG TERM

Establish a multi-year vision and document it in a manner that is easy to understand and communicate.

INCLUDE ALL STAKEHOLDERS

Think beyond Facilities. Create a culture of conservation by including accounting and financial leaders, executive management, and building occupants.

MAKE DATA-DRIVEN DECISIONS

Don't base your efforts solely on national averages. Know your facilities and your usage patterns.

Utility bills are the ideal source of information on which to base those data-driven energy management decisions. Utility bills arrive like clockwork (you hope) every month by the dozens or hundreds. Each one contains numerous line items, providing useful details about facility energy consumption and cost. Combine billing data with interval data from your metering system, and there's so much data, but so little time to analyze it.

ENERGY MANAGEMENT REPORTS

Question: With so much data available and so many items to track and analyze, how do you determine which reports are going to give you—the energy manager—the data you need to spot potential issues and make informed decisions?

Answer: Start with our ***Energy Management Report Guide***.

The Guide features our recommended list of EnergyCAP reports for facility and energy managers. They're based on the latest EnergyCAP technology, can be filtered to convey the specific information needed, provide actionable data in an easy-to-understand format, and look great. The Guide includes an image of each report, supporting notes, and suggested report filters.

SPOT PROBLEMS, ELIMINATE FALSE POSITIVES

Everyone whose job includes utility bill auditing and processing knows audit challenges all too well. The bane of analysts everywhere is false positives—audit results that point to a problem but are found to be groundless after further investigation.

Why are false positives so common? The simple answer is that utility bills can be quite variable, and audits are not smart enough. Most auditing systems rely on simple, arbitrary comparisons such as "flag the bill if average daily usage this year is more than 20% over the same month last year." That's easy to configure and simple to understand, but can result in an overwhelming number of audit flags, unacceptably high percentage of false positives, and much time wasted on "wild goose chases."

EnergyCAP's "Report-13: Bill Analysis," featured in the ***Energy Management Report Guide***, solves the problem. Report-13 uses a rolling quadratic regression of use and cost vs. mean daily temperature Extensive testing with million-bill client databases shows false positives to be virtually eliminated, allowing you to focus on true outliers. (Note: An outlier is an abnormal bill. That does not necessarily mean that it's in error, but it is most certainly abnormal and worthy of a closer look.)

Here's a sample. Report-13 caught this outlier bill, represented by the yellow X's on the right:


County Public Schools — Report-13 - Bill Analysis

Meter Code: **Commodity:** Electric **Bill ID:** 972145 **Bill Period:** Sep 2019
Place Code: **Account:**
Cost: $16,818.59 **Usage:** 174,277.00 kWh **Cost/Unit:** $0.097 **Rate Code:** 100
Cost Var Dev: 3.0 **Cost R-Squared:** 0.557 **Use Std Dev:** 3.4 **Use R Squared:** 0.542 **Demand Std Dev:** (0.9) **Demand R Squared:** 0.433

BP	Yr	Start Date	End Date	Use	Cost	Use/Day	Cost/Day	Unit Cost	Act Dem	Bill Dem	LF%	Est Bill
Sep	2019	8/13/2019	9/12/2019	174,277	$16,818.59	5,809.2	$560.62	$0.097	444.4	444.0	54.5	No
Aug	2019	7/15/2019	8/13/2019	135,095	$13,163.14	4,658.4	$453.90	$0.097	379.6	379.0	51.1	No
Jul	2019	6/13/2019	7/15/2019	113,969	$11,390.04	3,561.5	$355.94	$0.100	412.1	412.0	36.0	No
Jun	2019	5/14/2019	6/13/2019	133,779	$13,408.00	4,459.3	$446.93	$0.100	497.7	497.0	37.3	No
May	2019	4/12/2019	5/14/2019	113,444	$11,423.33	3,545.1	$356.98	$0.101	453.6	453.0	32.6	No
Apr	2019	3/14/2019	4/12/2019	95,086	$9,593.17	3,278.8	$330.80	$0.101	390.0	390.0	35.0	No
Mar	2019	2/12/2019	3/14/2019	97,423	$9,765.05	3,247.4	$325.50	$0.100	361.4	361.0	37.4	No
Feb	2019	1/13/2019	2/12/2019	102,975	$10,349.80	3,432.5	$344.99	$0.101	399.2	399.0	35.8	No
Jan	2019	12/11/2018	1/13/2019	93,593	$9,404.29	2,836.2	$284.98	$0.100	362.9	362.0	32.6	No
Dec	2018	11/8/2018	12/11/2018	107,790	$10,733.92	3,266.4	$325.27	$0.100	360.3	360.0	37.8	No
Nov	2018	10/11/2018	11/8/2018	108,581	$11,149.79	3,877.9	$398.21	$0.103	567.6	567.0	28.5	No
Oct	2018	9/12/2018	10/11/2018	139,176	$14,030.39	4,799.2	$483.81	$0.101	570.2	570.0	35.1	No
Sep	2018	8/13/2018	9/12/2018	147,261	$14,876.09	4,908.7	$495.87	$0.101	622.1	622.0	32.9	No

Page 1 7/1/2020 10:43 AM EnergyCAP

Report-13 gives you these powerful improvements over many classic audit processes:

- **Weather.** The weather this month can easily be 25% cooler or warmer than the same month last year, more than enough to cause a false positive audit. Report-13's underlying analysis intelligence adjusts for weather and eliminates those time-wasting false results.
- **Changing usage patterns.** The analysis uses a 24-month rolling polynomial regression that's updated with every bill, so recent changes in equipment and usage trends replace data further back in history.
- **Bill variability.** The bills for some accounts are quite predictable, while other accounts may have much inherent variability. By using statistical standard deviations as the outlier identifier, and adjusting for accounts with high correlation coefficients, the process identifies truly abnormal bills without relying on arbitrary and unreliable "same month" comparisons.
- **Seasonality.** Seasonal patterns are accounted for, even for meters that are not weather sensitive.
- **Investigation resources.** Report-13 gives you two years or more of graphical history, 13 months of tabular history, and links directly to the bill, meter, and account in question. You can quickly skip over and dismiss acceptable bills and drill down into those of most concern. The review process moves along much faster than a simple results list that requires drilling into every row.
- **Analysis results available for workflow audit processes.** The bill analysis is immediately performed when each bill is initially saved. That means that in addition to being available when Report-13 is run, the results can be incorporated into bill processing workflow automation to add audit flags to bill records and generate notification reports to accounting managers.

If you're an EnergyCAP user, you already have access to Report-13, so give it a try. The following filters are recommended:

- Billing Period equals June 2020 (use an earlier month if June bills have not yet been entered)
- Cost greater than 1000 (limit your analysis to more costly, more important bills)
- Value Analyzed for Outliers—Select Use, Cost or perhaps both
- Outlier Analysis Sensitivity equals 1—Severe Only (limit your analysis to the most likely problems)
- Number of Years [displayed] in Chart equals 2

If your first Report-13 comes back blank, congratulations! That means no severe outliers and no false positives. Try another month, or perhaps lower the sensitivity level or cost cutoff to see bills that may be just a bit questionable.

AUTOMATE AND WAIT

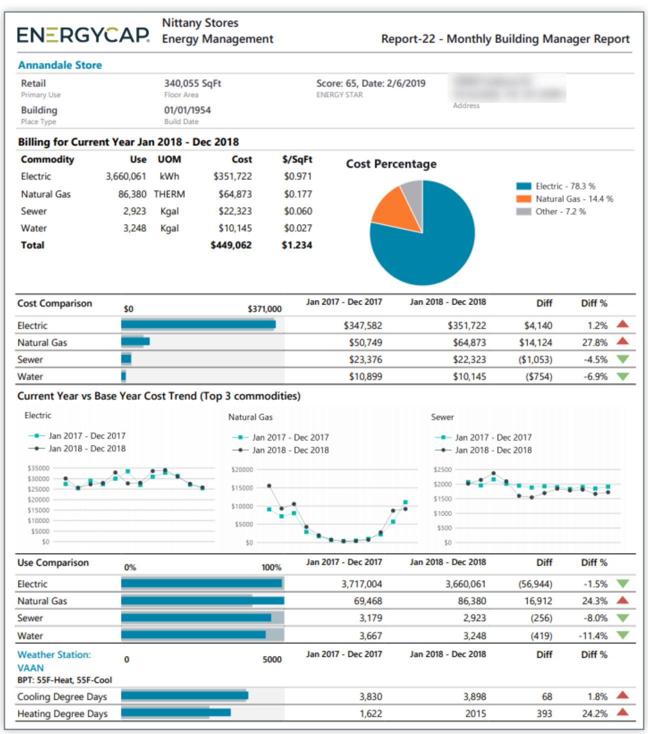
If you use EnergyCAP or another energy management information system (EMIS), take advantage of the automated email report subscription option. It's like a "Note to Self" reminder to look for energy and cost savings.

Here's a great example: Say you self-subscribe to Report-13, the outlier report described above. You can set the subscription to daily—"email me just those outlier bills that were entered yesterday"—or other frequencies. You set the report filters, so you can establish cost minimums—ignore bills costing under $100, for example—or set different thresholds based on commodity, vendor, cost, or other factors.

The result? You only receive the report when an impactful issue is identified, which means more time spent on recovering cost savings and much less time spent on fruitless investigations of valid bills.

Here are some other ideas for automated energy report subscriptions:

Email the concise one-page "Monthly Building Manager Report" to each building manager on the 15th of each month.



ENERGYCAP Nittany Stores Energy Management — Report-22 - Monthly Building Manager Report

Annandale Store

Retail (Primary Use) — 340,055 SqFt (Floor Area) — Score: 65, Date: 2/6/2019 (ENERGY STAR) — Address

Building (Place Type) — 01/01/1954 (Build Date)

Billing for Current Year Jan 2018 - Dec 2018

Commodity	Use	UOM	Cost	$/SqFt
Electric	3,660,061	kWh	$351,722	$0.971
Natural Gas	86,380	THERM	$64,873	$0.177
Sewer	2,923	Kgal	$22,323	$0.060
Water	3,248	Kgal	$10,145	$0.027
Total			**$449,062**	**$1.234**

Cost Percentage

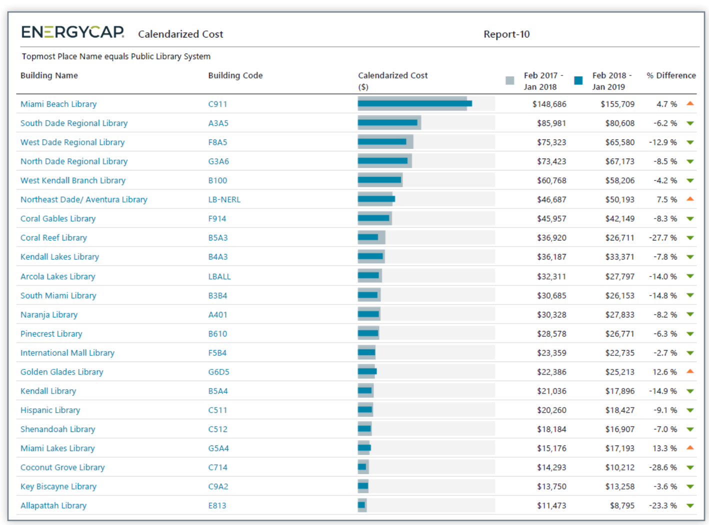
Cost Comparison	$0 – $371,000	Jan 2017 - Dec 2017	Jan 2018 - Dec 2018	Diff	Diff %
Electric		$347,582	$351,722	$4,140	1.2%
Natural Gas		$50,749	$64,873	$14,124	27.8%
Sewer		$23,376	$22,323	($1,053)	-4.5%
Water		$10,899	$10,145	($754)	-6.9%

Current Year vs Base Year Cost Trend (Top 3 commodities)

Use Comparison	0% – 100%	Jan 2017 - Dec 2017	Jan 2018 - Dec 2018	Diff	Diff %
Electric		3,717,004	3,660,061	(56,944)	-1.5%
Natural Gas		69,468	86,380	16,912	24.3%
Sewer		3,179	2,923	(256)	-8.0%
Water		3,667	3,248	(419)	-11.4%

Weather Station: VAAN BPT: 55F-Heat, 55F-Cool	0 – 5000	Jan 2017 - Dec 2017	Jan 2018 - Dec 2018	Diff	Diff %
Cooling Degree Days		3,830	3,898	68	1.8%
Heating Degree Days		1,622	2015	393	24.2%

Email the "Two-Year Comparison" ranking report to each Department Head quarterly, to show how Departments compare in consumption and usage reductions.

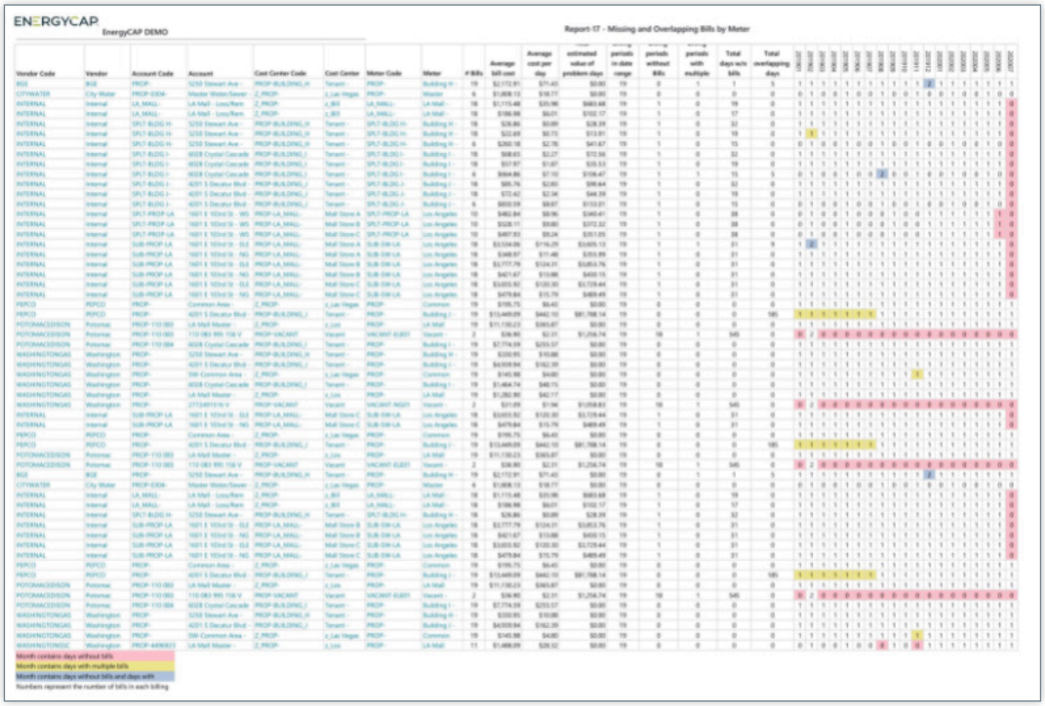


ENERGYCAP Calendarized Cost — Report-10

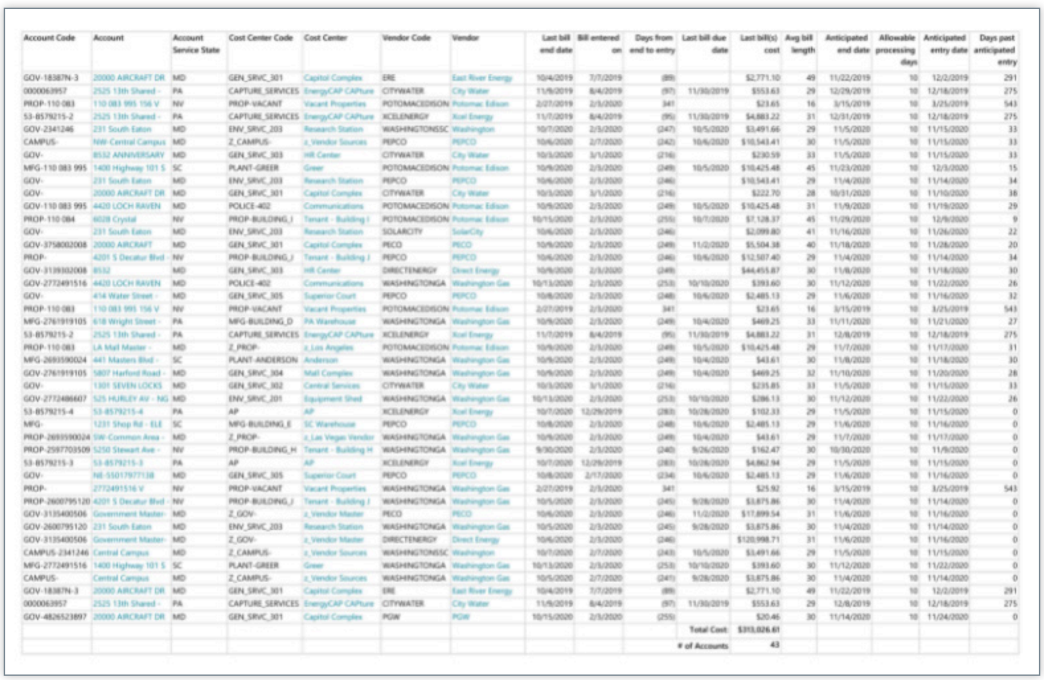
Topmost Place Name equals Public Library System

Building Name	Building Code	Calendarized Cost ($)	Feb 2017 - Jan 2018	Feb 2018 - Jan 2019	% Difference
Miami Beach Library	C911		$148,686	$155,709	4.7 %
South Dade Regional Library	A3A5		$85,981	$80,608	-6.2 %
West Dade Regional Library	F8A5		$75,323	$65,580	-12.9 %
North Dade Regional Library	G3A6		$73,423	$67,173	-8.5 %
West Kendall Branch Library	B100		$60,768	$58,206	-4.2 %
Northeast Dade/ Aventura Library	LB-NERL		$46,687	$50,193	7.5 %
Coral Gables Library	F914		$45,957	$42,149	-8.3 %
Coral Reef Library	B5A3		$36,920	$26,711	-27.7 %
Kendall Lakes Library	B4A3		$36,187	$33,371	-7.8 %
Arcola Lakes Library	LBALL		$32,311	$27,797	-14.0 %
South Miami Library	B3B4		$30,685	$26,153	-14.8 %
Naranja Library	A401		$30,328	$27,833	-8.2 %
Pinecrest Library	B610		$28,578	$26,771	-6.3 %
International Mall Library	F5B4		$23,359	$22,735	-2.7 %
Golden Glades Library	G6D5		$22,386	$25,213	12.6 %
Kendall Library	B5A4		$21,036	$17,896	-14.9 %
Hispanic Library	C511		$20,260	$18,427	-9.1 %
Shenandoah Library	C512		$18,184	$16,907	-7.0 %
Miami Lakes Library	G5A4		$15,176	$17,193	13.3 %
Coconut Grove Library	C714		$14,293	$10,212	-28.6 %
Key Biscayne Library	C9A2		$13,750	$13,258	-3.6 %
Allapattah Library	E813		$11,473	$8,795	-23.3 %

Email the concise one-page “Monthly Building Manager Report” to each building manager on the 15th of each month.



Email the “Anticipated Bills Not Yet Processed” spreadsheet to Accounting each week, highlighting bills that may be lost in the mail and at risk of incurring pesky late fees.



Sharing information is important. Sharing concise, actionable information with those who truly need it, when they need it, is critical and should be expected.

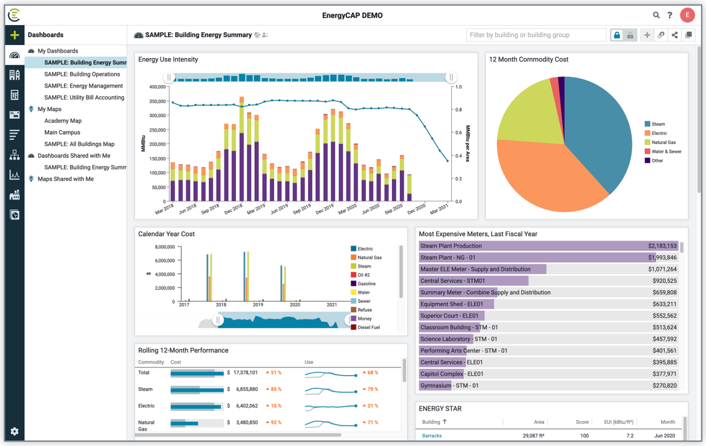
ENERGY DASHBOARDS

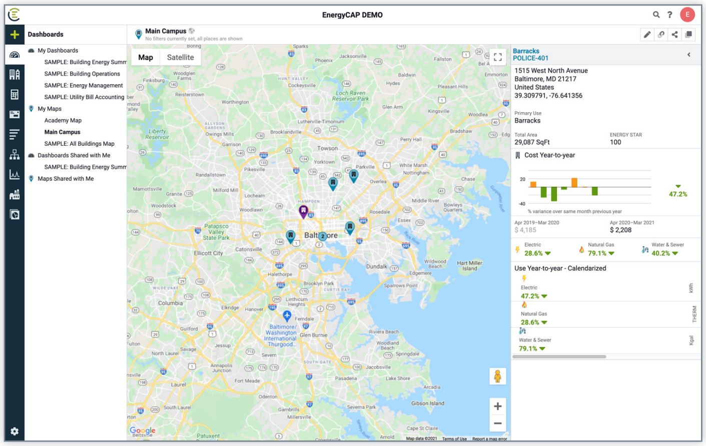
Communicating with the masses via dashboards is much easier, faster, and more convenient than with reports. Dashboards are commonly updated in real-time and are accessible across numerous platforms, including mobile phones and tablets. And, dashboards remind building inhabitants that energy use is being monitored, it's expensive, and it contributes to carbon emissions.

Culture change. We all know the saying "out of sight, out of mind." Dashboards help keep energy in sight and top of mind. Studies have shown that a culture of energy efficiency (awareness, outreach, feedback, accountability) can produce energy use reductions by as much as 10%. The primary motivation behind EPA ENERGY STAR ratings, mandatory benchmarking, and disclosure legislation is to drive culture change that lowers energy consumption and carbon emissions.

Given those benefits, we encourage all EnergyCAP and EMIS users to create and share energy dashboards that they feel will convey the information required to effectively promote organization-wide energy awareness and conservation. It's probably on your "do later" task list. Well, later is now. In the "new normal" of impending slashed budgets and highly scrutinized expenditures, you want energy cost reduction to be an organizational priority and a "can't do without" budget imperative.

If you have an awe-inspiring public dashboard that you'd like to share, ***email us the URL***. We'd love to see it!





Want to learn more about our EnergyCAP utility bill accounting and energy management solution? Contact us:

sales@EnergyCAP.com **877.327.3702** **www.EnergyCAP.com**

ENERGYCAP