

# Leveraging Audits to Spur Long Term Green & Healthy Property Management Actions

Presented by:



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# Who We Are

- Building Systems Consultants - founded 1972
- 20,000 + units of NYC housing in past several years – “owner’s rep’s for energy”
- 4 of first 5 ENERGY STAR High Rise Multifamily Buildings in the Country
- 1<sup>st</sup> LEED EB Certified Multifamily Building
- Actively Involved in City Code Greening Efforts
- Strong emphasis on training: DHCR, Local 32BJ, Building Performance Institute, National Center for Healthy Housing, HUD
- Applied building research with NREL, NYSERDA and HUD

# Learning Objectives

- Understand the importance of benchmarking all properties in a portfolio for energy and water.
- Learn the basics of the audit process and what level of owner involvement is necessary for success.
- Learn how to take what was implemented at one building and strategically turn those into portfolio wide policies.
- Identify 3 non audit related green and healthy practices that can enhance green property management actions.

# Greening Work Orders

## Scenario:

Bathroom damage from leaking toilet above, ceiling has peeling paint and has partially come down. Lower unit bath fan is not working well, vanity and flooring damaged due to leak/flood. Old toilet in upper unit. Building was constructed in late 1940's.

What do you do in the lower unit?

What do you do in the upper unit?

# Benchmarking Energy & Water Use

- What is benchmarking?
  - Benchmarking a building documents the buildings energy and water usage per square foot
  - A similar comparison would be a miles per gallon rating for a car
  - Energy use is standardized by converting electric, gas, oil and/or propane into BTUs (British thermal unit)
  - Calculating the square footage of “conditioned” space allows you to standardize the energy usage per square foot of conditioned space
  - After we have our BTU/square foot (sf), it’s then standardized again for climate conditions so buildings in every climate can be compared. This is done by dividing by Heating Degree Days (HDD) which can be found at [www.weather.com](http://www.weather.com).
  - Our ideal measurement is BTU/sf/HDD

# Calculating HDDs and CDDs

Daily Temp Variable	Defined As	Description
<b>CDD</b>	$(T - 65)$ Daily CDD	T is daily Average Temp (F). If T is less than 65F, CDD = 0
<b>HDD</b>	$(65 - T)$ Daily HDD	T is daily Average Temp (F). If T is greater than 65F, HDD=0
<b>Average (Mean) Temp of the Day</b>	$\frac{T_{\max} + T_{\min}}{2}$	Tmax (High) & Tmin (Low) are whole values.

# Energy Benchmark Targets

<b>Category</b>	<b>Target for High Performance</b>	<b>Consider Low-Hanging Fruit Upgrades</b>	<b>Consider an Energy Audit</b>
Space Heating	<10 BTU/ft <sup>2</sup> /HDD	11-14 BTU/sf/HDD	>15 BTU/ft <sup>2</sup> /HDD
Cooling	<10 BTU/ft <sup>2</sup> /CDD	11-14 BTU/sf/CDD	>15 BTU/ft <sup>2</sup> /CDD

## Examples

1<sup>st</sup> Energy Star Certified Multifamily Building in NYC – 6 BTU/sf/HDD

100 Unit Multifamily Retrofit in NJ – 8 BTU/sf/HDD

# Sample Software Options

- Building Performance Compass  
[www.psdconsulting.com/buildingperformance](http://www.psdconsulting.com/buildingperformance)
- EPA Portfolio Manager  
[www.energystar.gov/index.cfm?c=evaluate\\_performance\\_bus\\_portfoliomanager](http://www.energystar.gov/index.cfm?c=evaluate_performance_bus_portfoliomanager)
- WegoWise  
[www.wegowise.com](http://www.wegowise.com)
- Energy Score Cards  
<http://www.energyscorecards.com/>
- Your own spreadsheet

# The Power of Benchmarking

## Building Comparison View

### Building Comparison

Total: 103 buildings selected  
Energy data reported as kBtu/sq ft, weather normalized

Name, Address	Floor Area (sqft)	Total Energy	Baseload	Heating	Cooling	CO2e (lbs/sqft)	
Peer Building No 95	600,000	295	211	61	22	58	🔍
Peer Building No 57	486,270	188	142	27	18	16	🔍
Peer Building No 53	1,889,100	186	123	30	33	39	🔍
Peer Building No 84	2,262,060	185	147	24	14	33	🔍
Peer Building No 79	689,760	177	134	16	26	21	🔍
Peer Building No 63	1,259,010	172	124	18	30	24	🔍
Peer Building No 73	1,901,790	172	124	24	24	27	🔍
Peer Building No 86	432,090	171	84	3	84	14	🔍
Peer Building No 75	783,630	171	135	15	21	24	🔍
Peer Building No 5	540,300	169	128	24	17	15	🔍
Peer Building No 71	520,380	168	116	37	15	26	🔍
Peer Building No 1	2,099,000	167	110	27	30	35	🔍
Peer Building No 32	2,513,400	167	132	22	12	29	🔍
Peer Building No 65	956,520	166	118	26	22	24	🔍
Peer Building No 76	435,240	164	73	81	10	26	🔍
Peer Building No 27	766,400	159	121	15	23	19	🔍



Name

click for detailed data

Full-Year Sum

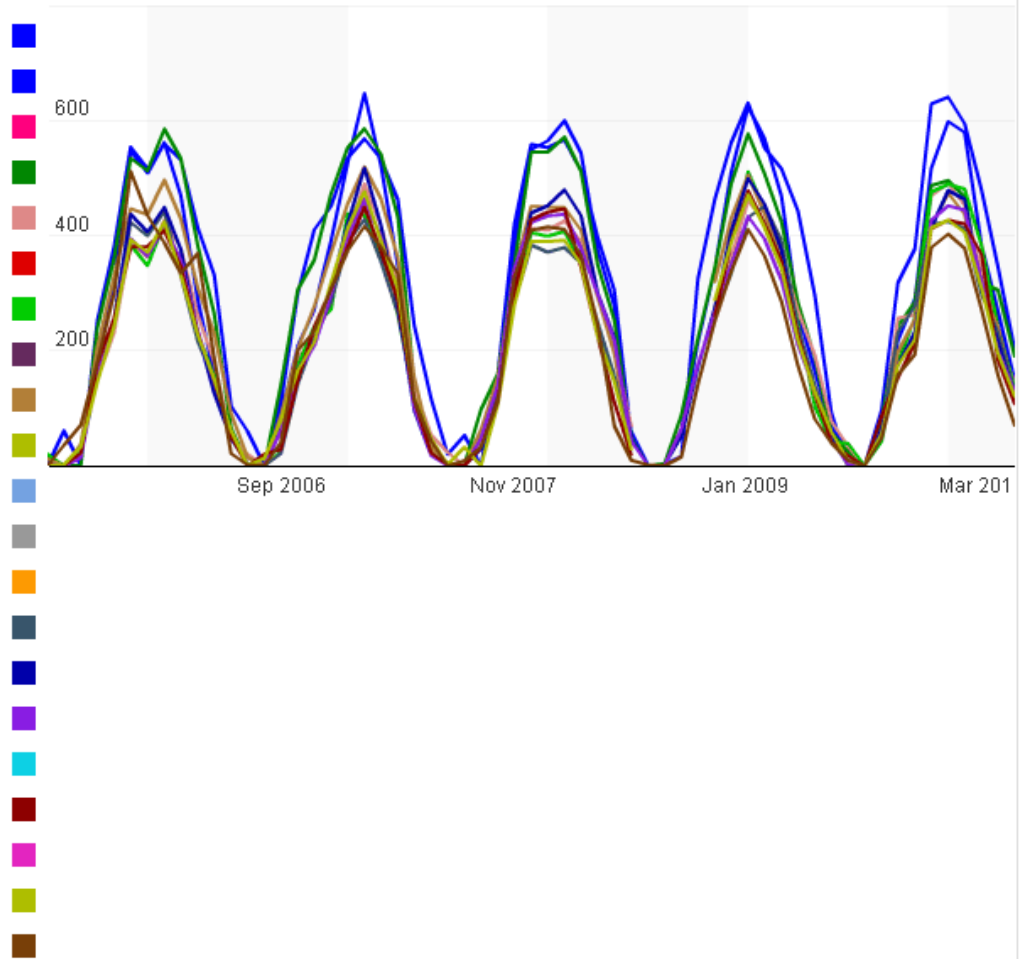
85 Russel Expressway	19.3
10 Patricia Parkways	16.1
78 Jaskolski Traf...	15.1
43 Pfannerstill Glen	15.1
32 Keven Courts	14.4
21 Lurline Burgs	14.1
22 Rohan Lights	14.1
85 Harry Pike	13.1
48 Joanne Forest	13.1
97 Kiley Club	13.0
21 Prohaska Sts	13.0
54 Bradtke Expres...	13.0
2 Tromp Forge	13.0
66 Willms Brooks	13.0
46 Alexa Meadows	12.9
27 Block Rest	12.6
26 Hyatt Ports	12.4
49 Daniel Pass	12.4
22 Kuphal Land	12.2
18 Kozey Sts	12.2
25 Ettie Plains	10.8

Detailed Data per Month

click a square to show or hide an item on the graph

date range: 2 yrs All dates

zoom in: click and drag



# Sample Energy Use Report

**138-52 ELDER AVE**  
Queens, NY, SELF\_HELP-001

**Property ScoreCard**

Most Recent Year ▼ Compare

(Jun 2008 - May 2010) Most Recent Available 12 Months

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**Property Information**

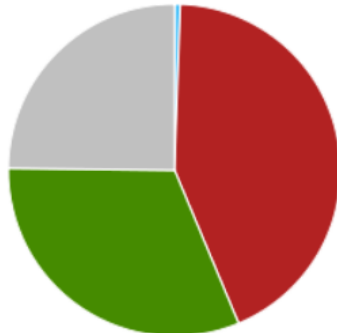
Prop ID: SELF\_HELP-001  
Address: 138-52 Elder Ave  
City: Queens  
Zip Code: 11355  
State: NY  
Property Type: Multi-Family  
Occupancy:  
Year Built:  
Total ft<sup>2</sup>: 120,380  
Non-Res ft<sup>2</sup>: 46,455  
Units: 159  
Bedrooms: 160  
Fuel Code: EGG  
Payment Code: (T) TOO  
Weather Station: NY-New York  
Alerts: None  
Tags:

Edit

Indexes    \$ / yr    Energy    \$ / Unit    \$ / SqFt    Carbon

Owner Energy Index <span style="float: right;">78 kBTU/ft<sup>2</sup>/yr</span> <span style="float: right;">D</span>
Owner Energy Spend <span style="float: right;">\$1.45 /ft<sup>2</sup></span> <span style="float: right;">\$1,099 /unit</span>
<span style="color: blue;">❄️</span> Cooling Index <span style="float: right;">0.2 BTU/ft<sup>2</sup>/CDD</span> <span style="float: right;">A</span>
<span style="color: red;">🔥</span> Heating Index <span style="float: right;">9.0 BTU/ft<sup>2</sup>/HDD</span> <span style="float: right;">D</span>
<span style="color: green;">🔌</span> Non-Seasonal Electric Index <span style="float: right;">2,023 kWh/unit/yr</span> <span style="float: right;">C</span>
<span style="color: gray;">🏠</span> Non-Seasonal Fossil Fuel Index <span style="float: right;">21.9 mmBTU/bdrm/yr</span> <span style="float: right;">D</span>
<span style="color: blue;">💧</span> Water Index <span style="float: right;">N/A gallons/bdrm/day</span> <span style="float: right;">N/A</span>
<div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 20px;"> <p><b>1,263,324 lbs</b></p> </div> <div style="text-align: center;"> <p><b>CO<sub>2</sub></b> per year</p> </div> </div>

**Annual Spending By End Use**



- Cooling - \$1,026
- Heating - \$75,323
- Non-Seasonal Electric - \$55,036
- Non-Seasonal Fossil Fuels - \$43,339

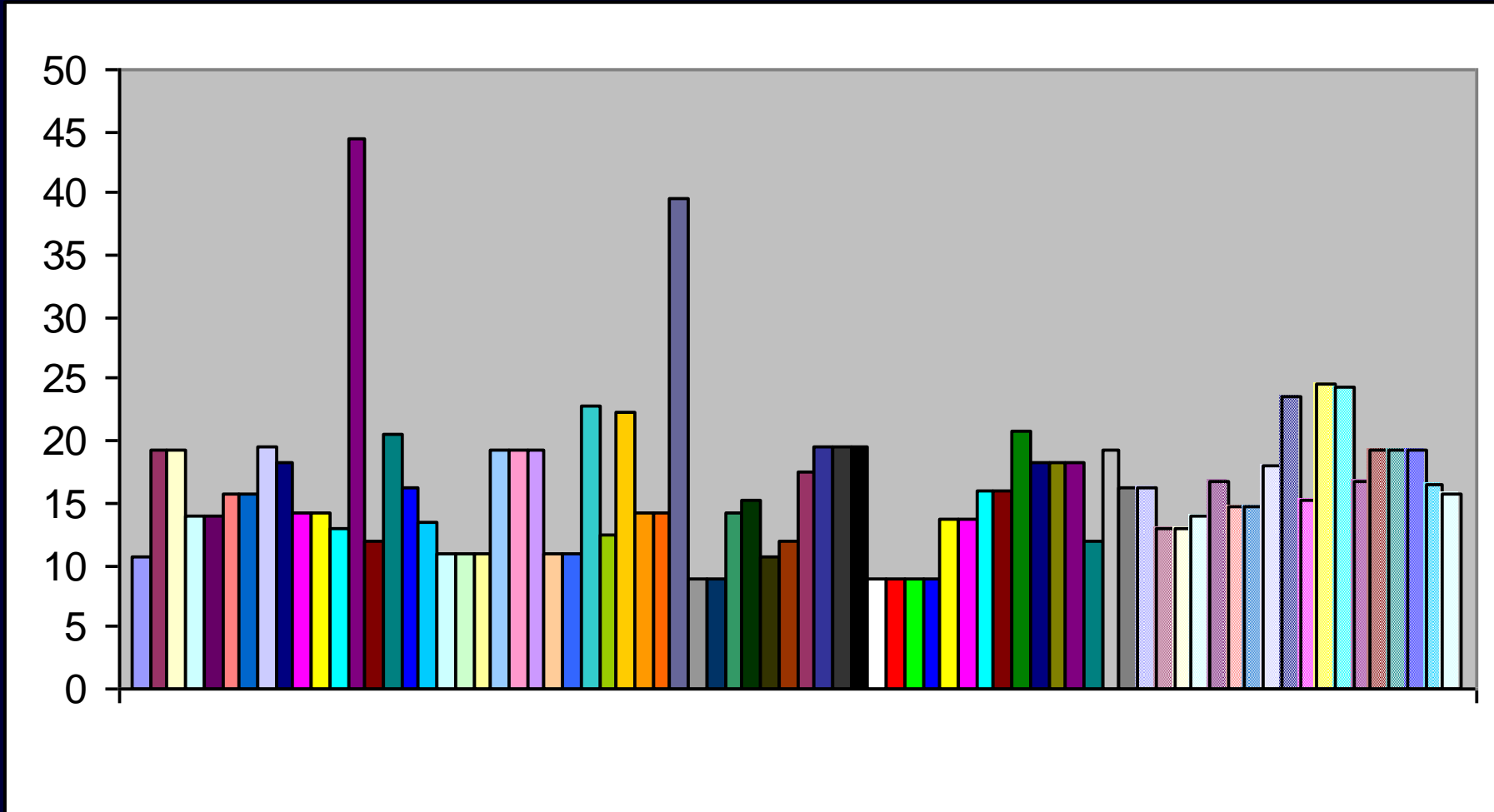
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Electricity: (2 accts)	\$56,067
Natural Gas: (3 accts)	\$118,658
<b>Total Energy Spending:</b>	<b>\$174,725</b>
Water:	
<b>Total Utility Spending:</b>	<b>\$174,725</b>

# Why Measure Energy & Water Use?

- To know how much energy and water we use
- Understand our carbon footprint
- To compare energy usage between buildings
- To target improvements to reduce operating expenses
- To inform capital needs and renovation plans

# NY City Portfolio Benchmarking Shows Variability

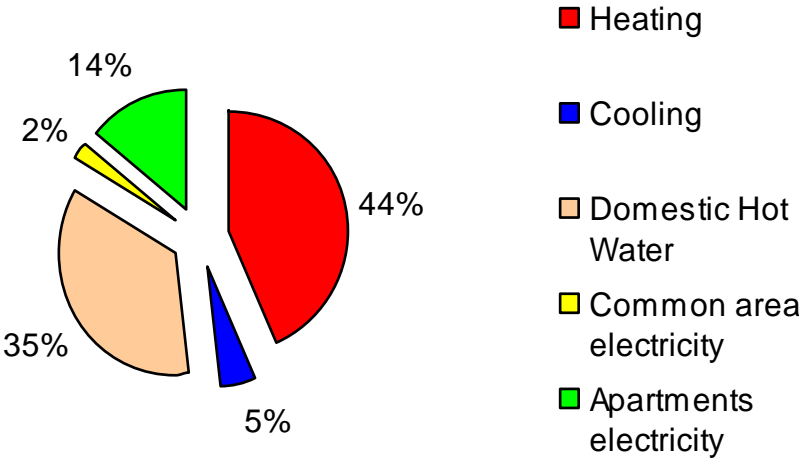


# Thinking Portfolio Wide

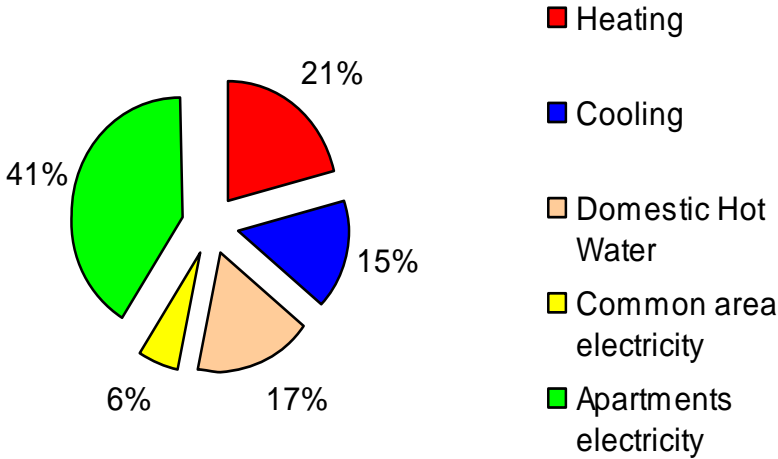
- Portfolio Wide Benchmarking
  - Identify high energy and water wasting buildings
  - BTU/ft<sup>2</sup>/HDD
    - Measure of building performance normalized for climate
- Building assessments of problem properties
- Portfolio Wide Opportunities for creating greener and healthier buildings

# Energy Use versus Energy Costs

### Energy usage per end-use



### Energy costs per end-use



# Audit Process

- Benchmarking
- Visiting apartments
- Air leakage testing
- Combustion efficiency testing
- Interviewing staff and tenants
  - Find the person who has worked there the longest
  - Building psychology

# Typical Scope of Work

- Boiler replacement
  - Atmospheric to condensing; separate smaller boiler for DHW
- Air sealing
- Ventilation balancing and aroosealing
  - Constant Airflow Regulator (CAR) installation
  - Duct cleaning
  - Roof fan replacement
- Added insulation to the roof cavity
- Replace motors with premium efficiency motors
- Thermostatic radiator valves (TRVs) and orifices

# Typical Scope of Work

- Low-flow faucet aerators and showerheads
- AC covers
- Energy Star appliances
- Weatherstripping doors
- Lighting change
  - CFLs in the units or LED strips
  - Bi-level fluorescent lighting in common areas
  - LED exit signs
  - Motion sensors wherever applicable

# Owner Involvement = Success

- Correct and complete billing data
- Owners aiding the communication with tenants
  - Unit access
  - Emphasis on tenant benefits; energy and health
- Building history and planned improvements
- Implementation oversight and inspections

# Importance of Training & Tools for Building Staff

- Building staff need to understand and know how to operate and optimize the new equipment in their building
  - Use videos for on-site tools
  - Importance preventative maintenance and action plan
- Energy Efficient Building Operator (EEBO) Training
  - Building Performance Institute (BPI) certification for all building operators
- A push towards building efficiency causes a need for trained operators

# Conclusion

- You can always find ways to increase efficiency of performance and operations
- Talk to the tenants and maintenance staff
  - Building psychology
- Know when to call in the experts
- Always investigate possible financial incentives and rebates
  - [www.dsireusa.org](http://www.dsireusa.org)

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Thank you for your time.  
Questions?

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