



Driving Action through Energy Data Visualization

Moderated by:

Sarah Zaleski
U.S. DOE



Driving Action through Energy Data Visualization

Dan Walworth
HEI Hotels



HEI Hotels & Resorts

Changing Behavior through
Data Visualization



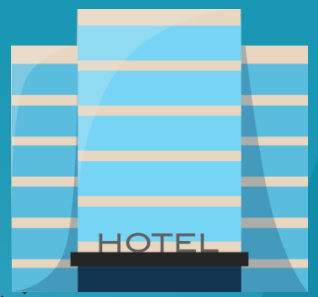
About HEI Hotels & Resorts

- Over 40 upper-upscale, name brand hotels
- Approximately 6,000 employees across 15 states
- Total energy spend exceeds \$20mm annually



Field-Based Organization

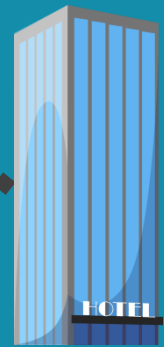
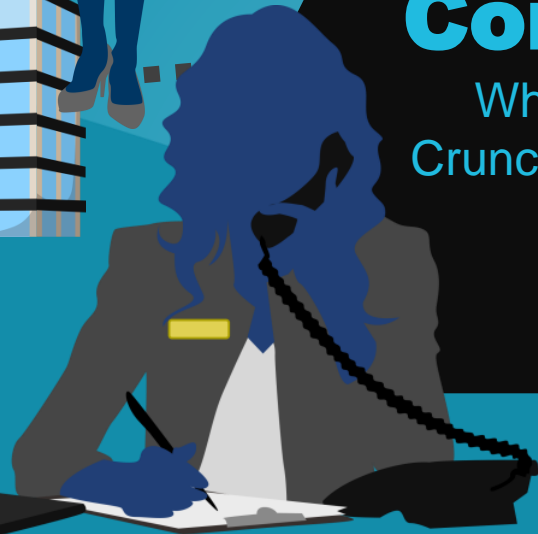
General Manager
Accountable for Entire Property



Property Chief Engineer
Manages Energy Usage

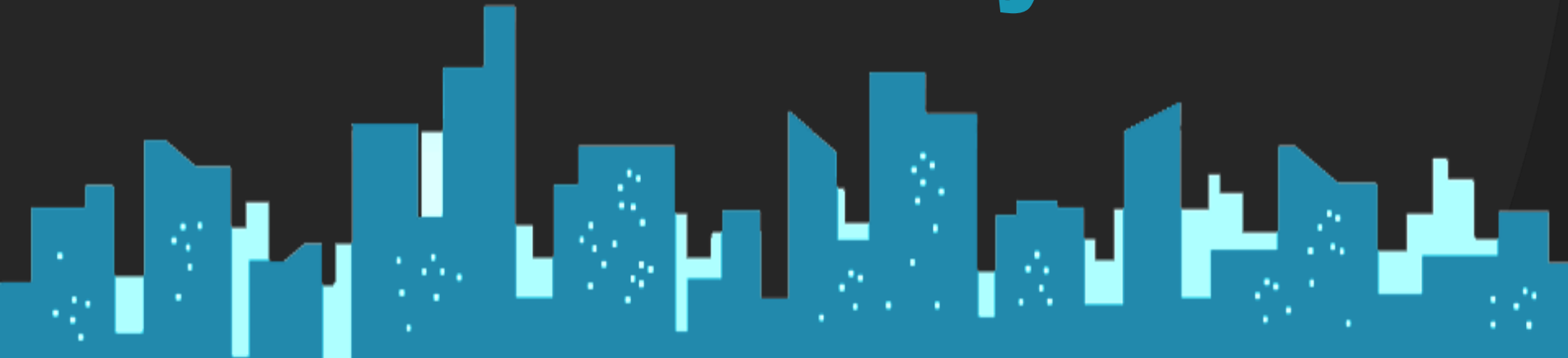


Corporate
Where Number Crunchers Often Live





Backstory



**History of
Sustainability
and Social
Responsibility**

**Monitored
Energy Costs**

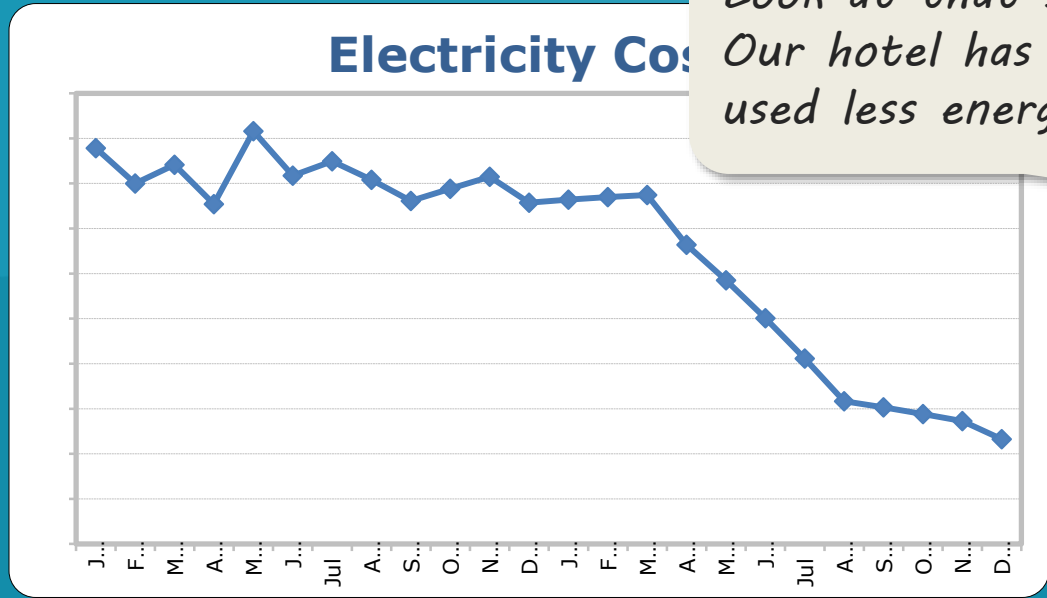
**Installed
Energy-Saving
Technologies**

**HEI
Discovered...**



Problem 1

Rate _{hid} usage.



*Look at that savings!
Our hotel has never
used less energy!*



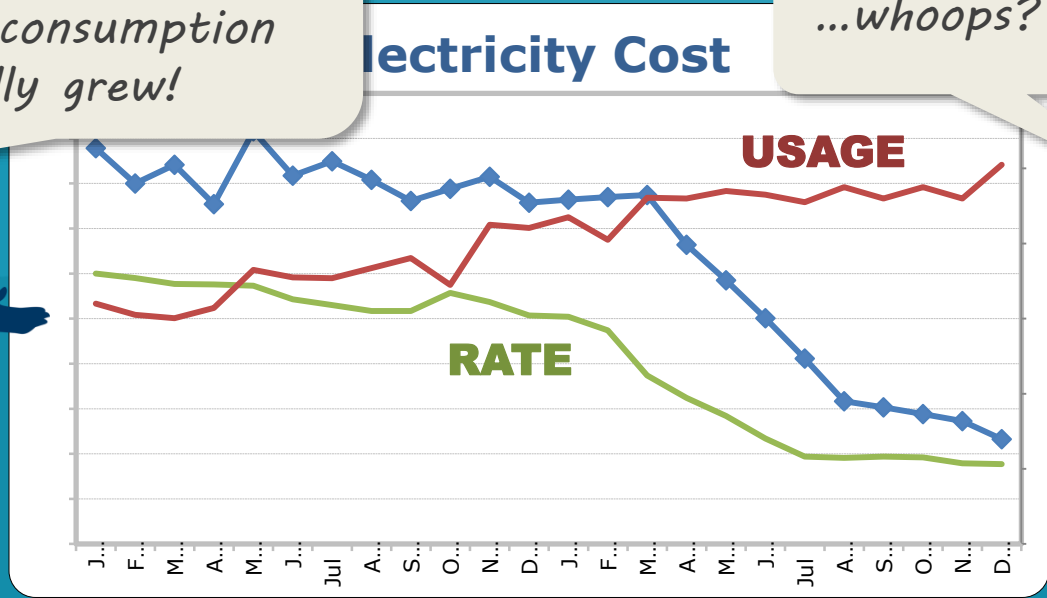


Problem 1

Rate hid Usage.

That's because the rate went down. Your consumption actually grew!

...whoops?





Solution 1

Simple but highly effective change: focus on consumption rather than cost!

COST OF ENERGY

RATE
(cost per unit)


CONSUMPTION
(units required)






Problem 2

Too many excuses resulting from
factors outside
our properties' control.



*According to this text box,
you used 25% more
electricity than last year.
Way to be wasteful.*



*That's not fair! We had
a heat wave! My
clipboard and I think you
should check those
numbers again.*

August Last Year Electric Usage: 400,000 kWh
August This Year Electric Usage: 500,000 kWh



Solution 2



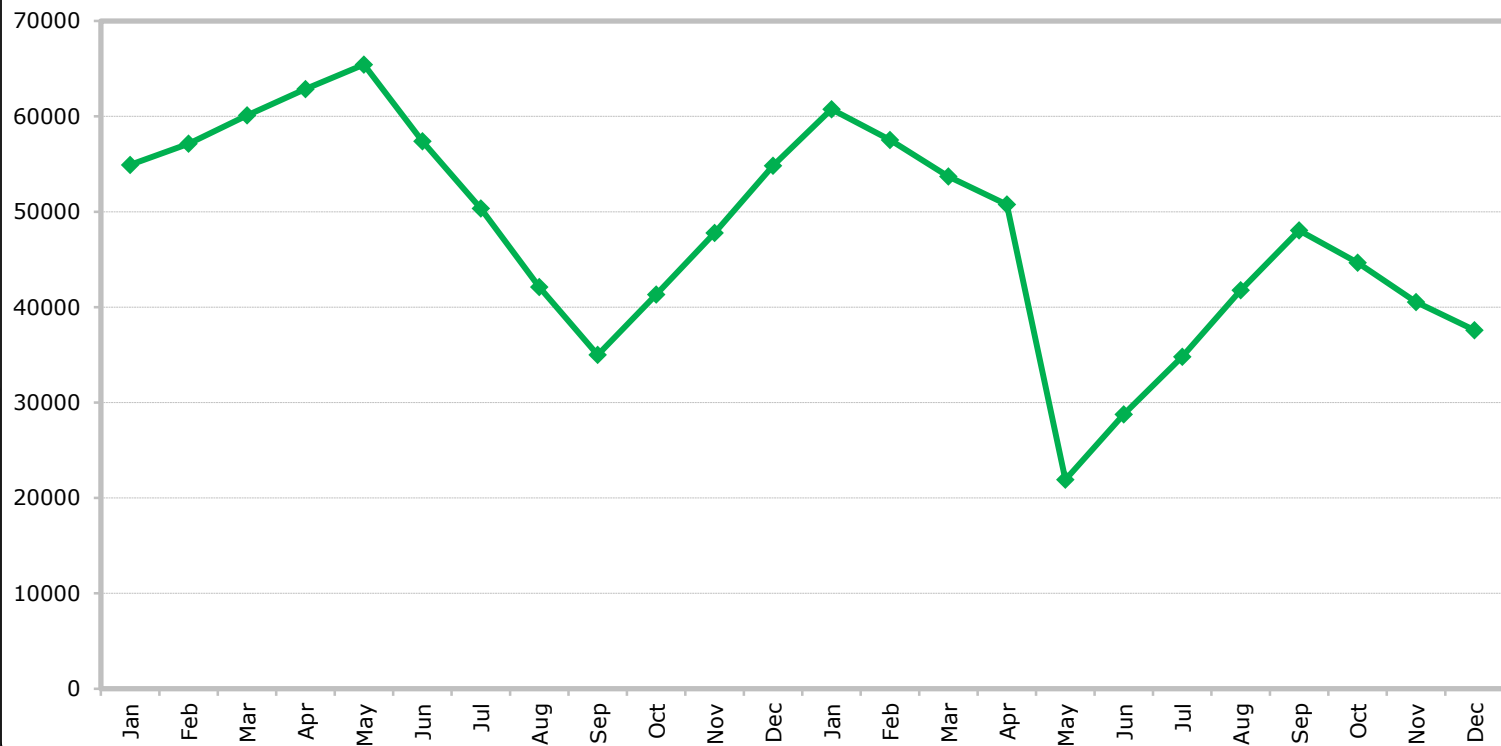
- Get as much historical data as possible
- Find out what factors affect energy usage and by how much



Solution 2

Discover which **primary factors** affect **energy usage** at our hotels.

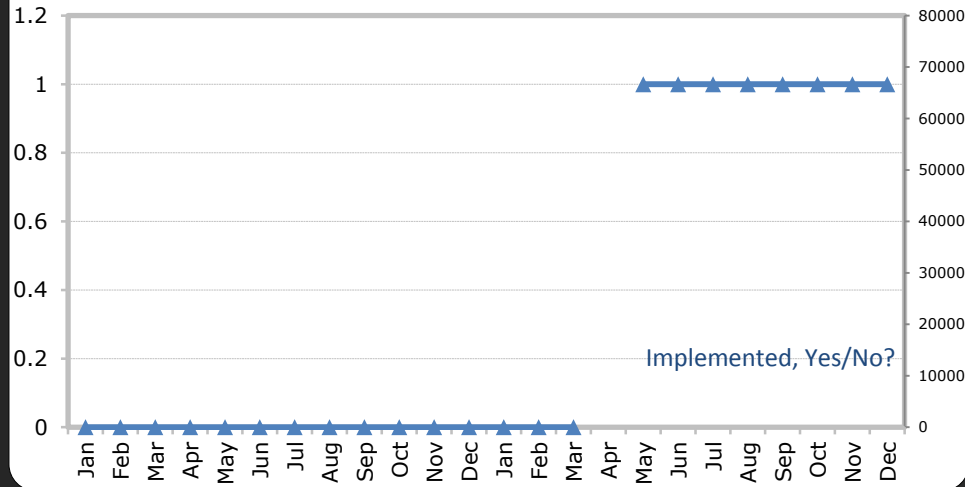
Hotel Electricity Usage



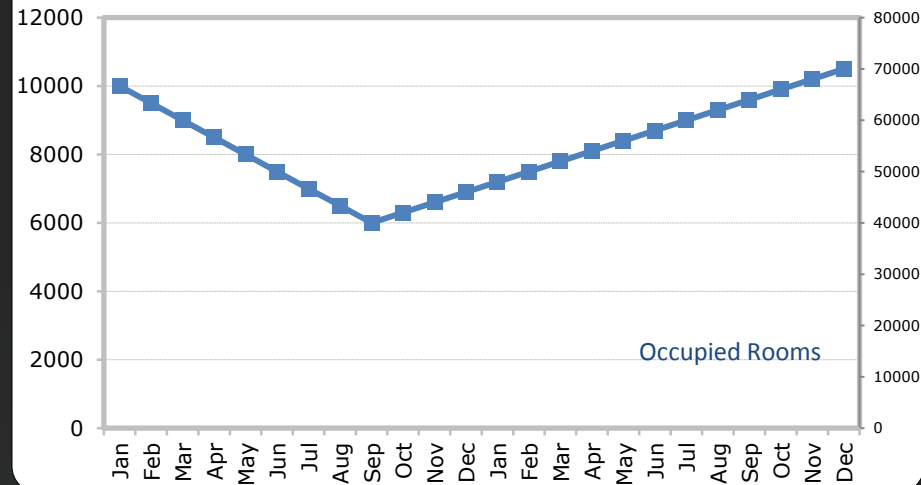


Factors Affecting Usage

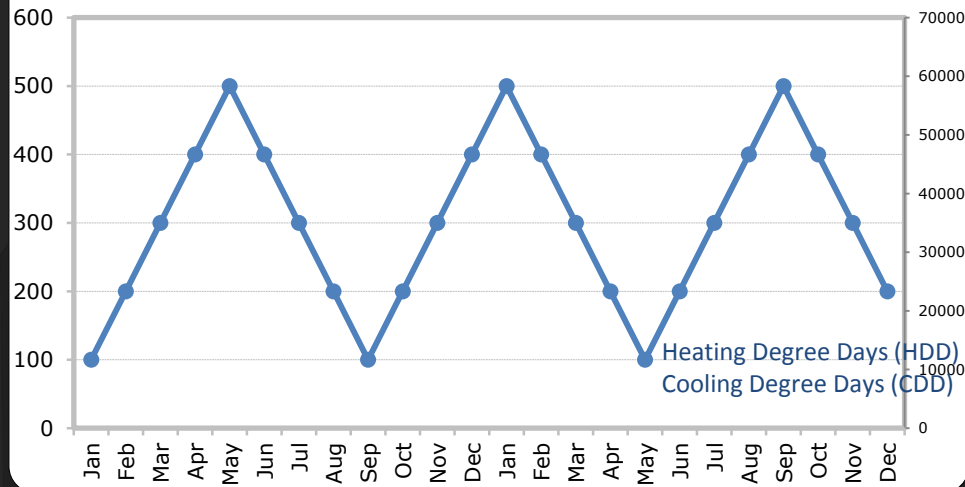
Usage vs. Lighting Upgrade



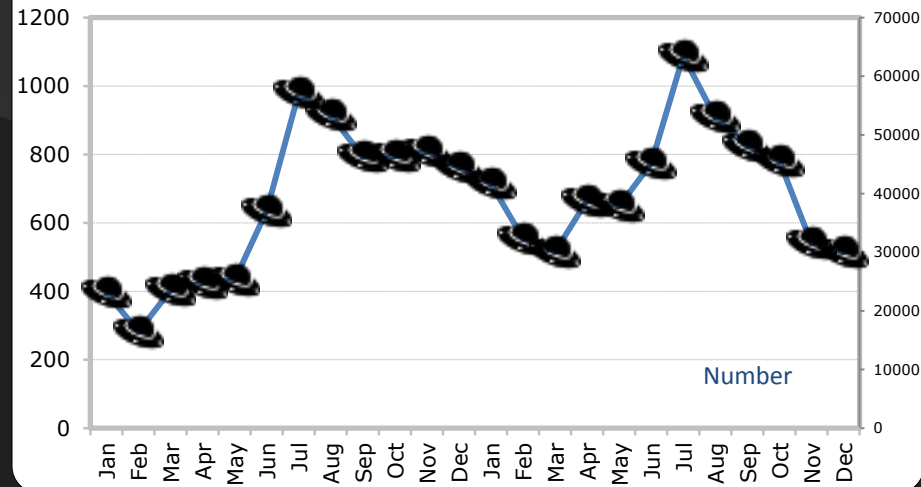
Usage vs. Occupancy



Usage vs. Temperature



Usage vs. UFO Sightings in the US

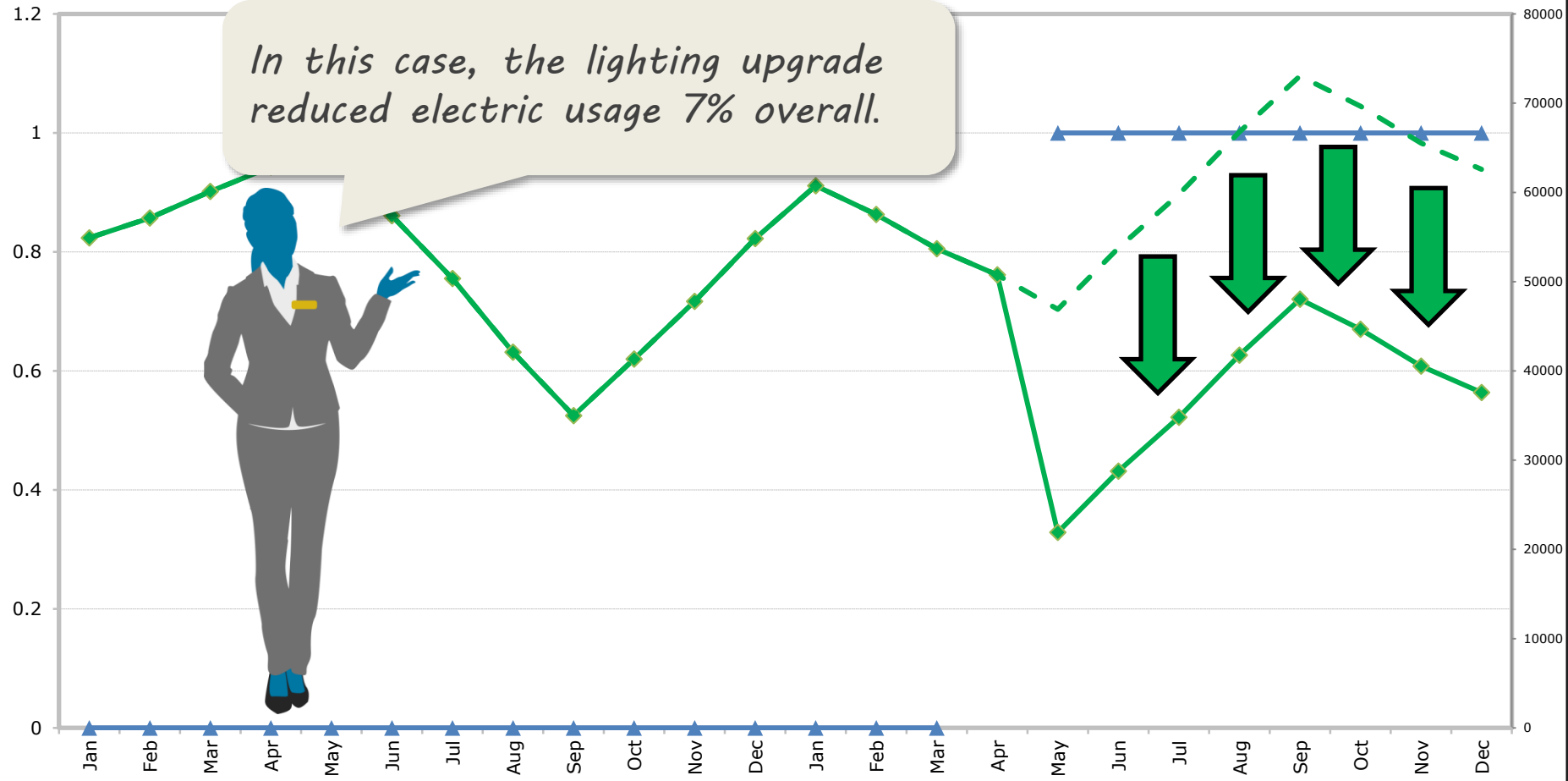
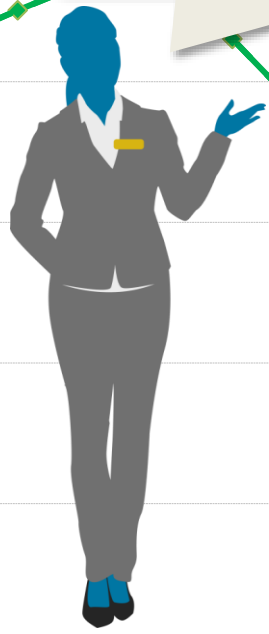




Factors Affecting Usage

Usage vs. Lighting Upgrade

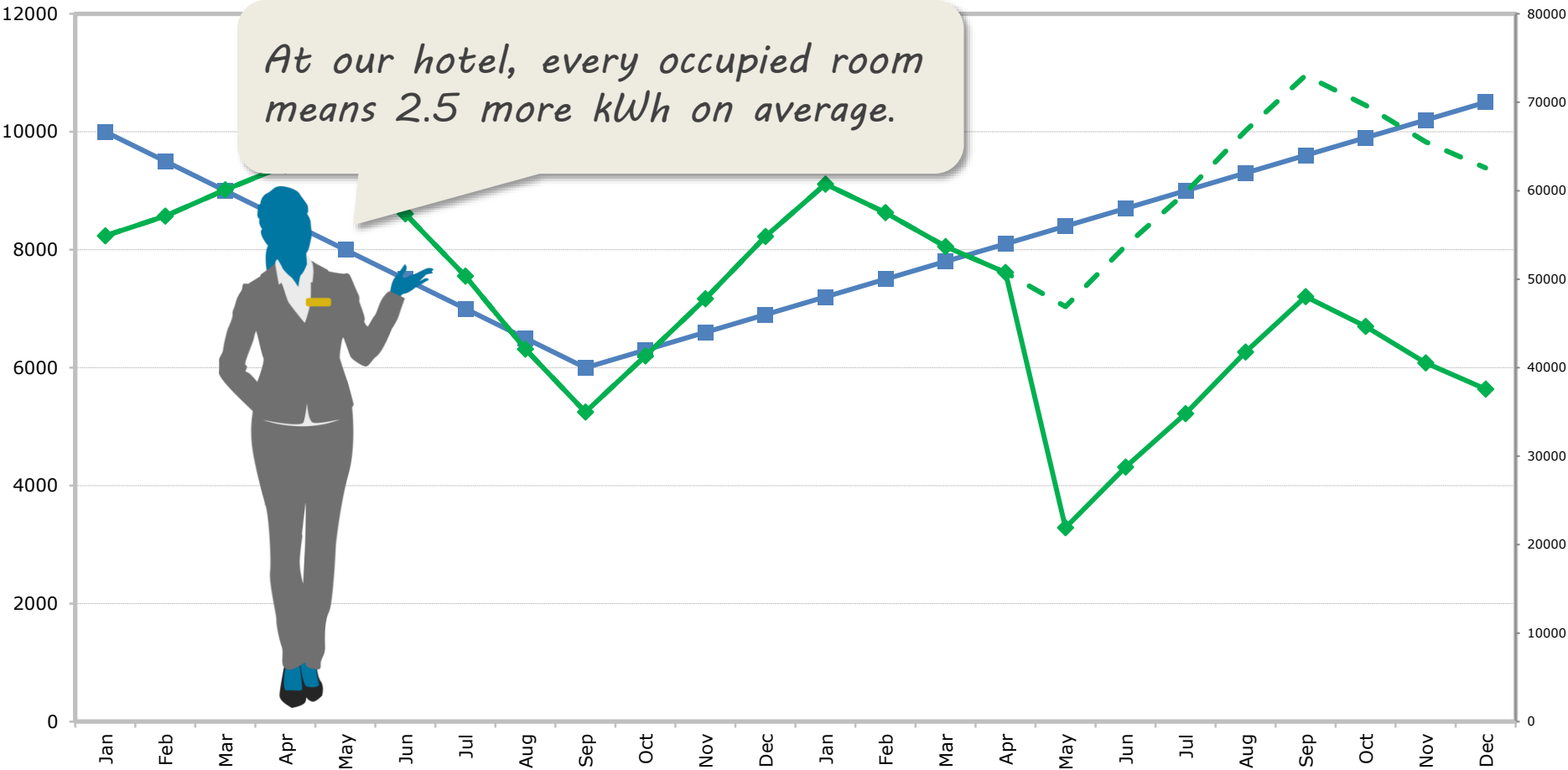
In this case, the lighting upgrade reduced electric usage 7% overall.





Factors Affecting Usage

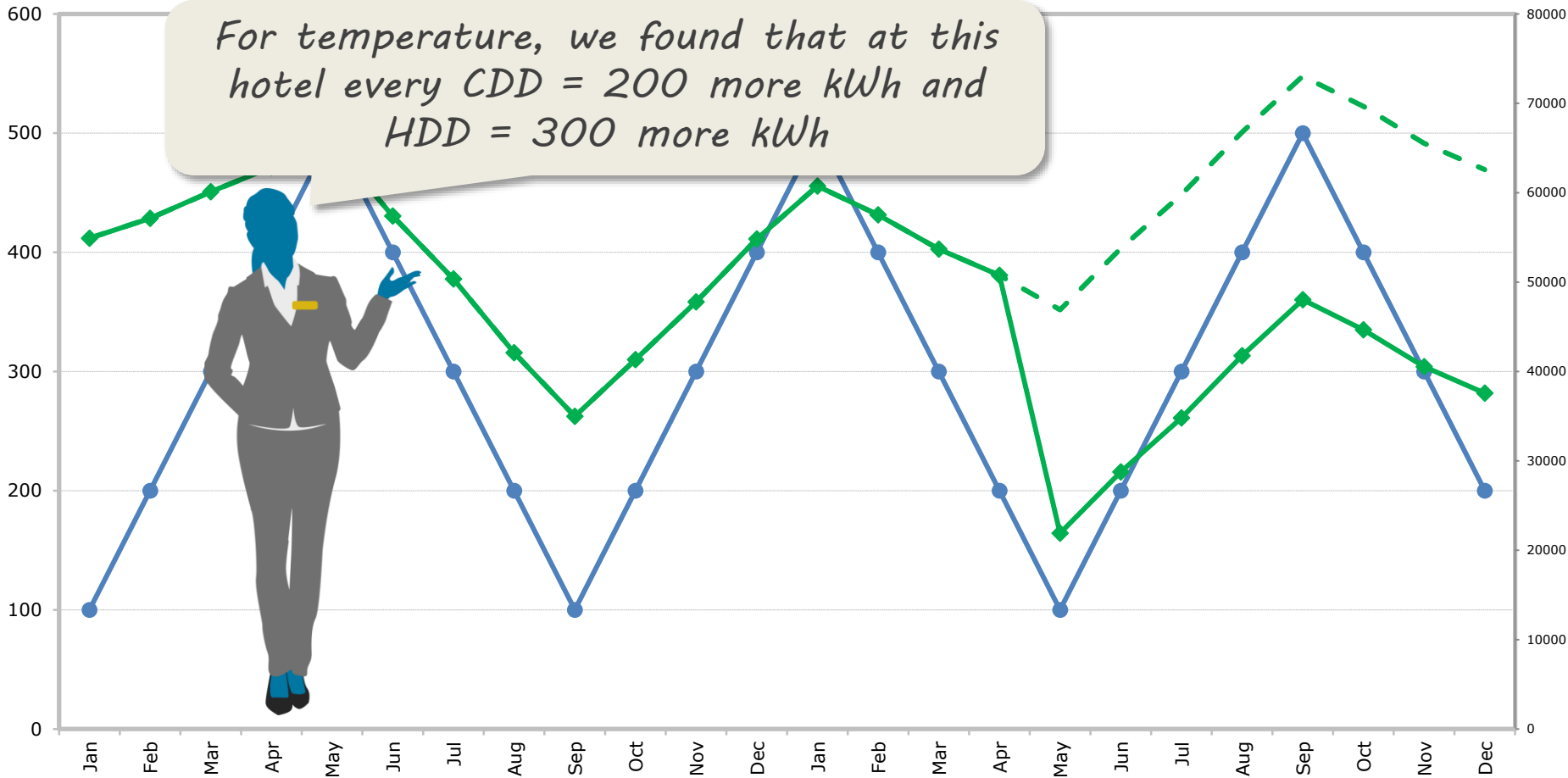
Usage vs. Occupancy





Factors Affecting Usage

Usage vs. Temperature

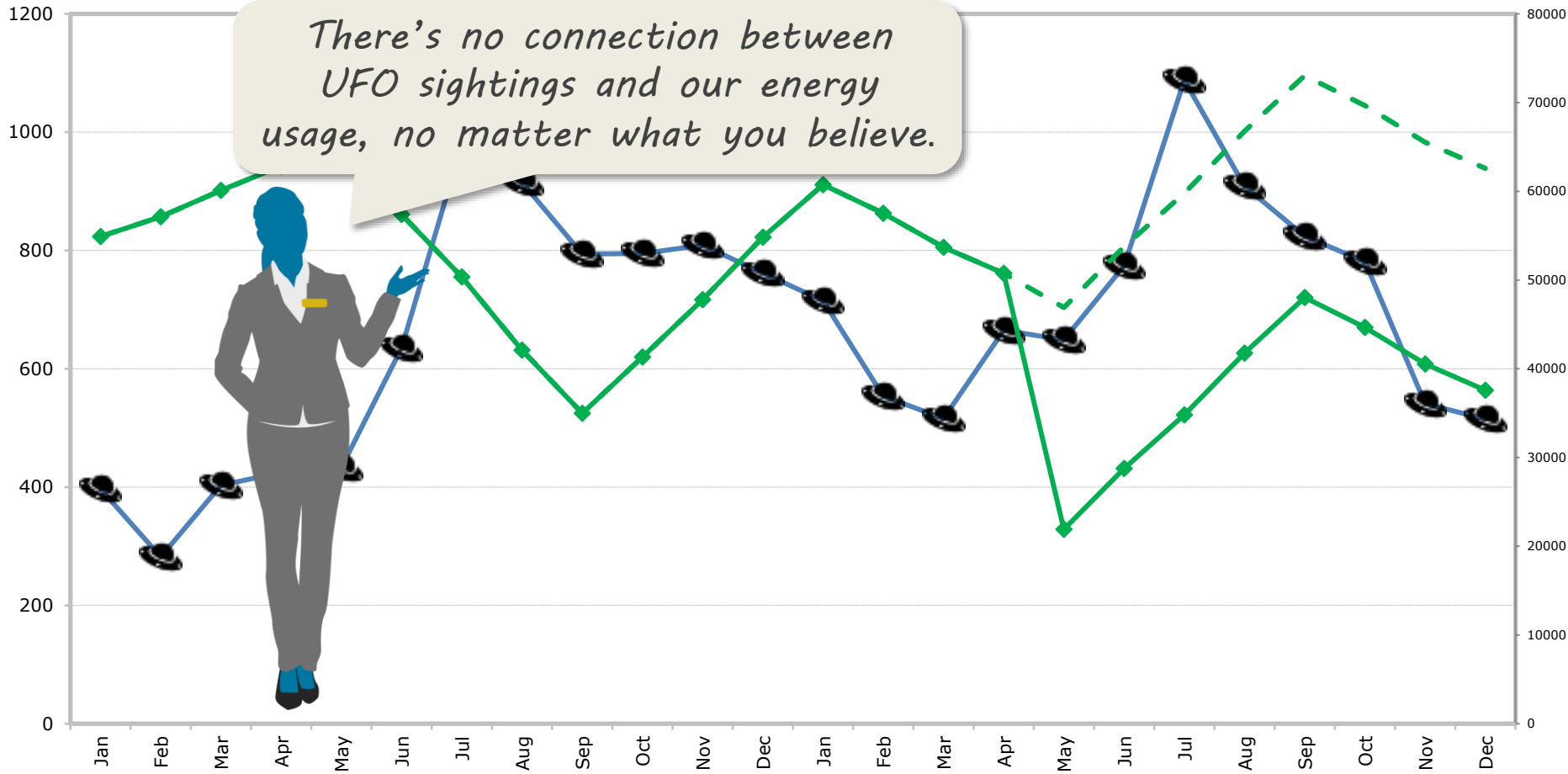
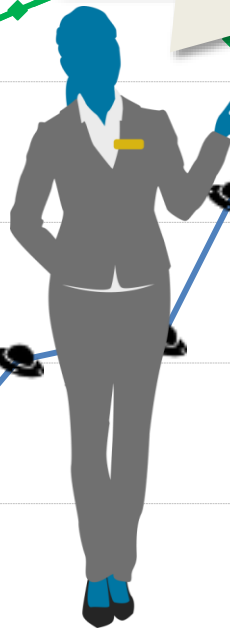




Factors Affecting Usage

Usage vs. UFO Sightings

There's no connection between UFO sightings and our energy usage, no matter what you believe.





Solution 2

So does our engineer have a point about that heat wave?

$$\begin{array}{r} 450 \text{ CDD} \\ \times 200 \text{ kWh} \\ \hline 90,000 \text{ kWh} \end{array}$$



Indeed he does. We found that for every additional CDD, our hotel uses 200 kWh more of electricity on average.

Since there were 450 more CDD this August than last, we can make a fairer comparison using this simple adjustment.



Solution 2

We crunched the numbers. Turns out if last year was as hot as this year the difference in your electric usage is only 2%.

That sounds reasonable. We did forget to turn lights off in unused rooms. We'll have to post reminders for everyone.



~~August Last Year Electric Usage: 400,000 kWh~~

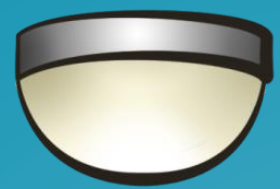
August This Year Electric Usage: 500,000 kWh

ADJUSTED to Today's Environment: 490,000 kWh



Problem 3

Energy-saving capital **projects**
obscured energy-saving **behaviors.**



Is that light saving energy or are we?

That's deep.





Solution 3

Adjust usage calculations to remove the impact of savings from Capital Projects. After that and the prior adjustments are done, what's left is the impact of behavior.

COST OF ENERGY

RATE
(cost per unit)

CONSUMPTION
(units required)

EQUIPMENT

BEHAVIOR





Solution 3

Wait! Come to think of it, didn't we just buy brand new high-efficiency chillers since last year? Those are claimed to save 7%.

So what are you saying?

~~August Last Year Electric Usage: 400,000 kWh~~

~~August Last Year Electric Usage,
ADJUSTED to Today's Environment: 490,000 kWh~~

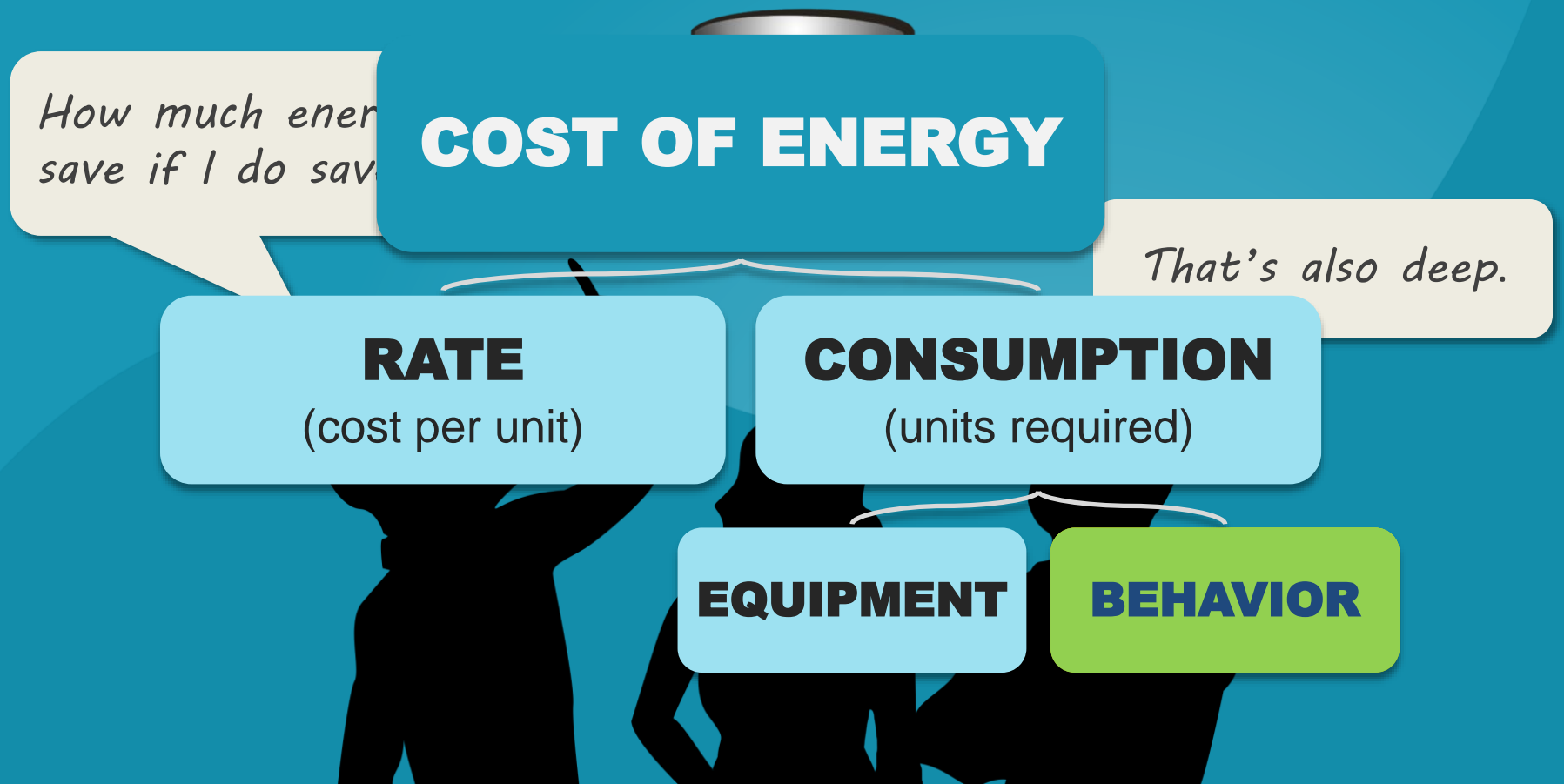
August This Year Electric Usage, ADJUSTED to Today's
Environment and Equipment: 455,000 kWh





Problem 4

Find a way to **track the impact** of our **associates** in the field.





The Energy Looking Glass®

The Hotel Name
ENERGY Looking Glass®

YOUR PROPERTY May

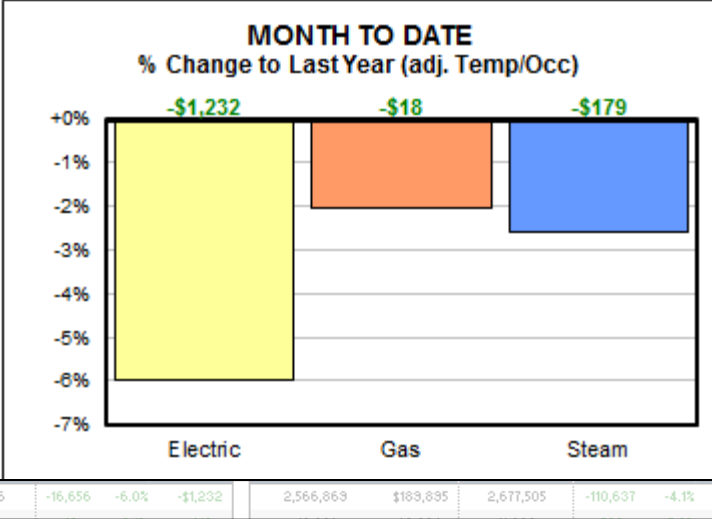
Square Footage: 320,000
Year Built: 1990

Energy Star Rating as of:
Orig Rating: 60
Curr Rating: 82

*Top 25% of peer group
Qualified for Energy Star
plaque*

YOUR ENERGY CONSUMPTION

UTILITY (unit)	MONTH TO DATE		LAST YEAR	
	Units Consumed	Est Cost	Units Consumed	Est Cost
Electric (kWh)	261,150	\$19,320	277,806	\$26,947



Temp/Occ

Steam

EXP VAR TO BUDGET	
MTD	YTD
-\$26,712	+\$42,456
-\$2,419	-\$6,338
-\$6,703	+\$40,387
-\$35,841	+\$77,104

YOUR ENERGY CONSUMPTION

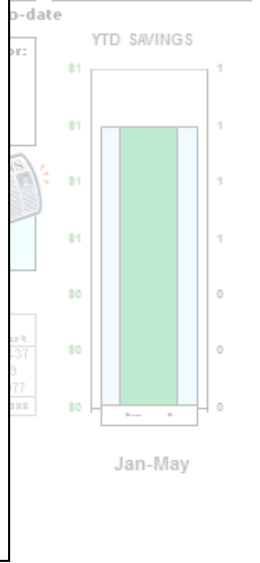
UTILITY (unit)	MONTH TO DATE		LAST YEAR (adj.)*		CHANGE	
	Units Consumed	Est Cost	Units Consumed	Units	% Chg	Est Cost
Electric (kWh)	261,150	\$19,320	277,806	-16,656	-6.0%	-\$1,232
Gas (therm)	899	\$875	917	-19	-2.1%	-\$18
Steam (therm)	3,781	\$6,753	3,881	-100	-2.6%	-\$179
TOTAL (MM BTU)		\$26,947			-4.8%	-\$1,430

CARBON FOOTPRINT*
**excluding waste*

225.1 metric tons of carbon dioxide equivalent yesterday

MTD, YOU HAVE:

- CONSERVED 68,766,688 BTUs of Energy to last year, or:
 - Planted 88.2 tree seedlings and grew them for 10 years
 - Duplicated the effects of 0.8 acres of pine or fir trees each year
 - Saved 1,045.4 sq ft of forest from deforestation



Occ. Revenue	2,718	\$,195	+24,274	+0	+1,643	72,687	28,242	+675,756	+0	+46,309
Capital Improvements		Detailed on Daily Entry	+0	+0	+0		Detailed on Daily Entry	+0	+0	+0
TOTAL ADJUSTMENT			-55,992	-67	+3,223			*****	+256	-48,688



The Energy Looking Glass®

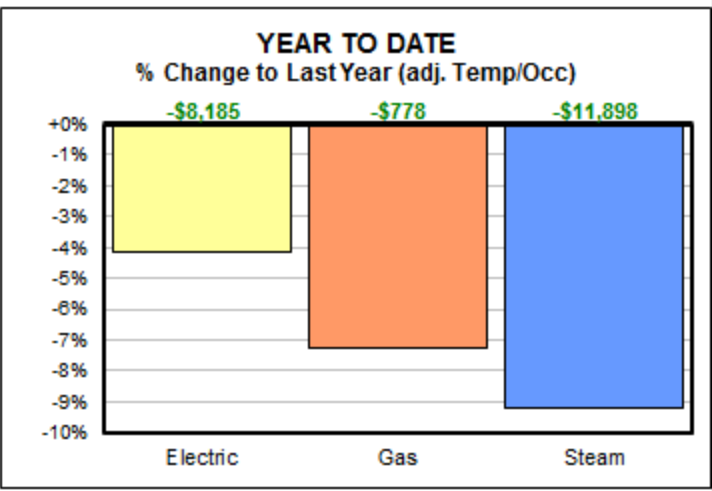
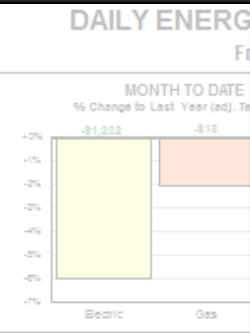
The Hotel Name
ENERGY Looking Glass®

YOUR PROPERTY May 14, 2015

Square Footage: 320,000
Year Built: 1990

energy Star Rating as of: 11/26/2014
Orig Rating: 68 SILVER
Curr Rating: 82 GOLD
Top 25% of peer group / Qualified for Energy Star plaque

ENERGY STAR AWARD 2013
PARTNER OF THE YEAR Sustained Excellence



May: Focus on Water

YOUR ENERGY CONSUMPTION

UTILITY (unit)	MONTH TO DATE		LAST YEAR (adj. Temp)	Unit	CHANGE % Chg	Est Cost	YEAR TO DATE
	Unit Consumed	Est Cost					
Electric (kWh)	261,150	\$19,320	277,806	-16,656	-6.0%	-\$1,232	2,566,869
Gas (therm)	899	\$875	917	-19	-2.1%	-\$18	10,201
Steam (therm)	3,781	\$6,753	3,881	-100	-2.6%	-\$1,232	103,835
TOTAL (MM BTU)		\$26,947			-4.8%	-\$1,232	

UTILITY (unit)	MONTH TO DATE	LAST YEAR (adj. Temp)	CHANGE
Electric (kWh)	261,150	277,806	-16,656 (-6.0%)
Gas (therm)	899	917	-19 (-2.1%)
Steam (therm)	3,781	3,881	-100 (-2.6%)
TOTAL (MM BTU)			-4.8%

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UTILITY (unit)	YEAR TO DATE		LAST YEAR (adj. Temp)		CHANGE	
	Units Consumed	Est Cost	Units Consumed	Units	% Chg	Est Cost
Electric	2,566,869	\$189,895	2,677,505	-110,637	-4.1%	-\$8,185
Gas	10,201	\$9,934	11,000	-799	-7.3%	-\$778
Steam	65,569	\$117,112	72,230	-6,661	-9.2%	-\$11,898
TOTAL		\$316,940			-6.4%	-\$20,860

DAILY NEWS

"You cannot get through a single day without having an impact on the world around you. What you do you want to make." —Jane Goodall

2,466.6 metric tons of carbon dioxide equivalent month-to-date

YOUR ENERGY CONSUMPTION (w/o Adjustments - for reference only)

UTILITY (unit)	MONTH TO DATE		LAST YEAR	Unit	CHANGE % Chg	Est Cost
	Unit Consumed	Est Cost				
Electric (kWh)	261,150	\$19,320	432,118	-170,968	-39.6%	-\$1,232
Gas (therm)	899	\$875	2,136	-1,237	-57.9%	-\$18
Steam (therm)	3,781	\$6,753	5,886	-2,105	-35.8%	-\$1,232
TOTAL (MM BTU)		\$26,947			-31.8%	-\$1,232

YTD, YOU HAVE:

CONSERVED 1,123,625,565 BTUs of Energy to last year, or:

- Planted 1,440.5 tree seedlings and grew them for 10 years
- Duplicated the effects of 12.8 acres of pine or fir trees each year
- Saved 17,081.9 sq ft of forest from deforestation

***FACTORS IMPACTING ENERGY USAGE**


	MONTH TO DATE		ADJ. TO LAST YEAR	
	ACT.	LV	Est	Cost
Cooling Degree Days	96	31	+31,259	+0
Heating Degree Days	39	91	+0	-47
Occ. Rooms	2,719	1,116	+24,274	+0
Capital Improvements	Detailed on Daily Entry		+0	+0
TOTAL ADJUSTMENT			-15,592	-47

UTILITY (unit)	MONTH TO DATE	LAST YEAR (adj. Temp)	CHANGE
Electric (kWh)	261,150	432,118	-170,968 (-39.6%)
Gas (therm)	899	2,136	-1,237 (-57.9%)
Steam (therm)	3,781	5,886	-2,105 (-35.8%)
TOTAL (MM BTU)			-31.8%



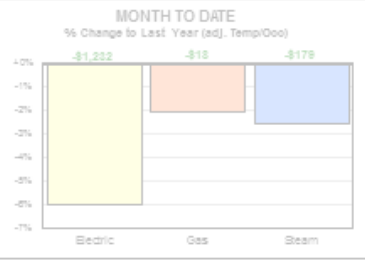
The Energy Looking Glass®

The Hotel Name
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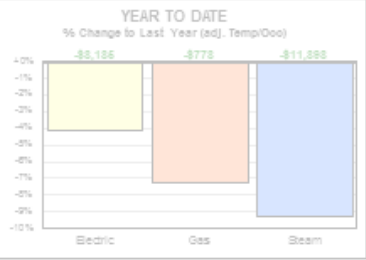
YOUR PROPERTY
May 14, 2015
Square Footage: 320,000
Year Built: 1990
Energy Star Rating as of: 11/26/2014
 Orig Rating: 60 SILVER
 Curr Rating: 82 GOLD
Top 25% of peer group / Qualified for Energy Star plaque


DAILY ENERGY CONSUMPTION REPORT
Friday, May 15, 2015

MONTH TO DATE
% Change to Last Year (adj. Temp/Doo)



YEAR TO DATE
% Change to Last Year (adj. Temp/Doo)



May: Focus on Water Conservation

EXP VAR TO BUDGET
VAR TO BUDGET

	MONTH TO DATE			LAST YEAR (+/-)			CHANGE	YEAR TO DATE			LAST YEAR (+/-)			CHANGE		
	Units	Cost	Ext Cost	Units	Cost	Ext Cost		Units	Cost	Ext Cost	Units	Cost	Ext Cost			
Electric (kWh)	261,150	\$19,320		432,118	\$11,031		-46.3%	-117,091		2,566,869	\$183,835		1,975,715	+\$67,154	+23.7%	+\$43,437
Gas (therm)	899	\$875		2,136	\$1,207		-57.3%	-\$1,205		10,201	\$9,334		10,744	-\$543	-5.1%	-\$529
Steam (therm)	3,781	\$6,753		5,886	\$2,105		-35.8%	-\$3,159		65,569	\$117,112		23,534	+\$42,034	+178.6%	+\$75,077
TOTAL (MM BTU)		\$26,947					-81.8%	-\$22,858			\$316,949			+\$37,222	-97.2%	-\$197,388

DAILY NEWS

"You cannot get through a single day without having an impact on the world around you. What you do makes a difference, and you have to decide what kind of difference you want to make." —Jane Goodall




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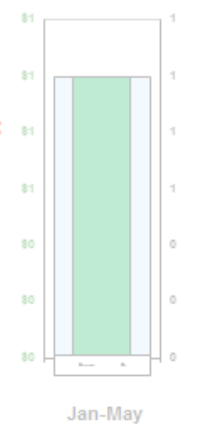
YOUR ENERGY CONSUMPTION (w/o Adjustments - for reference only)

UTILITY (unit)	MONTH TO DATE			LAST YEAR			CHANGE			YEAR TO DATE			LAST YEAR			CHANGE		
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TOTAL (MM BTU)		\$26,947					-81.8%	-\$22,858			\$316,949			+\$37,222	-97.2%	-\$197,388		

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	MONTH TO DATE		ADJ. TO LAST YEAR		
	ACT.	LY	Wk	Wk	Wk
Cooling Degree Days	96	31	+31,259	+0	+0.0
Heating Degree Days	39	91	+0	-47	-440
Occ. Rooms	2,718	1,116	+24,274	+0	+1,663
Capital Improvements	Detailed on Daily Entry				
TOTAL ADJUSTMENT			-35,332	-47	+1,223

	YEAR TO DATE		ADJ. TO LAST YEAR		
	ACT.	LY	Wk	Wk	Wk
Cooling Degree Days	168	122	+22,034	+0	+0.0
Heating Degree Days	3,226	2,944	+0	+256	+2,386
Occ. Rooms	72,697	24,242	+675,756	+0	+46,309
Capital Improvements	Detailed on Daily Entry				
TOTAL ADJUSTMENT			+256	-48,638	



Jan-May



The Energy Looking Glass®

The Hotel Name
ENERGY Looking Glass®

DAILY ENERGY CONSUMPTION REPORT

Friday, May 15, 2015

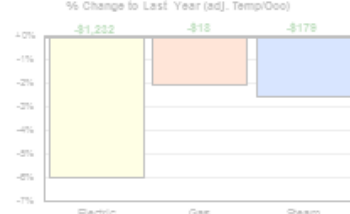
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May 14, 2015

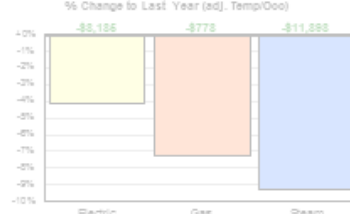
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MONTH TO DATE



YEAR TO DATE



YOUR ENERGY CONSUMPTION

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**including parts*

225.1 metric tons of carbon dioxide equivalent yesterday

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2,466.6 metric tons of carbon dioxide equivalent month

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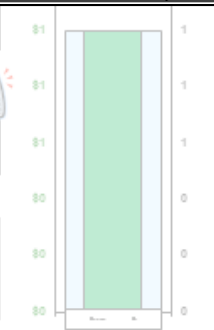
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Electric (kWh)	2,566,869	\$189,895	1,975,715	591,154	+29.7%	+\$43,437
Gas (therm)	10,201	\$9,934	10,744	-543	-5.1%	-\$529
Steam (therm)	65,569	\$117,112	23,534	42,034	+178.6%	+\$75,077
TOTAL (MM BTU)		\$316,940			+37.2%	-\$197,388

FACTORS IMPACTING ENERGY USAGE

	MONTH TO DATE		ADJ. TO LAST YEAR	
	ACT.	LY	W/ Wtr	W/ Wtr
Cooling Degree Days	96	31	+31,259	+0
Heating Degree Days	39	91	+0	-47
Occ. Rooms	2,719	1,116	+24,274	+0
Capital Improvements	Detailed on Daily Entry		+0	+0
TOTAL ADJUSTMENT			-15,592	-47

	YEAR TO DATE		ADJ. TO LAST YEAR	
	ACT.	LY	W/ Wtr	W/ Wtr
Cooling Degree Days	168	122	+22,034	+0
Heating Degree Days	3,226	2,944	+0	+256
Occ. Rooms	72,697	24,242	+675,756	+0
Capital Improvements	Detailed on Daily Entry		+0	+0
TOTAL ADJUSTMENT			+256	-48,488



Jan-May



The Energy Looking Glass®



Spellcheck

The Hotel Name

May: Focus on Water Conservation

ELG™ Reviews

Hold an energy meeting every month to discuss whatever utility shows the most change, either positive or negative. Fill in the green boxes below for each meeting.

Meeting Date	5/10/15	Presented by	Kate Chavez	Utility:	Electric	%Var MTD	2%	Helped/Hurt?	Hurt
Why does this utility have a significant change?	Hotel guests cranking A/C due to mascot convention staying with us.			What are the next steps?	Make sure Energy Set Points are being used.				

Fab Four & Energy Buddy Checklists

Fab Four should complete at least 4 checklists this month. Energy Buddies should complete at least 20 checklists this month. Those with fewer than those amounts are flagged with an X below.

	Name		# Completed and on File	Comments
Fab Four	Peter Caffrey	✓	4	
	Kate Chavez	✓	4	
	Jack Riggs	✗	3	Took a week's vacation
	Annabelle Kimira	✓	4	
Energy Buddy	Elizabeth Mills	✓	20	
	Clint Bishop	✓	20	Spotted leak in the kitchen, Peter will make sure it gets repaired.
	Gordon Price	✓	20	
	Ron Hiller	✓	20	

Contact support@heihotels.com to update or change any of the names on your Fab Four or Energy Buddy list.



The Energy Looking Glass®

The Hotel Name

ENERGY Looking Glass®

DAILY ENERGY CONSUMPTION REPORT

Friday, May 15, 2015

YOUR PROPERTY

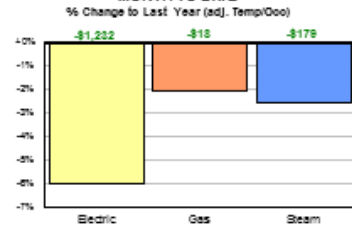
May 14, 2015

Square Footage: 320,000
Year Built: 1990

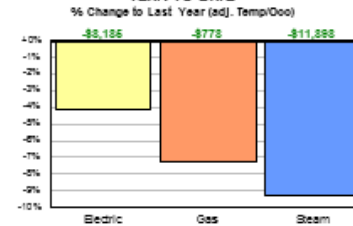
Energy Star Rating as of: 11/26/2014
 Orig Rating: 60 SILVER
 Curr Rating: 82 GOLD

Top 25% of peer group / Qualified for Energy Star plaque

MONTH TO DATE



YEAR TO DATE



May: Focus on Water Conservation

YOUR ENERGY CONSUMPTION

UTILITY (unit)	MONTH TO DATE		LAST YEAR (+/-)	Unit	CHANGE % Chg	Ert Cost
	Unit Consumed	Ert Cost				
Electric (kWh)	261,150	\$13,320	217,806	-16,656	-6.0%	-\$1,232
Gas (therm)	839	\$875	917	-19	-2.1%	-\$18
Steam (therm)	3,781	\$6,753	3,881	-100	-2.6%	-\$179
TOTAL (MM BTU)		\$26,947			-4.8%	-\$1,430

UTILITY (unit)	YEAR TO DATE		LAST YEAR (+/-)	Unit	CHANGE % Chg	Ert Cost
	Unit Consumed	Ert Cost				
Electric (kWh)	2,566,869	\$189,835	2,617,505	-110,637	-4.1%	-\$8,185
Gas (therm)	10,201	\$9,334	11,000	-799	-7.3%	-\$778
Steam (therm)	65,569	\$117,112	72,230	-6,661	-9.2%	-\$11,838
TOTAL (MM BTU)		\$316,940			-6.4%	-\$29,860

EXP VAR TO BUDGET

VAR TO BUDGET	MTD	YTD
EXP VAR TO BUDGET	-\$26,712	+\$42,456
VAR TO BUDGET	-\$2,419	-\$6,338
EXP VAR TO BUDGET	-\$6,709	+\$40,987
VAR TO BUDGET	-\$35,841	+\$77,104



225.1 metric tons of carbon dioxide equivalent yesterday

MTD, YOU HAVE: CONSERVED 68,766,688 BTUs of Energy to last year, or:

- Planted 88.2 tree seedlings and grew them for 10 years
- Duplicated the effects of 0.8 acres of pine or fir trees each year
- Saved 1,045.4 sq ft of forest from deforestation

2,466.6 metric tons of carbon dioxide equivalent month-to-date

YTD, YOU HAVE: CONSERVED 1,123,625,565 BTUs of Energy to last year, or:

- Planted 1,440.5 tree seedlings and grew them for 10 years
- Duplicated the effects of 12.8 acres of pine or fir trees each year
- Saved 17,081.9 sq ft of forest from deforestation

DAILY NEWS

"You cannot get through a single day without having an impact on the world around you. What you do makes a difference, and you have to decide what kind of difference you want to make." —Jane Goodall



YOUR ENERGY CONSUMPTION (w/o Adjustments - for reference only)

UTILITY (unit)	MONTH TO DATE		LAST YEAR	Unit	CHANGE % Chg	Ert Cost
	Unit Consumed	Ert Cost				
Electric (kWh)	261,150	\$13,320	432,178	###	-46.3%	-\$17,091
Gas (therm)	839	\$875	2,136	-1,237	-57.3%	-\$1,205
Steam (therm)	3,781	\$6,753	5,886	-2,105	-35.8%	-\$3,159
TOTAL (MM BTU)		\$26,947			-81.8%	-\$22,858

UTILITY (unit)	YEAR TO DATE		LAST YEAR	Unit	CHANGE % Chg	Ert Cost
	Unit Consumed	Ert Cost				
Electric (kWh)	2,566,869	\$189,835	1,975,715	+567,154	+28.7%	+\$43,437
Gas (therm)	10,201	\$9,334	10,744	-543	-5.1%	-\$529
Steam (therm)	65,569	\$117,112	23,534	+42,034	+178.6%	+\$75,077
TOTAL (MM BTU)		\$316,940			+37.2%	-\$197,388

YTD SAVINGS



FACTORS IMPACTING ENERGY USAGE

	MONTH TO DATE		ADJ. TO LAST YEAR		
	ACT.	LY	Elec	Gas	Steam
Cooling Degree Days	96	31	+31,259	+0	+0.0
Heating Degree Days	39	91	+0	-47	-440
Occ. Rooms	2,719	1,116	+24,274	+0	+1,663
Capital Improvements	Detailed on Daily Entry		+0	+0	+0
TOTAL ADJUSTMENT			-55,532	-47	+1,223

	YEAR TO DATE		ADJ. TO LAST YEAR		
	ACT.	LY	Elec	Gas	Steam
Cooling Degree Days	168	122	+22,034	+0	+0.0
Heating Degree Days	3,226	2,944	+0	+256	+2,386
Occ. Rooms	72,607	28,242	+675,756	+0	+46,309
Capital Improvements	Detailed on Daily Entry		+0	+0	+0
TOTAL ADJUSTMENT			+675,756	+256	-48,438

Jan-May



Reinforcement

Also known as how to keep an energy-saving program from losing steam!

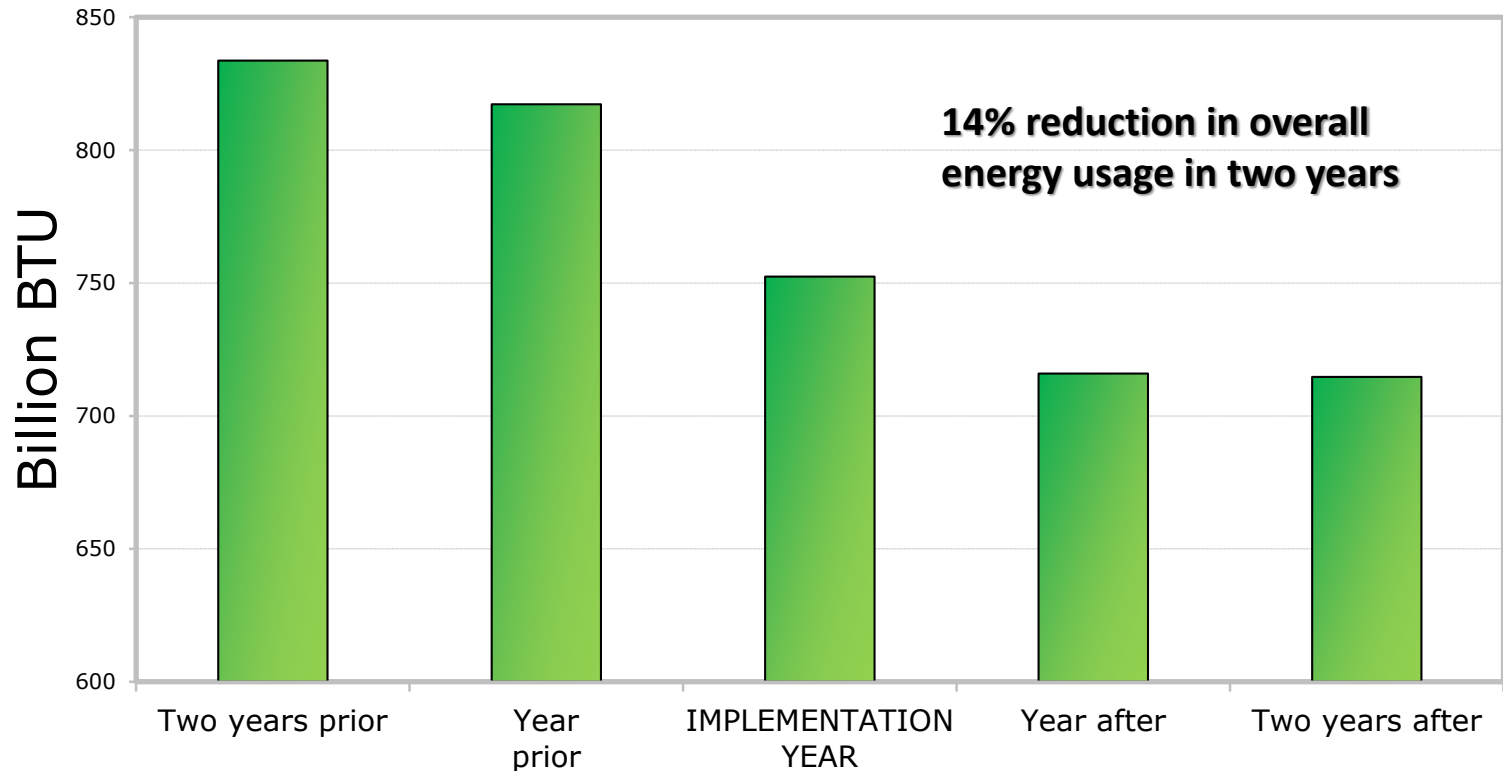
That joke will never be funny.

- **Rewards and Recognition**
- **Consistent and Accurate Reporting**
- Embracing a **Cultural Shift**



Results

HEI Energy Usage



Includes portfolio of properties managed for entire period



In Summary

- Focus on **consumption**
- Use a **methodology** that everyone can **understand** and to which everyone can **relate**
- **Reinforce** daily





Driving Action through Energy Data Visualization

Aaron Bastion & Cody David
Atlanta Better Buildings Challenge

Atlanta Better Buildings Challenge

Driving Action through Data Visualization

May 28, 2015



power to change

ready. set. realize.



“Atlanta’s goal is to become a top-tier city for sustainability.

-Mayor Kasim Reed

Our sustainability Impact Areas



- Air Quality
- Land Use
- Sustainability Planning
- Transportation & Mobility
- Education
- Growing Business
- Energy Efficiency & Renewables**
- Community Health & Vitality
- Materials Management
- Water Management

Commercial EE Ordinance – 2015!



- Benchmarking
- Transparency
- Audits
- Retrocommissioning

Subject to commercial buildings **25,000** square feet or greater.

2,350 buildings that, as a whole, currently represent **80** percent of the city's commercial sector.



Atlanta BBC Steering Committee

City of Atlanta



Central Atlanta Progress



BATMA



Midtown Alliance



ESCO



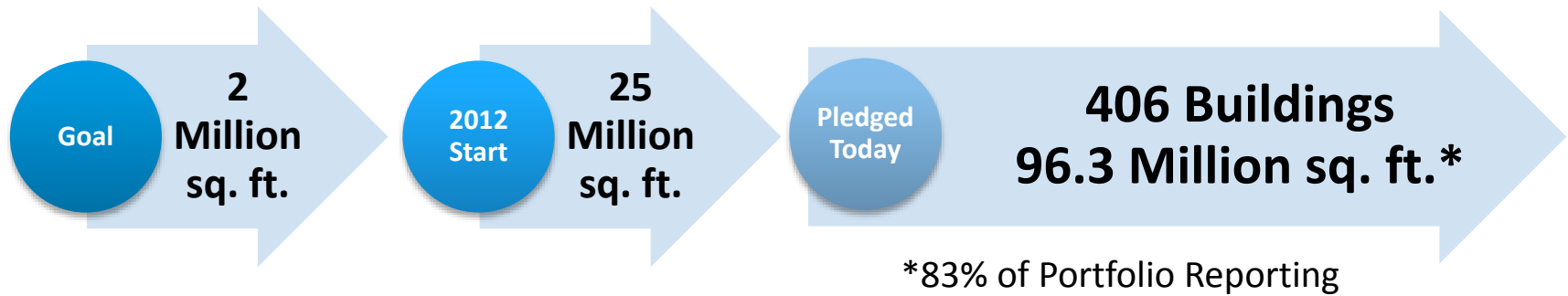
Southface



Invest Atlanta



Participant Update: May 2015



*Includes City of Atlanta Facilities and Participants outside of listed Activity Centers



Annual Reporting



ATLANTA IS TRANSFORMING
THROUGH THE COMMITMENT OF OUR PARTICIPANTS

2013 NEWSLETTER COVER

ATLANTA:
COMMITTED TO SUSTAINABILITY

ATLANTA IS A LEADER IN THE NATIONAL CHALLENGE TO MAKE COMMERCIAL BUILDINGS 36% MORE ENERGY & WATER EFFICIENT BY 2018.



Better Buildings CHALLENGE
U.S. DEPARTMENT OF ENERGY

CITY OF ATLANTA, GA
Energy Performance

GOAL
20% Reduction in Energy Intensity by 2020 from a 2008 Baseline

CHALLENGE COMMITMENT
55 Million Square Feet

PROGRESS TO DATE

Cumulative (vs. Baseline)	9%
Annual (2013)	2%

PORTFOLIO ENERGY PERFORMANCE

Better Buildings Challenge partners strive to decrease portfolio-wide source energy use intensity (SEUI) and to increase the percent improvement compared to a set baseline. Since 2008, Atlanta has improved collective energy performance by 9% for a diverse portfolio of properties representing private, local government, federal government, education, and nonprofit sectors. Atlanta's portfolio consists of more than 100 facilities and 50 million square feet. The portfolio includes 4 million square feet of public facilities and 45 million square feet of private facilities. The public commitment includes several of Atlanta's largest municipal consumers of energy: its primary drinking water treatment plant, airport parking decks, and civic center.

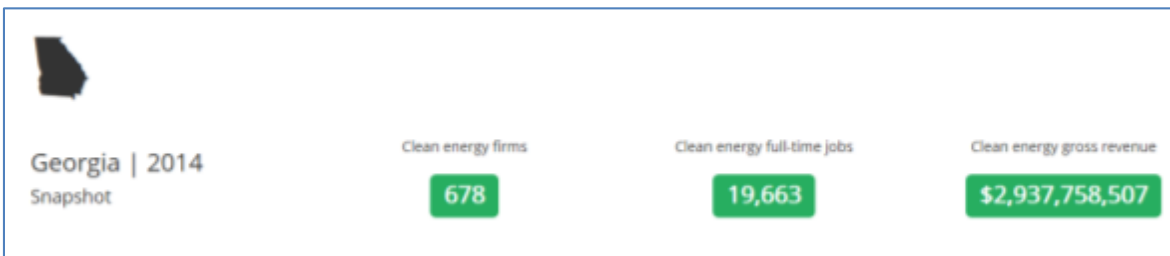
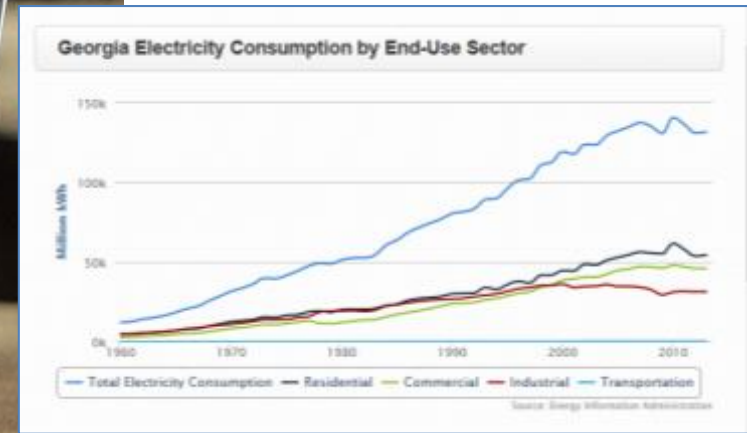
Cumulative % Improvement from Baseline



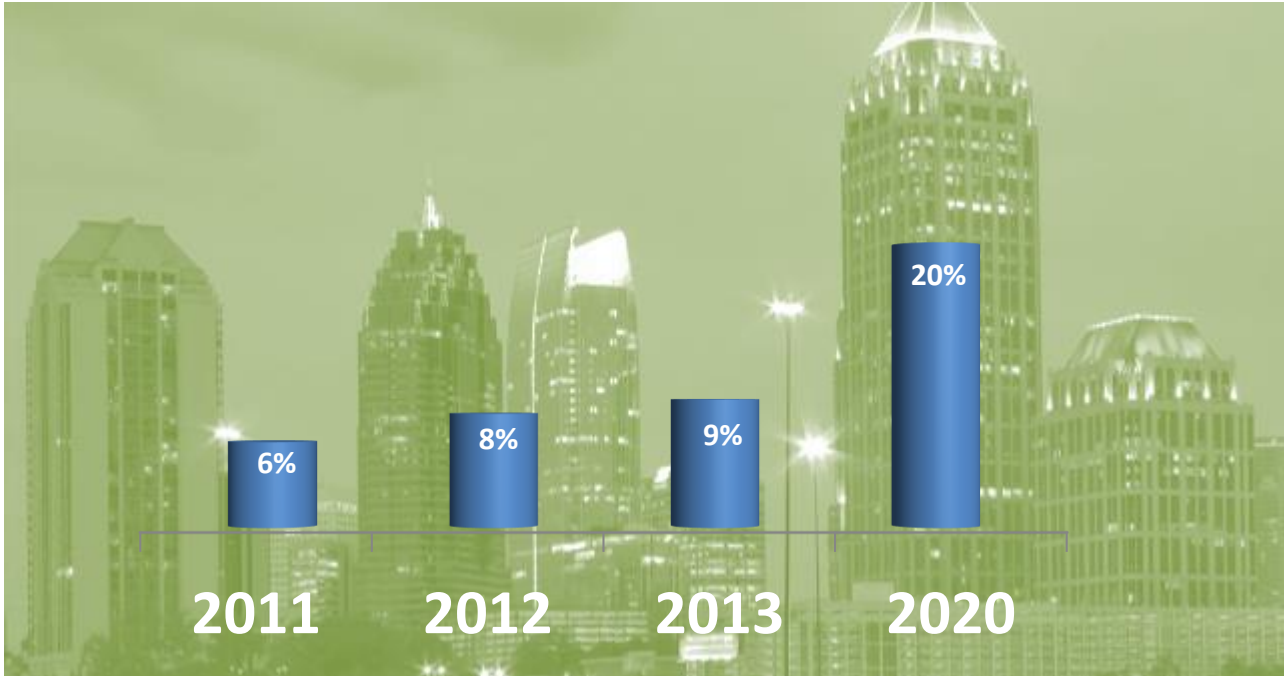
Year	% Improvement
2008	0%
2010	5%
2011	8%
2012	9%
2013	9%



Using The Power of Data Visualizations



Support Program Initiatives



Feature Atlanta's Diverse Portfolio



ENERGY STAR Web Services

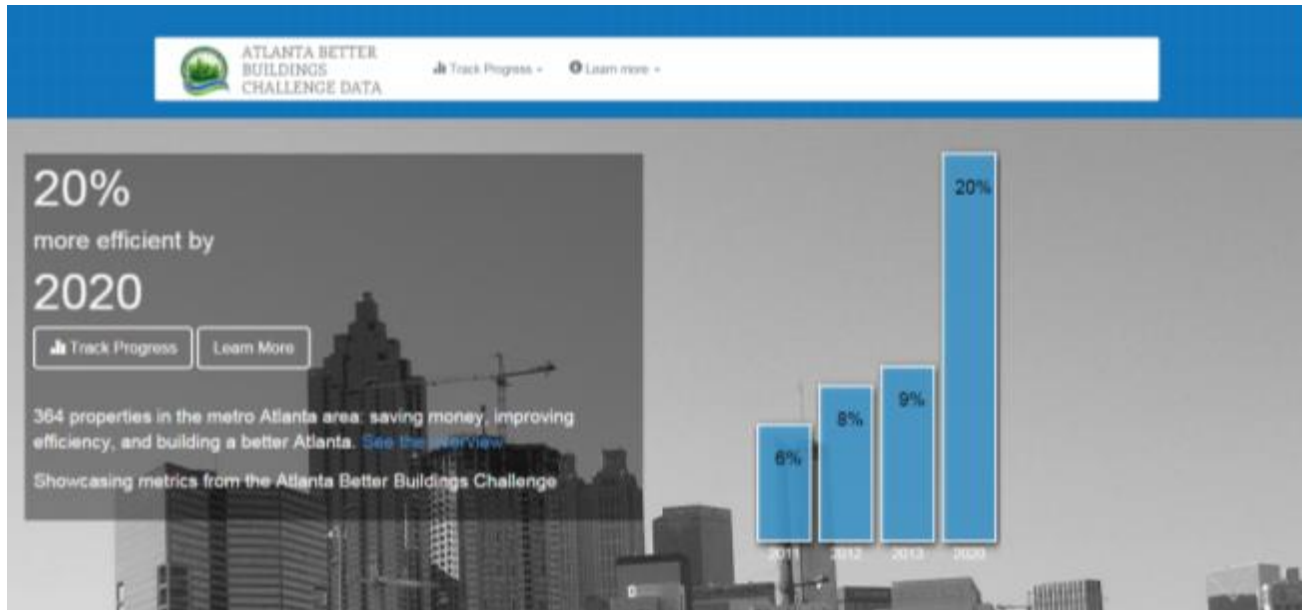


Development Challenges

- What do we *want* to display?
- What *can* we display with the metrics available?
- What *should* we actually display?
- How to make data easier to display?



Demonstration



www.abbcdata.org





Driving Action through Energy Data Visualization

Andrew Sharp
City of Philadelphia



Philadelphia Energy Benchmarking

Taking Building Energy Data to the Market
Andrew Sharp, Mayor's Office of Sustainability

GREENWORKS

PHILADELPHIA

Energy

PHILADELPHIA REDUCES ITS VULNERABILITY TO RISING ENERGY PRICES



Environment

PHILADELPHIA REDUCES ITS ENVIRONMENTAL FOOTPRINT



Equity

PHILADELPHIA DELIVERS MORE EQUITABLE ACCESS TO HEALTHY NEIGHBORHOODS



Economy

PHILADELPHIA CREATES A COMPETITIVE ADVANTAGE FROM SUSTAINABILITY



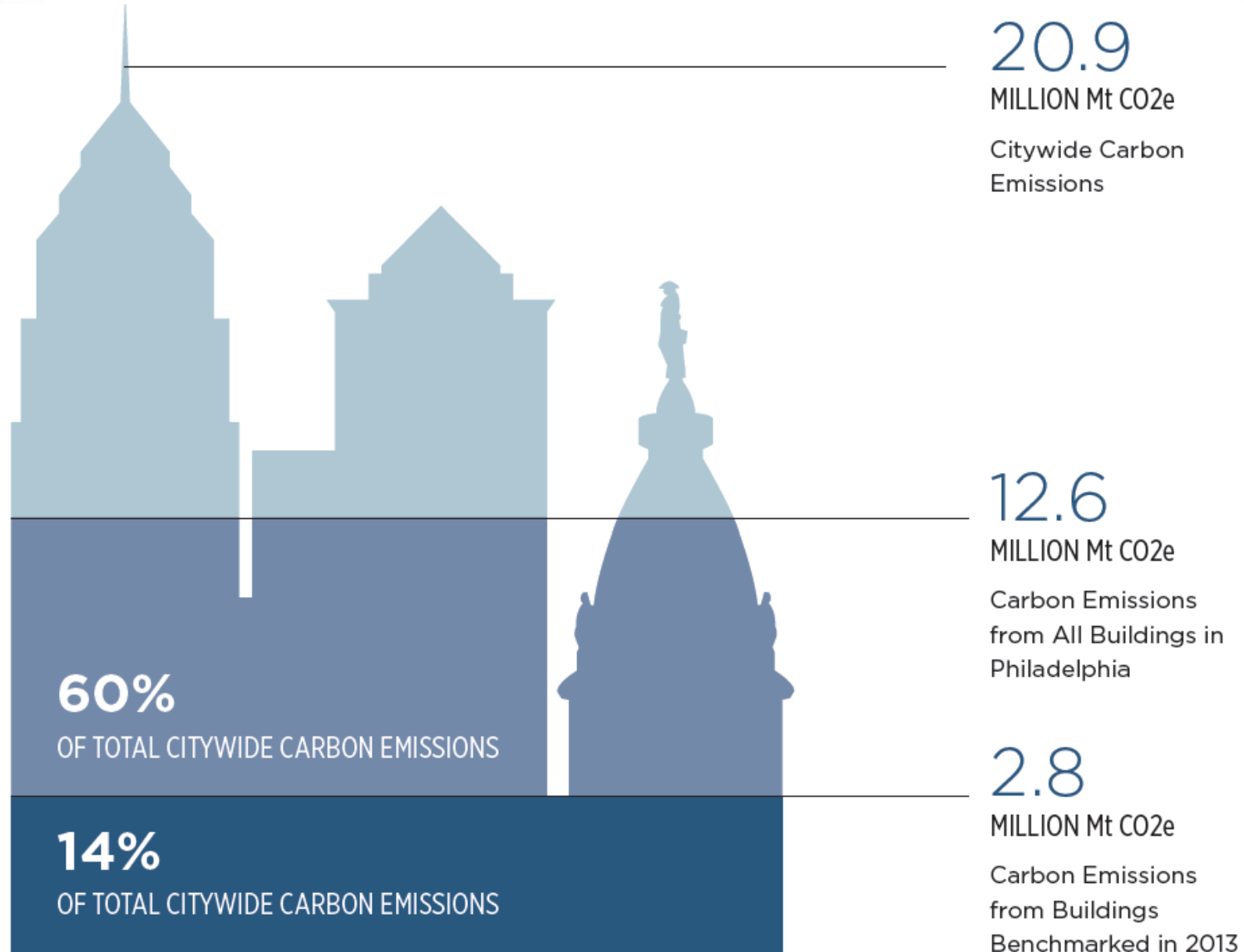
Engagement

PHILADELPHIANS UNITE TO BUILD A SUSTAINABLE FUTURE

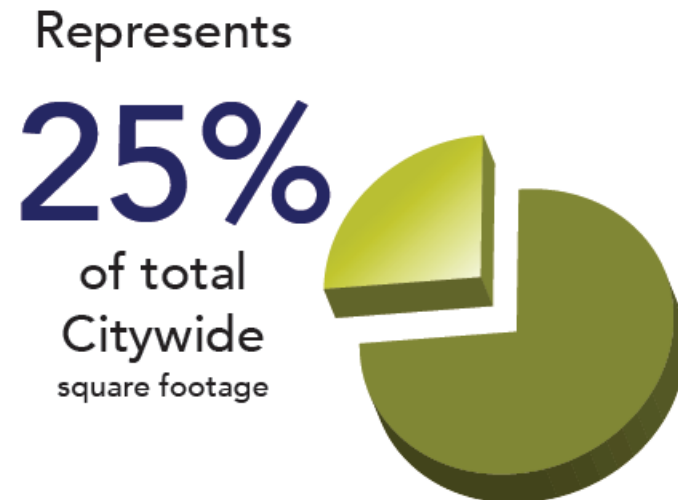
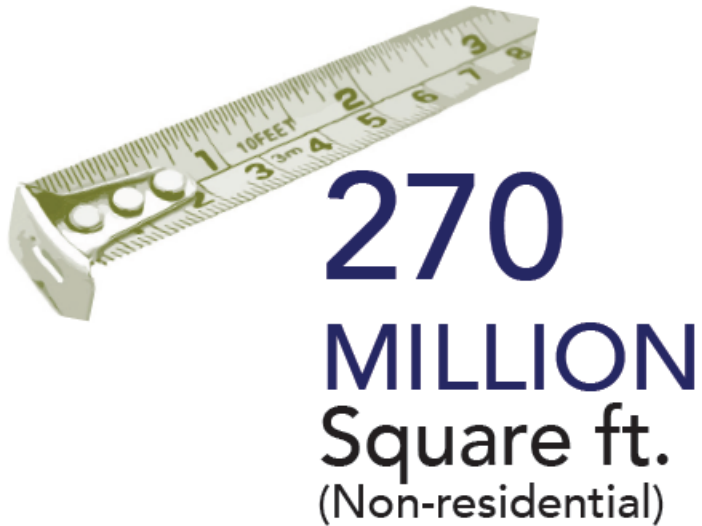


5 goals, 15 targets, over 150 initiatives

Buildings and Carbon Emissions



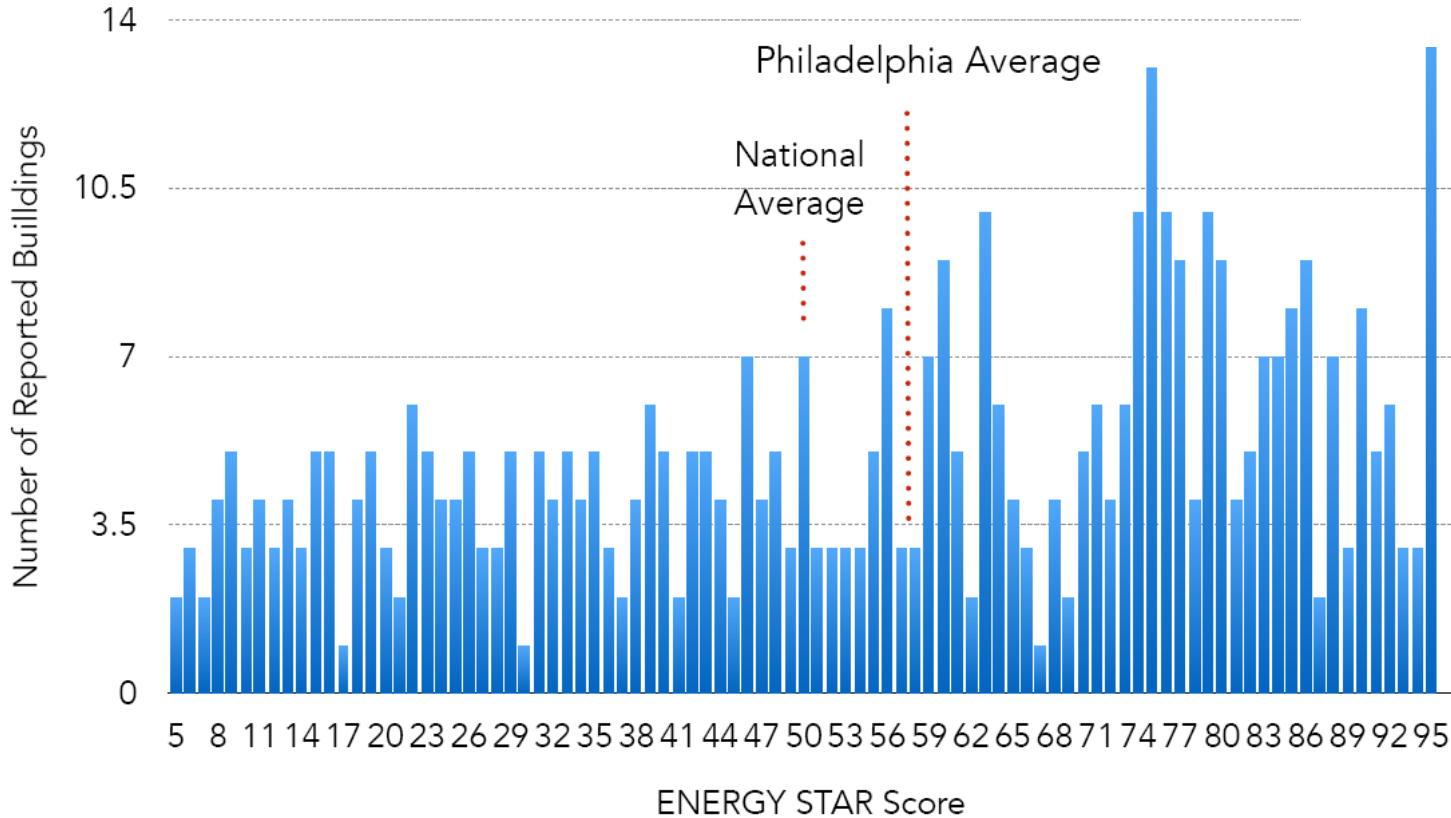
Year Two Benchmarking Results



Year Two Benchmarking Results

58
Average
ENERGY STAR
Score

ENERGY STAR Ratings of Reported Buildings



Connecting Individual Performance to Financing and Technical Assistance



2013 Building ENERGY Performance Profile

ADDRESS: 1515 Arch St

YEAR BUILT: 1962

GROSS FLOOR AREA (SQUARE FEET): 502,000

OPA ID#: 772059100

Compare Your Building's ENERGY STAR® Score to Similar Buildings in the U.S. & Philadelphia

(1-100 Score, 100 is most efficient building)



Below is how your building's annual ENERGY STAR® Score compares to other National and Philadelphia Office buildings reported in 2013.

NATIONAL
AVERAGE SCORE



YOUR BUILDING'S
SCORE



PHILADELPHIA'S
AVERAGE SCORE



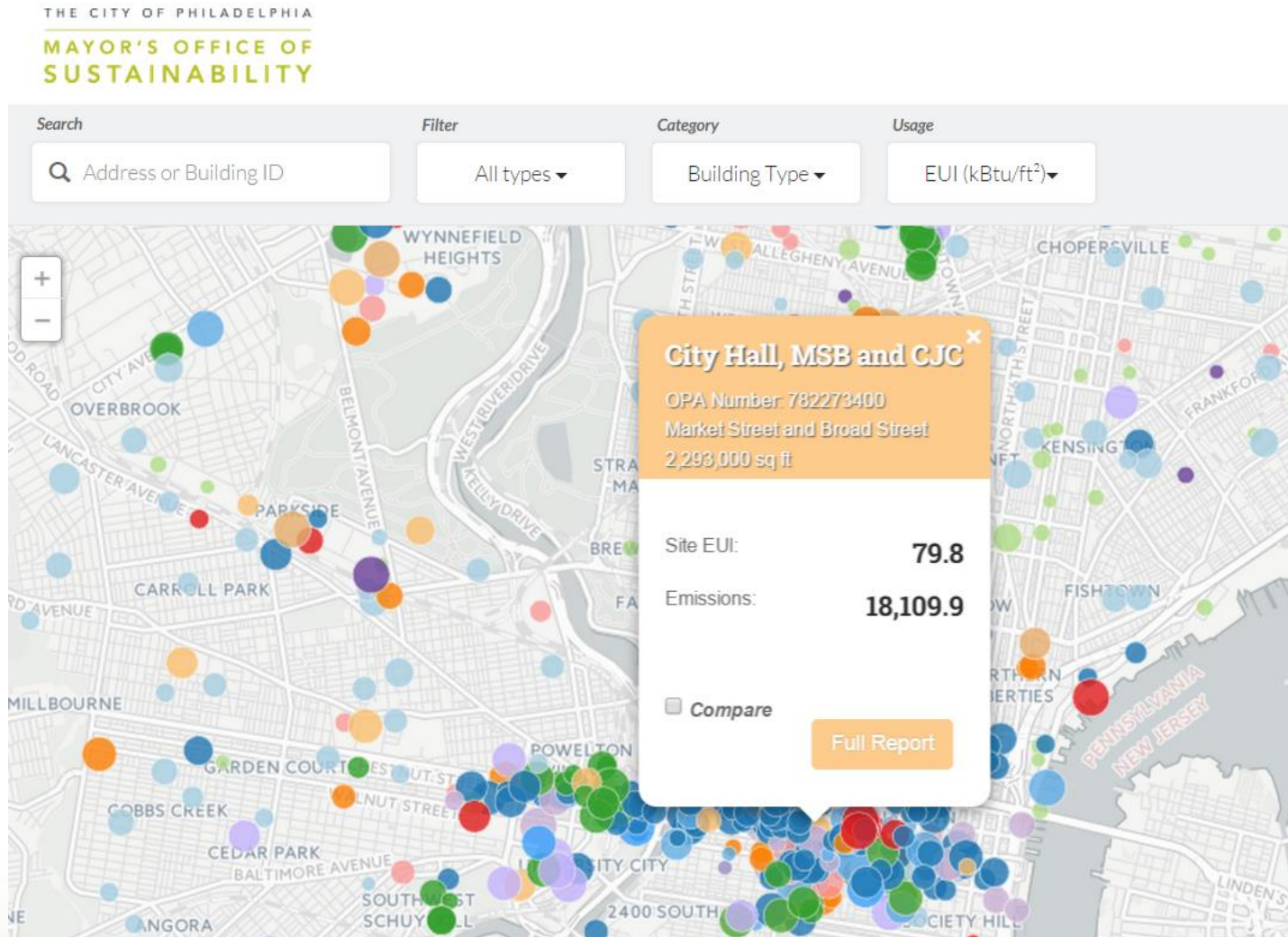
Your Building Ranks # **132**
out of **165** similar buildings



- Ranking is based on self-reported data provided by building owners and operators.
 - Buildings 75 or above are eligible for ENERGY STAR certification
- Visit www.energystar.gov/benchmark to learn how.



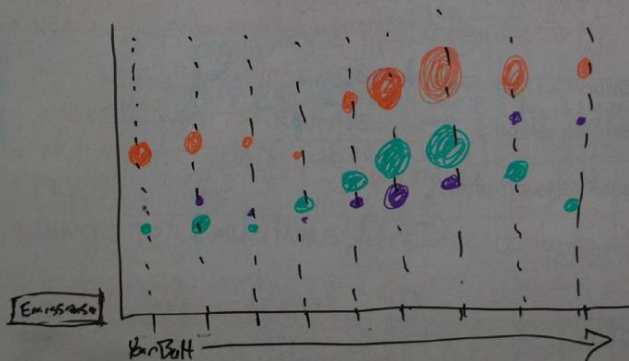
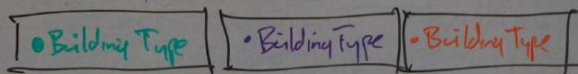
Delivering More Impactful Information to the Marketplace



<http://visualization.phillybuildingbenchmarking.com>

Visualization Tool Development

Output, Time, Type, Magnitude

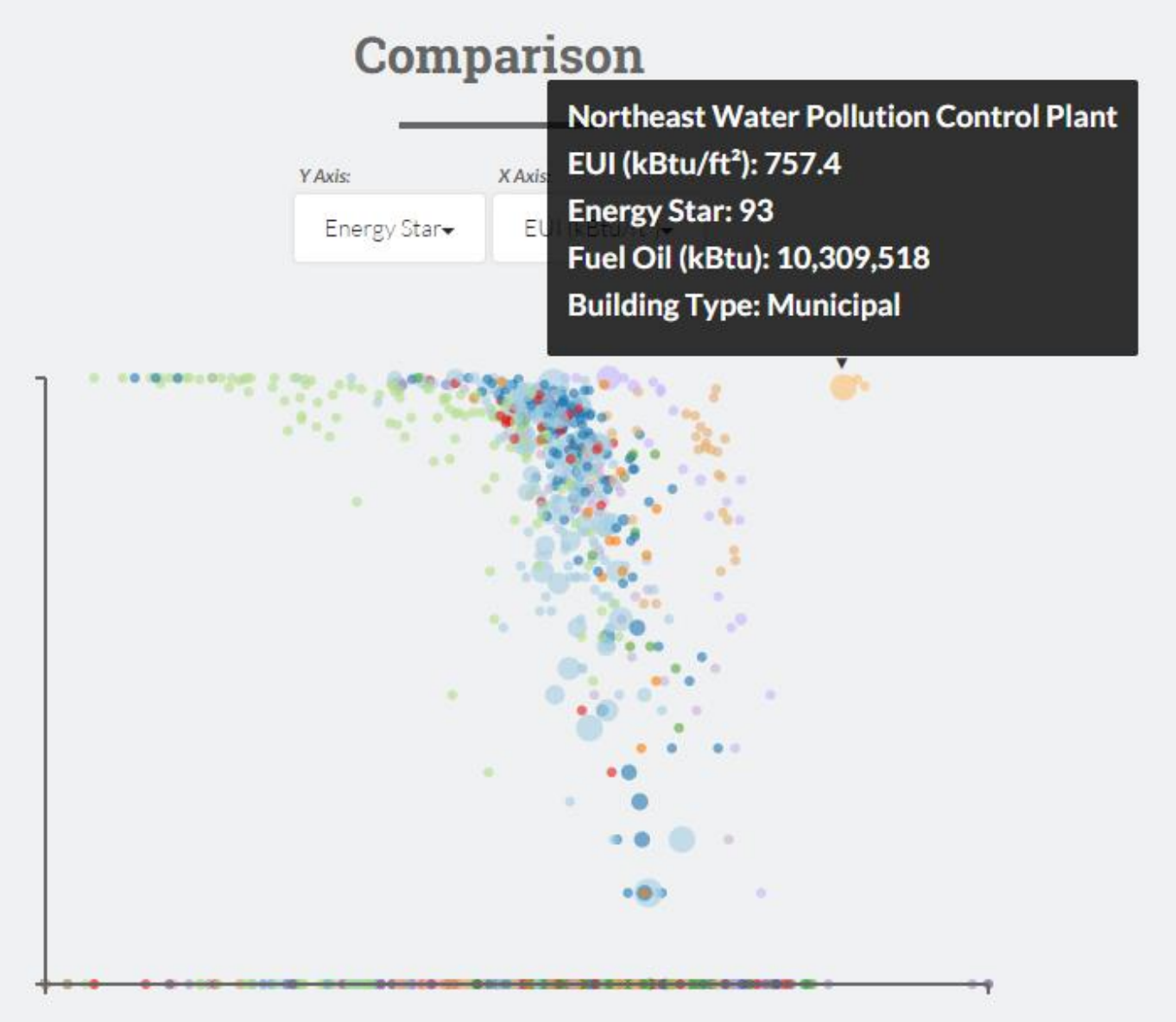


Sketched out potential visualizations






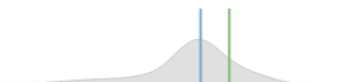



Azavea, MOS, and other energy benchmarking stakeholders

Understand Dynamics among Data Types



Allows Comparisons among Multiple Buildings

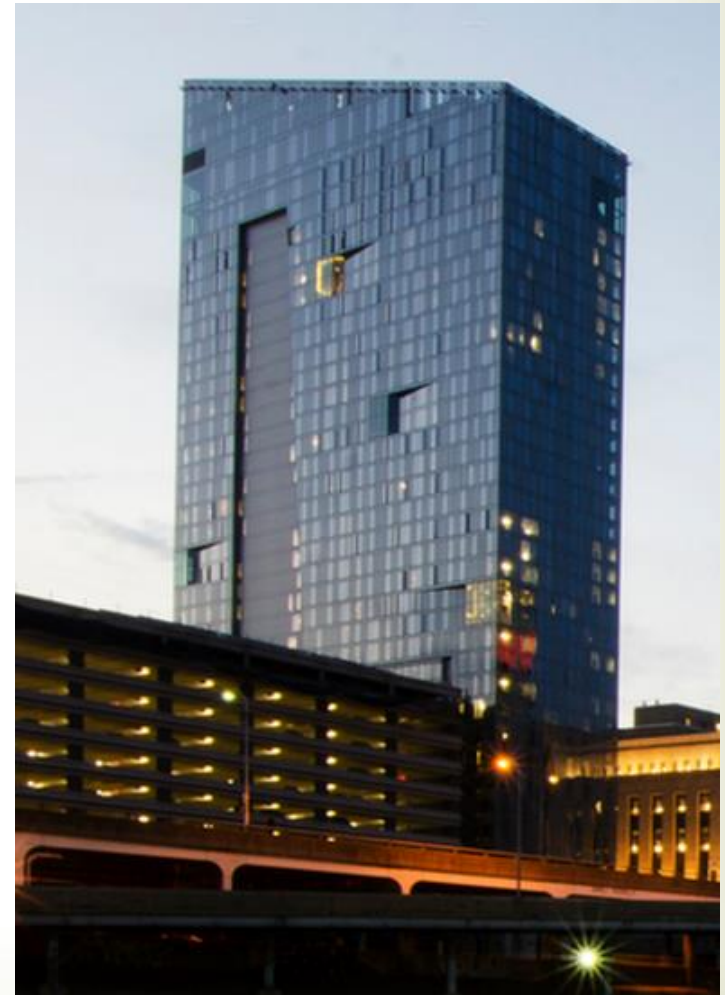
Comparison

	 One Parkway Building 1515 Arch St	 City Hall, MSB and CJC Market Street and Broad Street	Composite
Energy Star	39	N/A	
EUI (kBtu/ft ²)	151	80	
Emissions (MtCO ₂ e)	7,475	18,110	
Electricity (kBtu)	47,119,720	110,424,467	
Natural Gas (kBtu)	28,412,890	64,888,387	

<http://visualization.phillybuildingbenchmarking.com>

What's next?

- Benchmarking for multi-family facilities
- Additional research and focus groups related to outreach tools
- Expanded outreach for Year Three benchmarking





Philadelphia Energy Benchmarking

Andrew Sharp, Mayor's Office of Sustainability

www.phila.gov/benchmarking

Questions & Discussion

abbcdata.com

<http://visualization.phillybuildingbenchmarking.com>