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SENSIBLE,
SUSTAINABLE

READ WHAT'S ON YOUR CHAIR PLEASE

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Data + Stuff I Know About Multifamily Buildings

Data Not Dogma
July 29, 2014
F.L. Andrew Padian
The Community Preservation Corporation
www.communityp.com

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Hello!
Your Apartment Building Quiz Starts Now!

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SURVEY TIME

- Geeks
- Nerds
- BS
- Do not look at Data

- Homeowners
- Multifamily (5+)
- Coop/Condo
- Commercial
- MF Rental

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The Community Preservation Corporation

- Private non-profit mortgage finance company
- Founded in NYC in 1974
- Provide multifamily construction & perm financing
- Sponsored by 70 banks and insurance companies
- Mission: Stabilize, strengthen and sustain low and moderate income communities
  - Use our financing to preserve existing and develop new affordable housing in the communities we serve
  - Provide a consistent source of capital in low-income areas

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Why is a banker telling us about ENERGY????

- Well, for starters I'm not a banker, I'm an energy and buildings geek
- I've spent the last 35+ years learning about why buildings go bad
- Started in policy, then energy, H+S, durability, sustainability, resilience
- When I am at a building, I spend about the same amount of time with people as systems
- 25% Data, 75% Pschology
- Owner+super+manager+occupants ÷ 4 = near truth
- Today I want to talk about some things that I've learned

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Some Notices Here:

- 3000 multifamily buildings 100MM ft^2
- All over the country, primarily Northeast
- Bank, Engineering, Weatherization, Gubment
- Clinically disabled:
    1. BFBBM+CRI

Welcome to New York!

(Very Different from the PNW)

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CITY	HDD	CDD	$/Therm	¢/KWH
NYC	4872	1160	$1.50 (Andy Pays $15.65)	25¢ (Andy Pays 42.67¢)
Portland	4300	398	$1.20	6¢
Seattle	4900	183	$1.20	10¢

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NYC Heating/DWH Code

- Oct 31 to May 31
- 6am-10pm outside <55ºF inside 68ºF
- 10pm-6am outside <40ºF inside 55ºF
- DHW 120ºF minimum 24/7
- ANY violation $500/apt/day

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#1 Reason people move out of Apartments in USA?

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COST.

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#2 Reason people move out of Apartments in USA?

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SMELL.

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#3 Reason people move out of Apartments in USA?

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NOISE.

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#1 Reason people move out of Apartments in NYC?

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PCV/ST vs. Solaire

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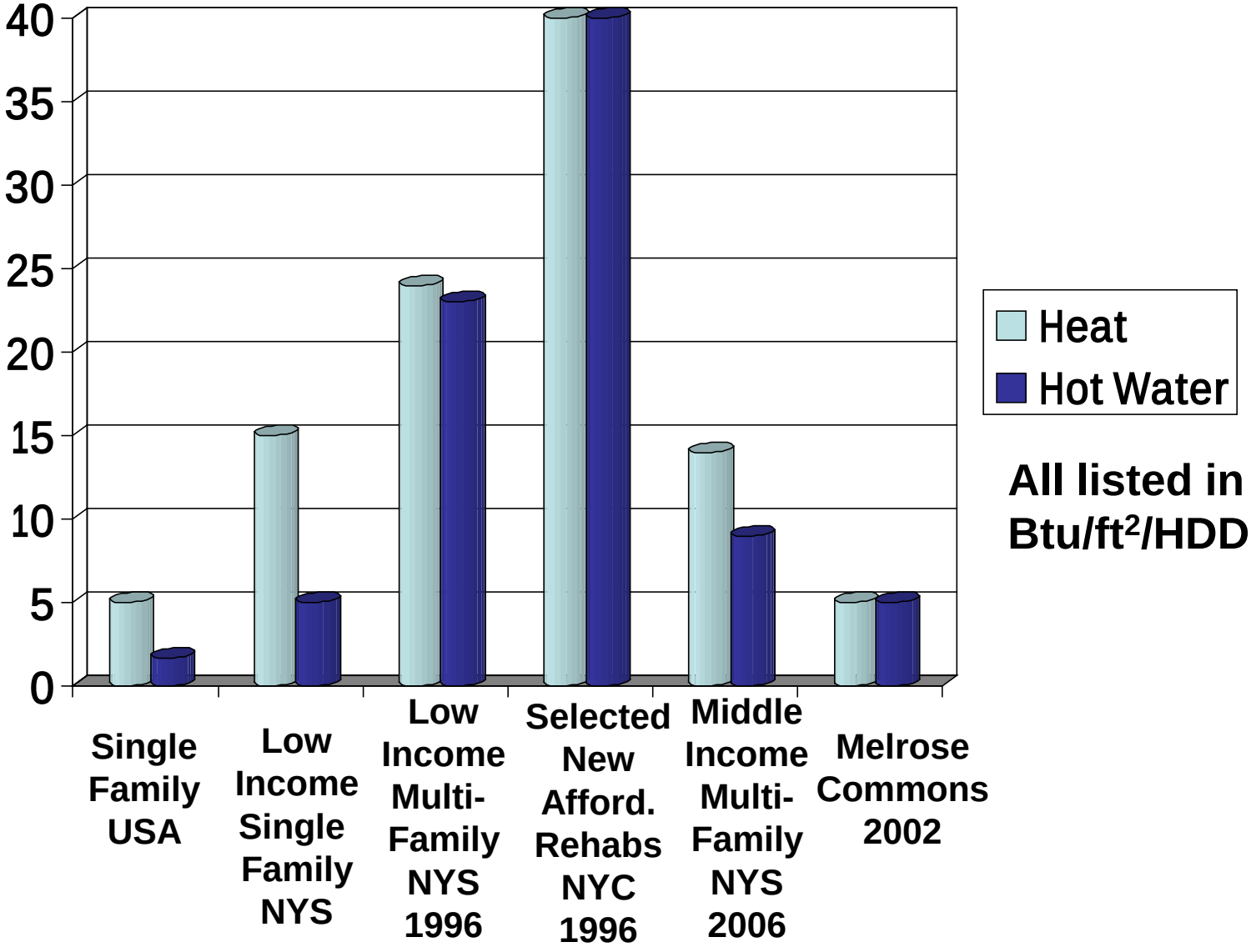
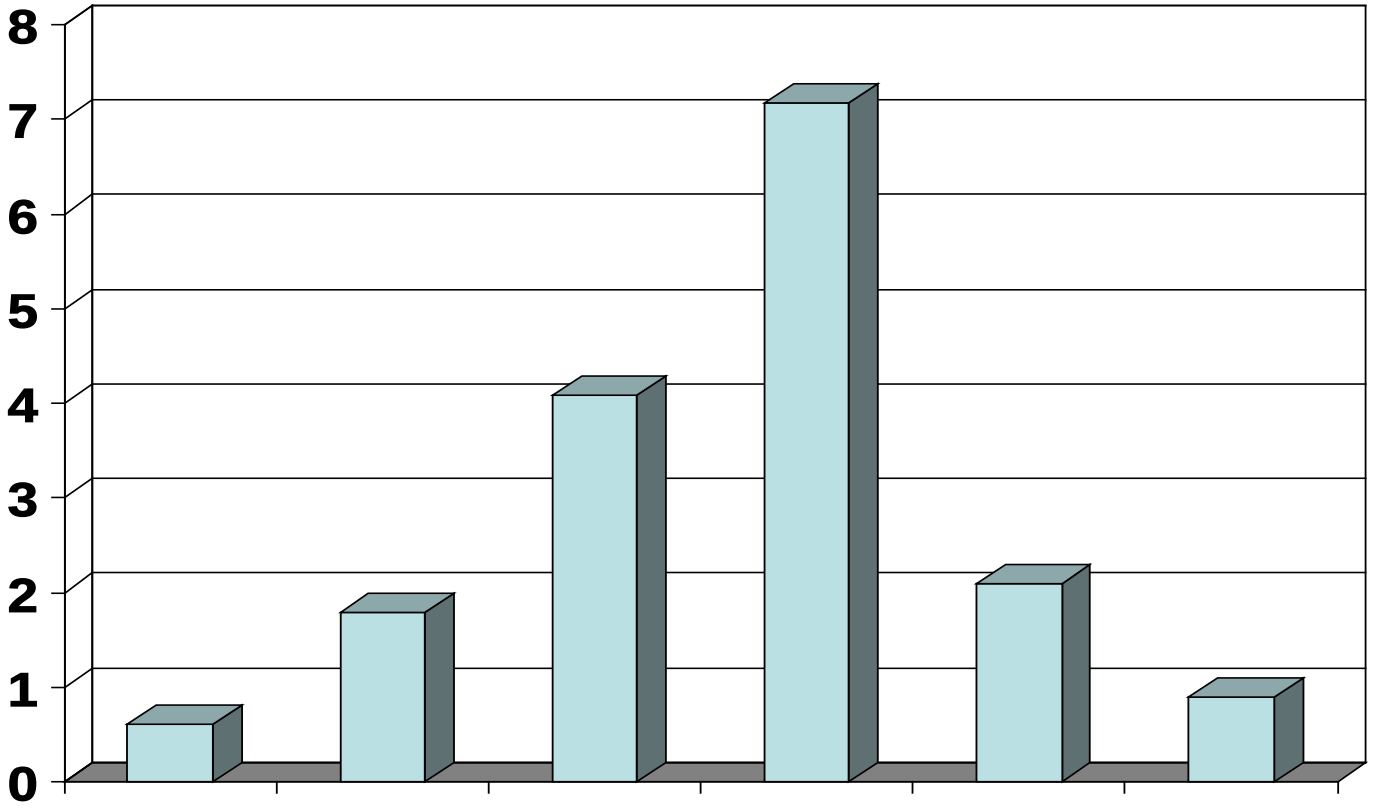
The Seven-to-One Problem in Multifamily (DATA)

Range of Energy Usage in Buildings

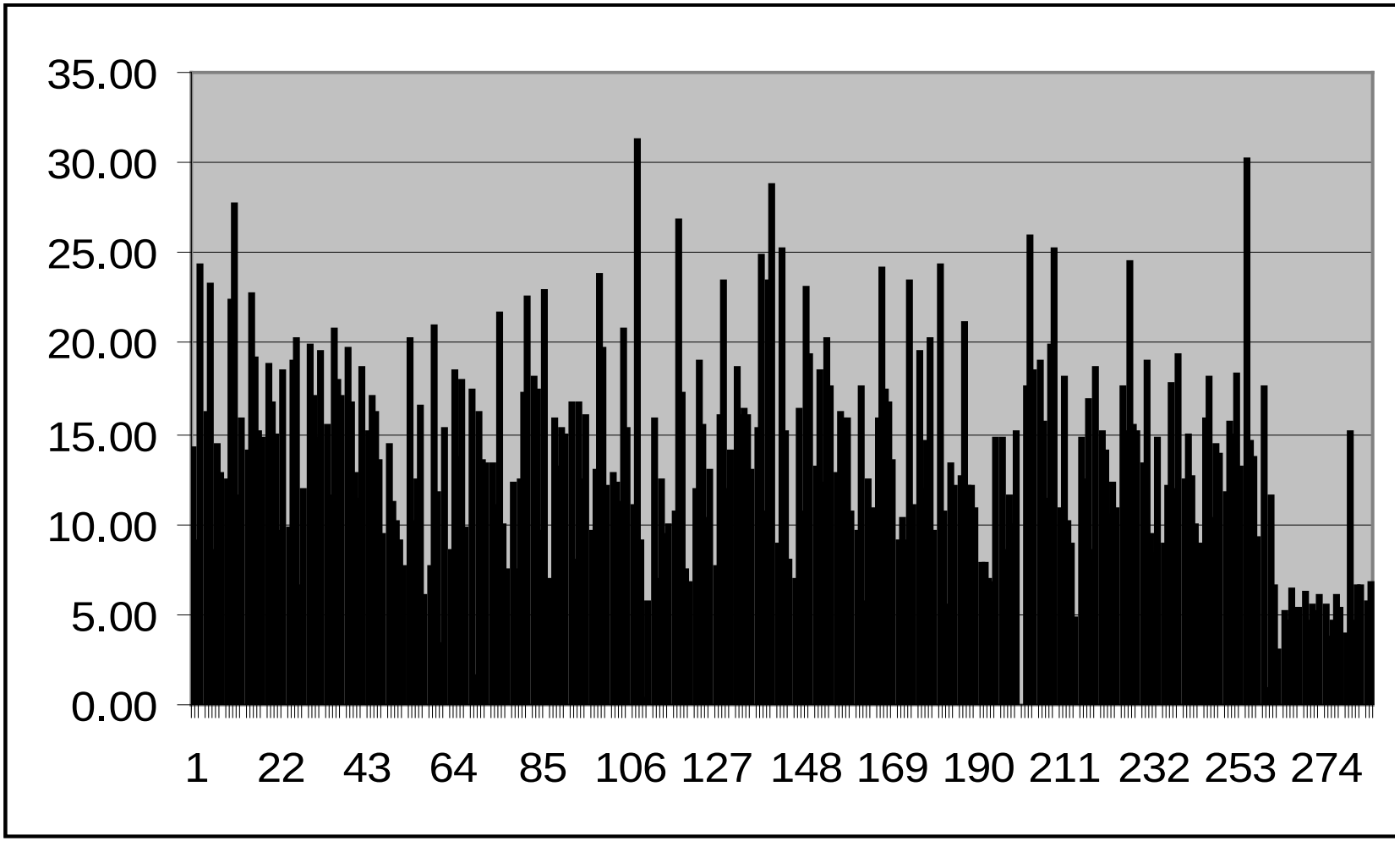


What does this mean in energy costs?



Gas Cost Assumes $1.85/therm

Almost 300 NYS Buildings requesting Energy Audits 2001-2005 (BTU/ft2/HDD)

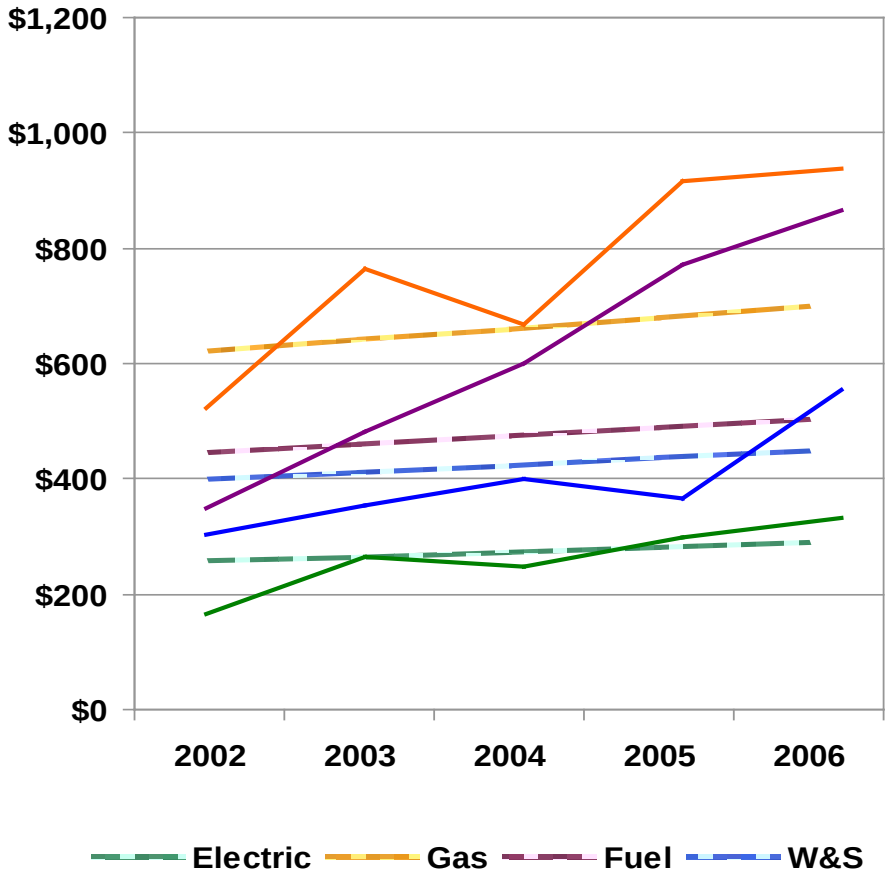


Utility Costs: Actual vs. Projected

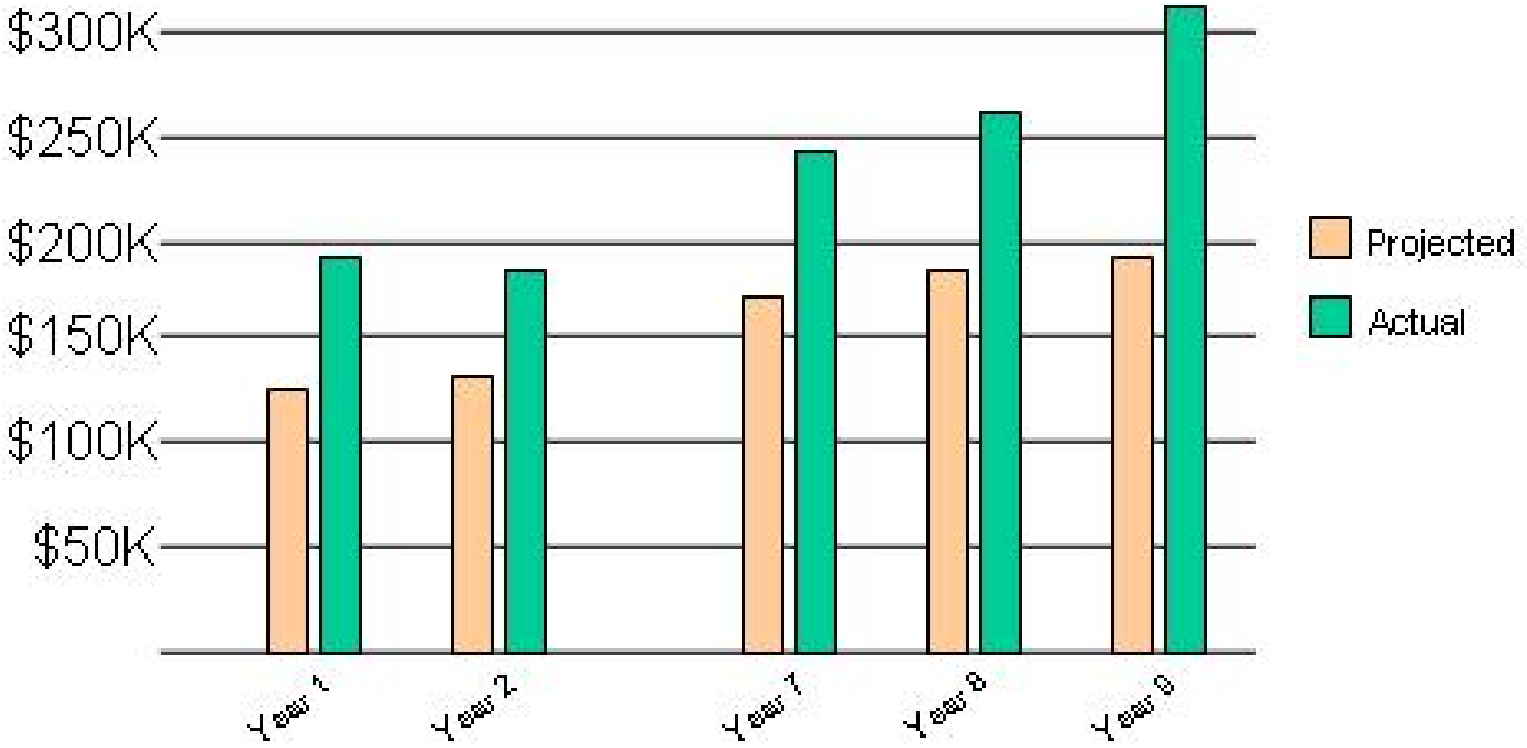
Utilities are underwritten at 3% annual growth

Rising Utility Costs 2002-2006:

- **Gas: 41%**
- **Water & Sewer: 39%**
- **Electricity: 40%**
- **Fuel: 54%**

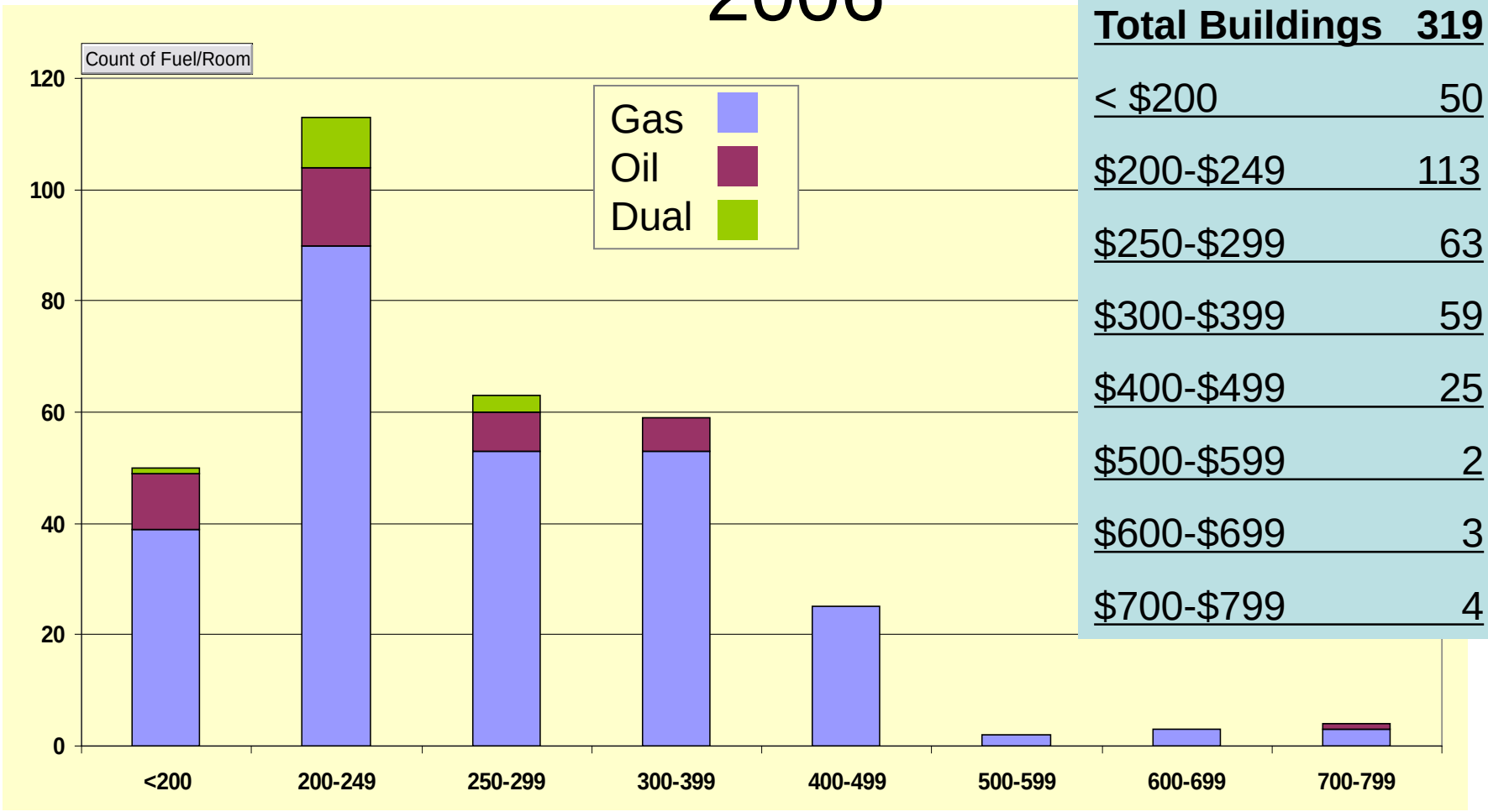


Actual utility costs for Urban Horizons have been consistently higher than projected in our real estate *pro formas* (1995)



Costs were 50% higher than projected in Year 1.
Costs were 65% higher in Year 9.

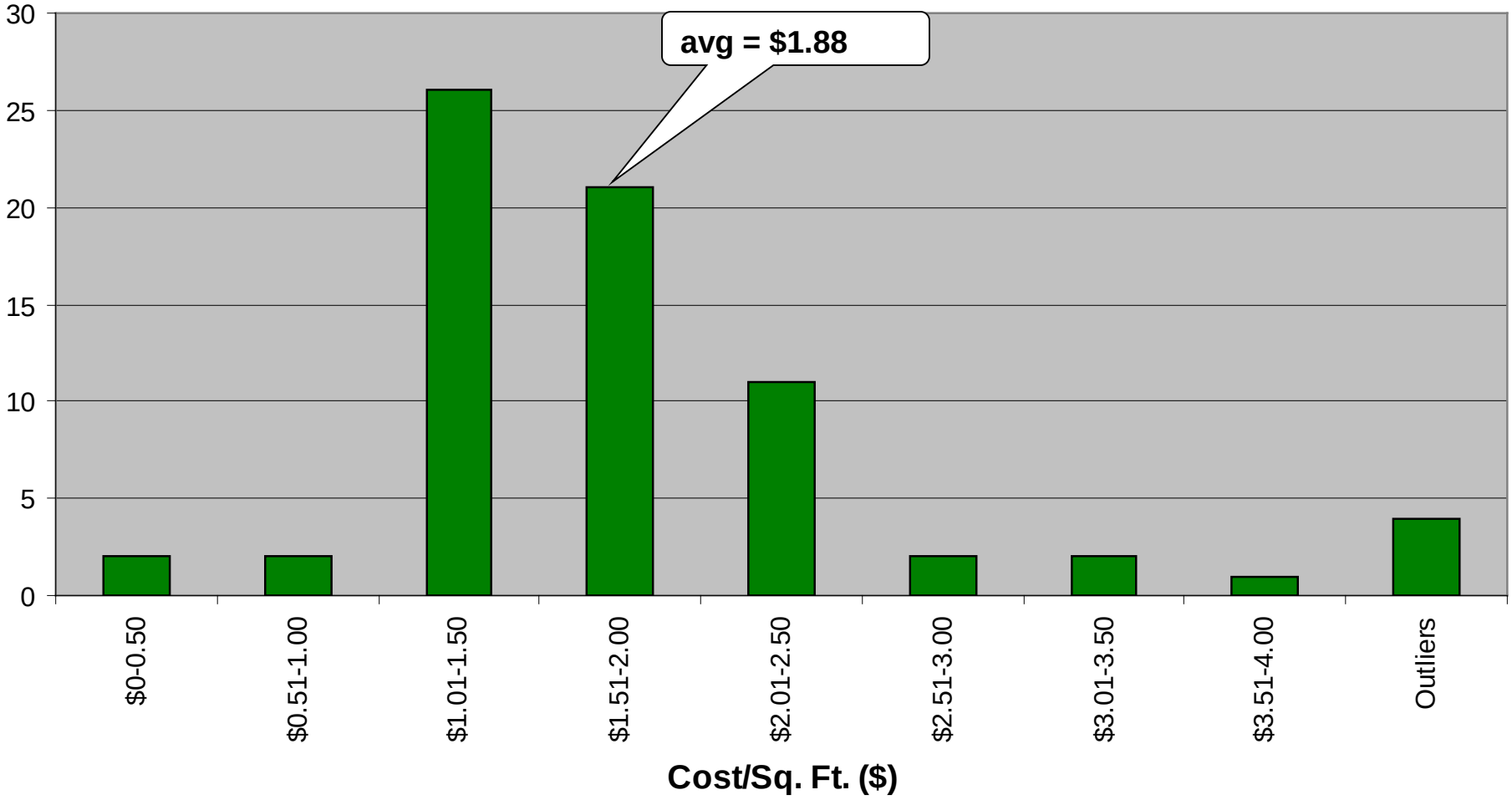
CPC Buildings- Fuel Costs per Room 2006



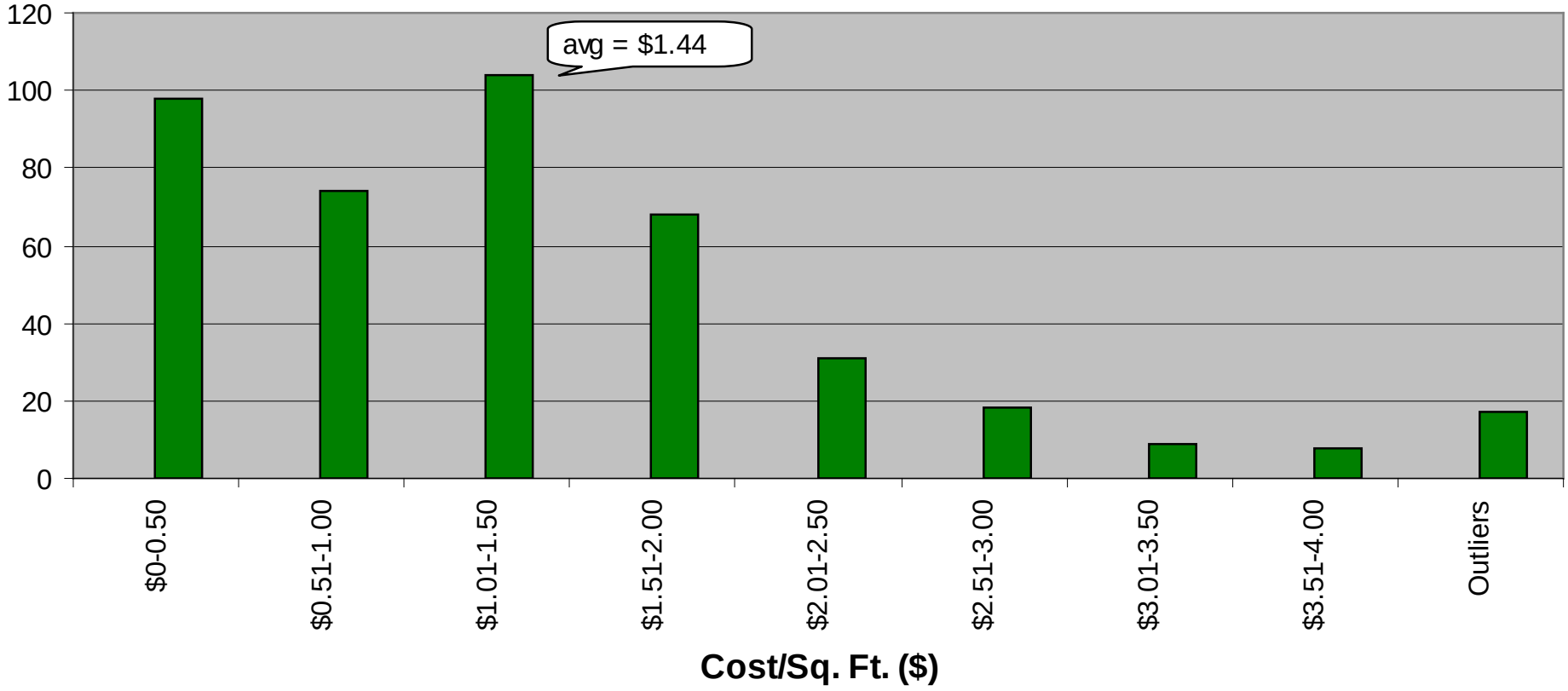
Total Buildings	319
< $200	50
$200-$249	113
$250-$299	63
$300-$399	59
$400-$499	25
$500-$599	2
$600-$699	3
$700-$799	4

Fuel Cost/Room ($)

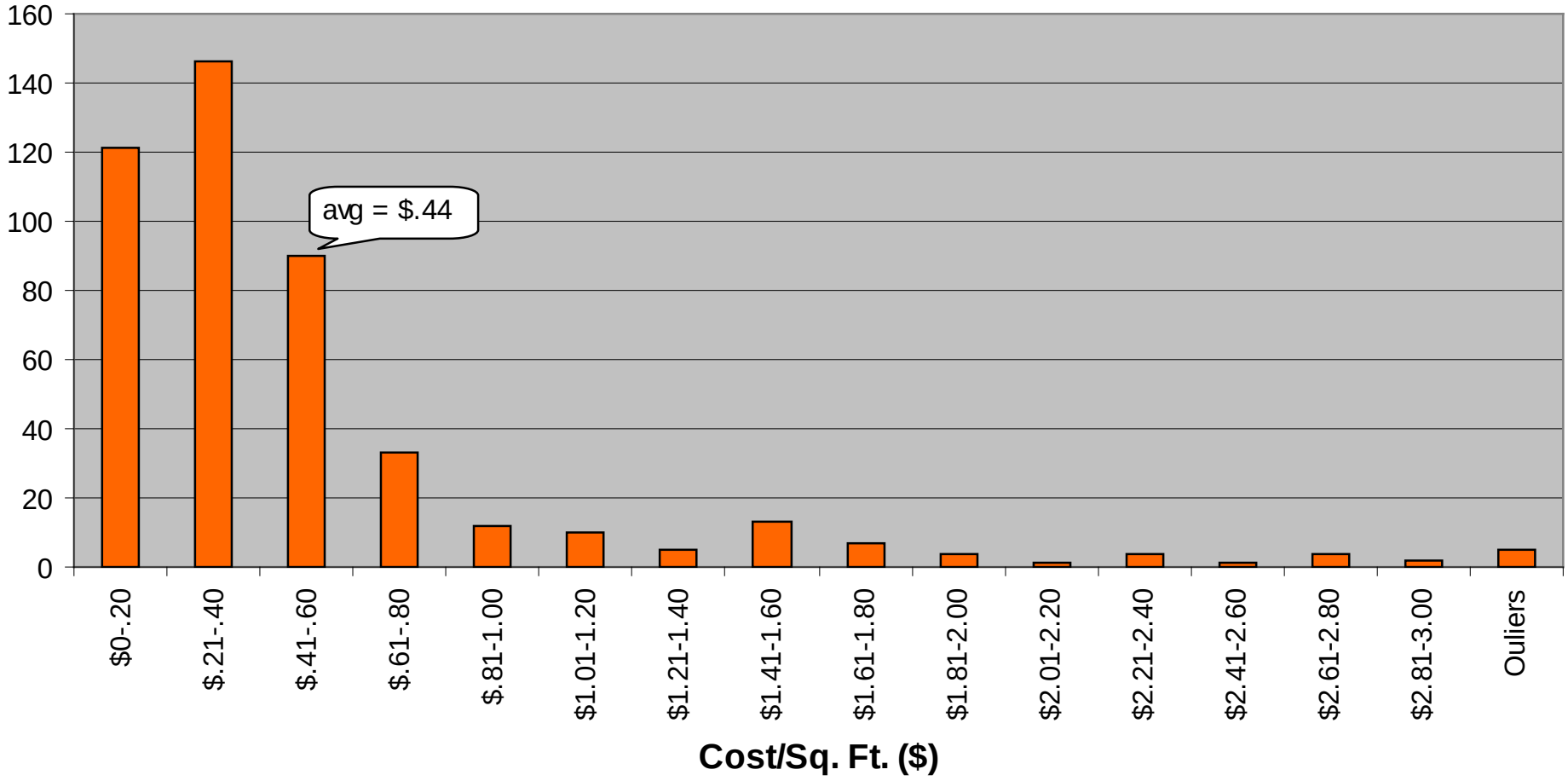
CPC buildings - Fuel (#2, #4 & #6)
Costs Per Sq. Ft.



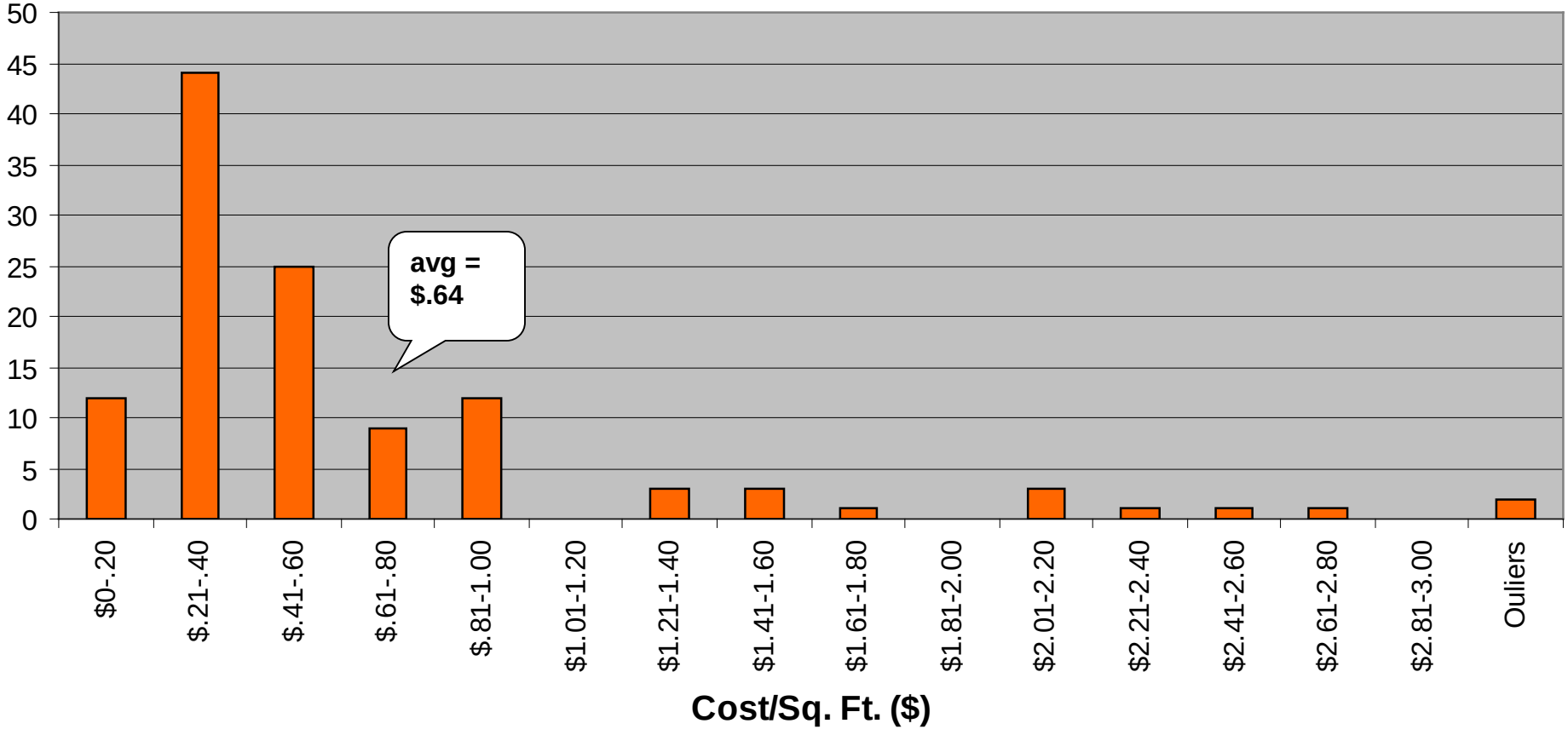
CPC buildings - Fuel/Gas
Costs Per Sq. Ft.



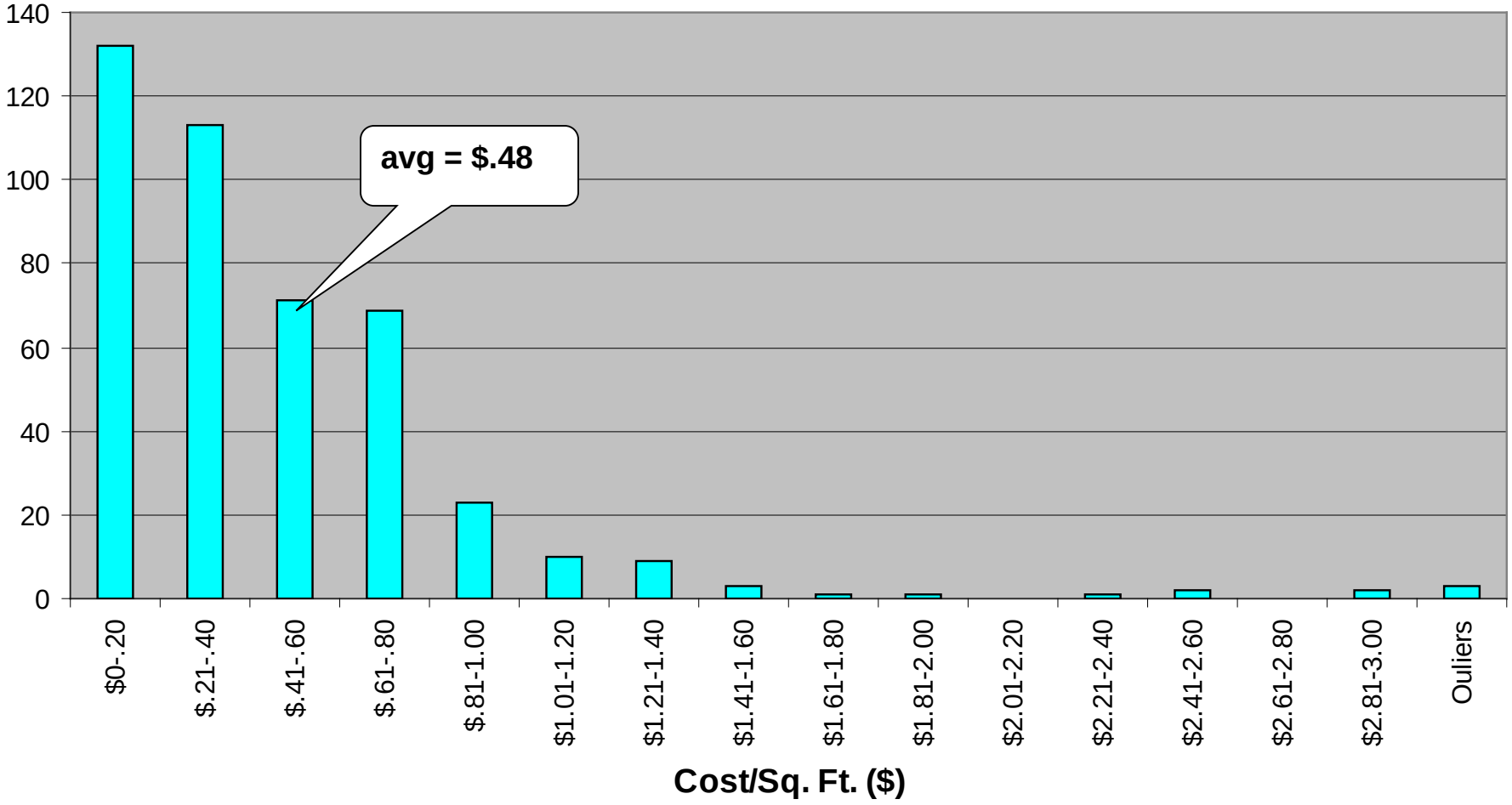
CPC Buildings - Electric (Walkup)
Costs Per Sq. Ft.



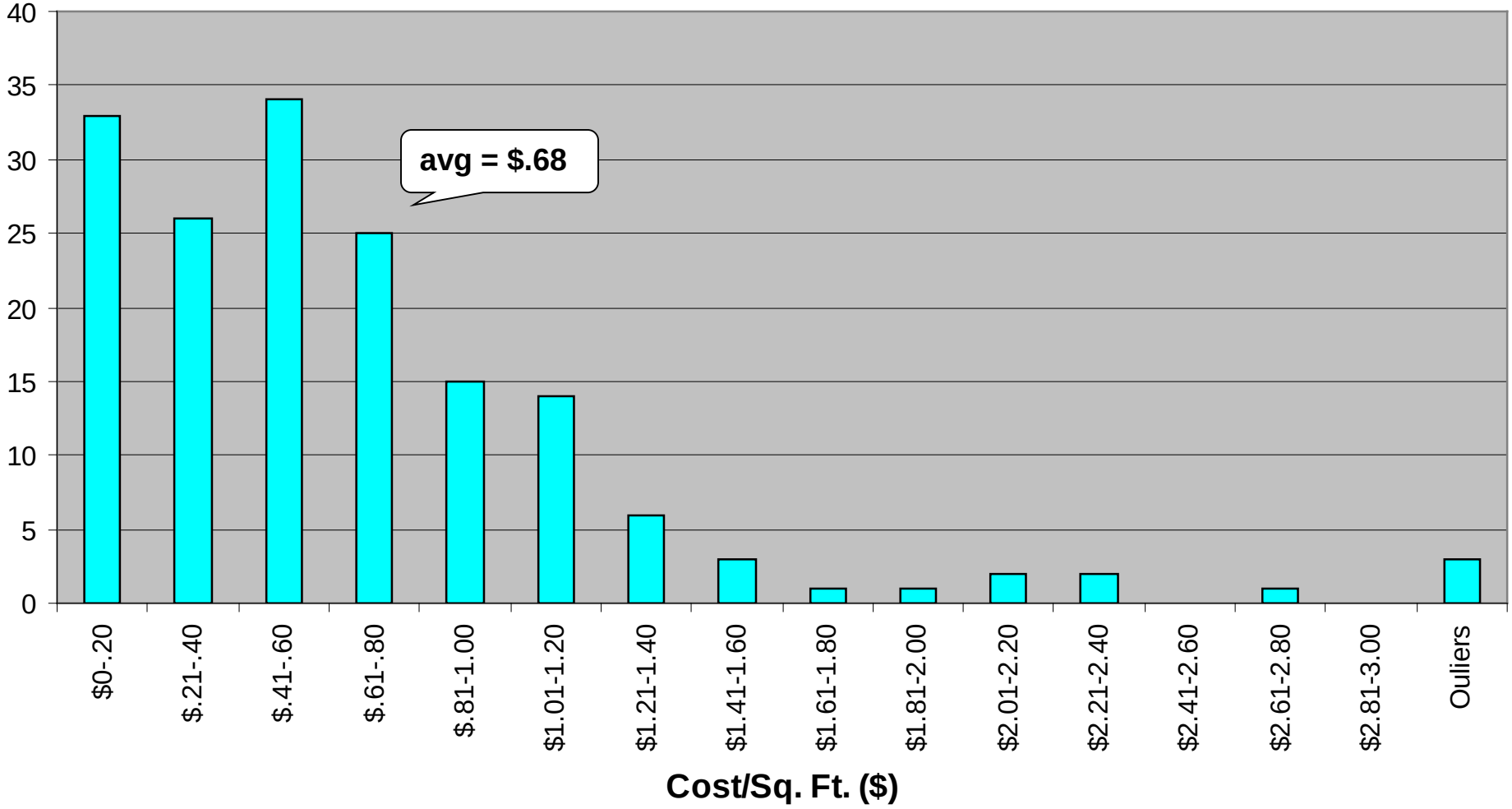
CPC Buildings - Electric (Elevator)
Costs Per Sq. Ft.



CPC Buildings - Water and Sewer Costs Per Sq. Ft.



CPC Buildings - Water Meter Costs Per Sq. Ft.



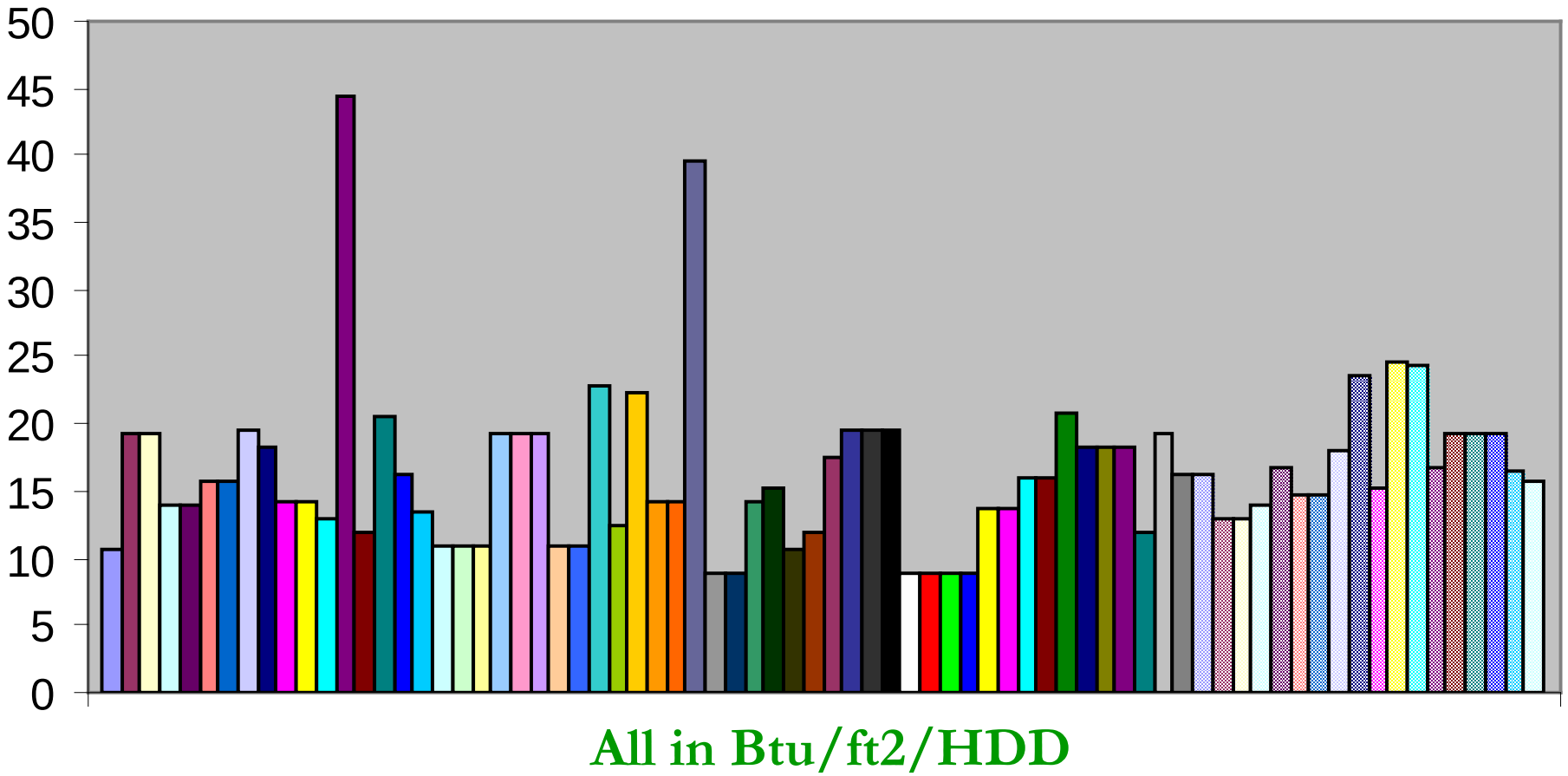
Boston Property Maintenance Costs

	Low	Mean	High
Water and sewer	$117	$516	$977*
Pest control	$32	$75	$156
Painting	$13	$72	$189
Landscaping	$0	$72	$187
Appliances	$0	$22	$79
Cabinets - Maintenance	$0	$34	$83
Cleaning supplies	$2	$33	$65
Lighting fixtures and bulbs	$6	$17	$38
Ovens and ranges	$0	$15	$26
Windows	$0	$5	$26
Lighting – Fixtures only	$0	$9	$18
Kitchen and bath fans	$0	$9	$2
Lighting - Bulbs only	$0	$3	$6

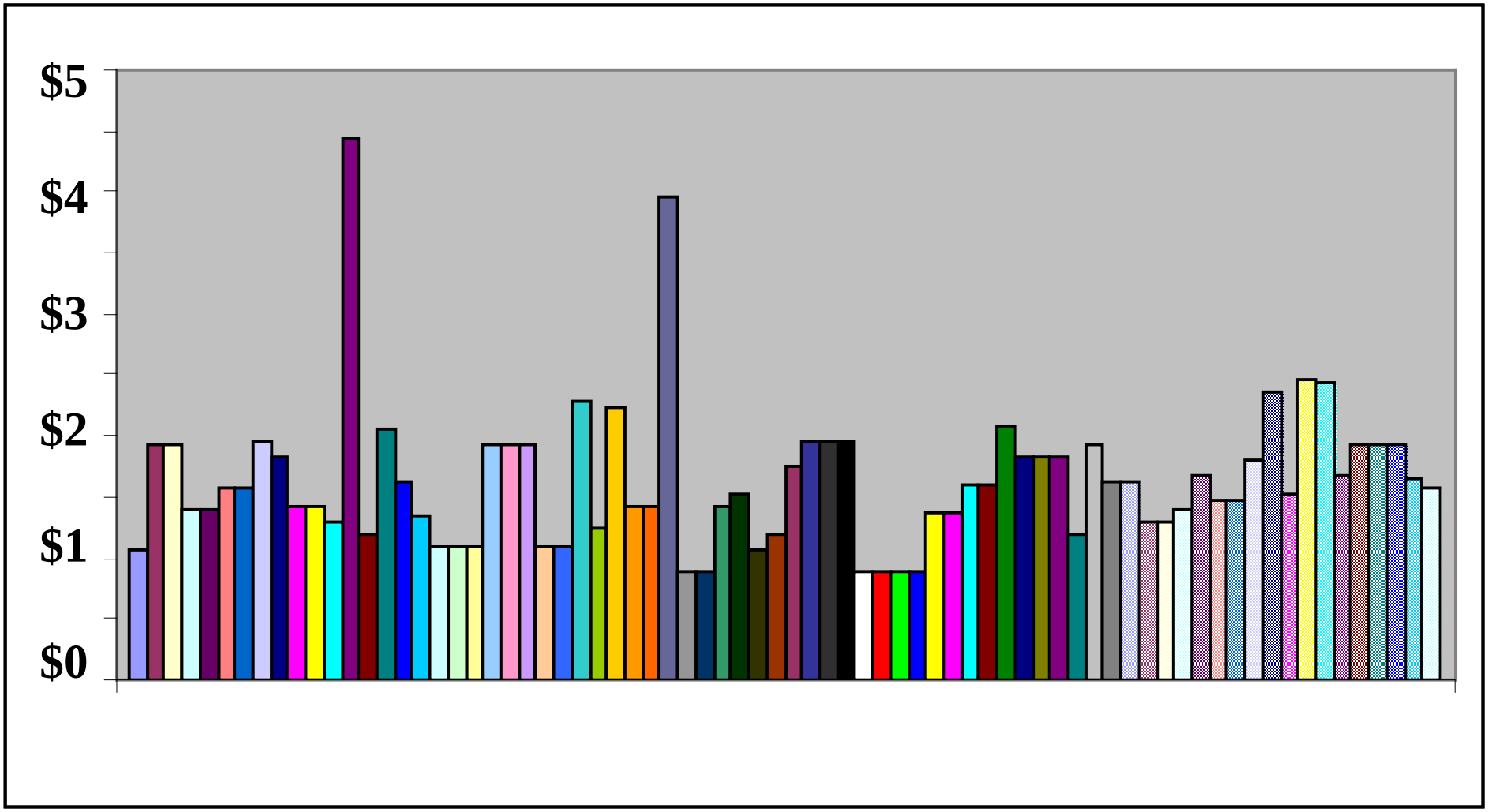
*** High costs are due to an unnoticed water usage with an outside hose.**

So, wanna see a real bad management company?

A Top 10 Owner of NYC Properties: Multifamily Energy Usage



($/ft^2/Year)



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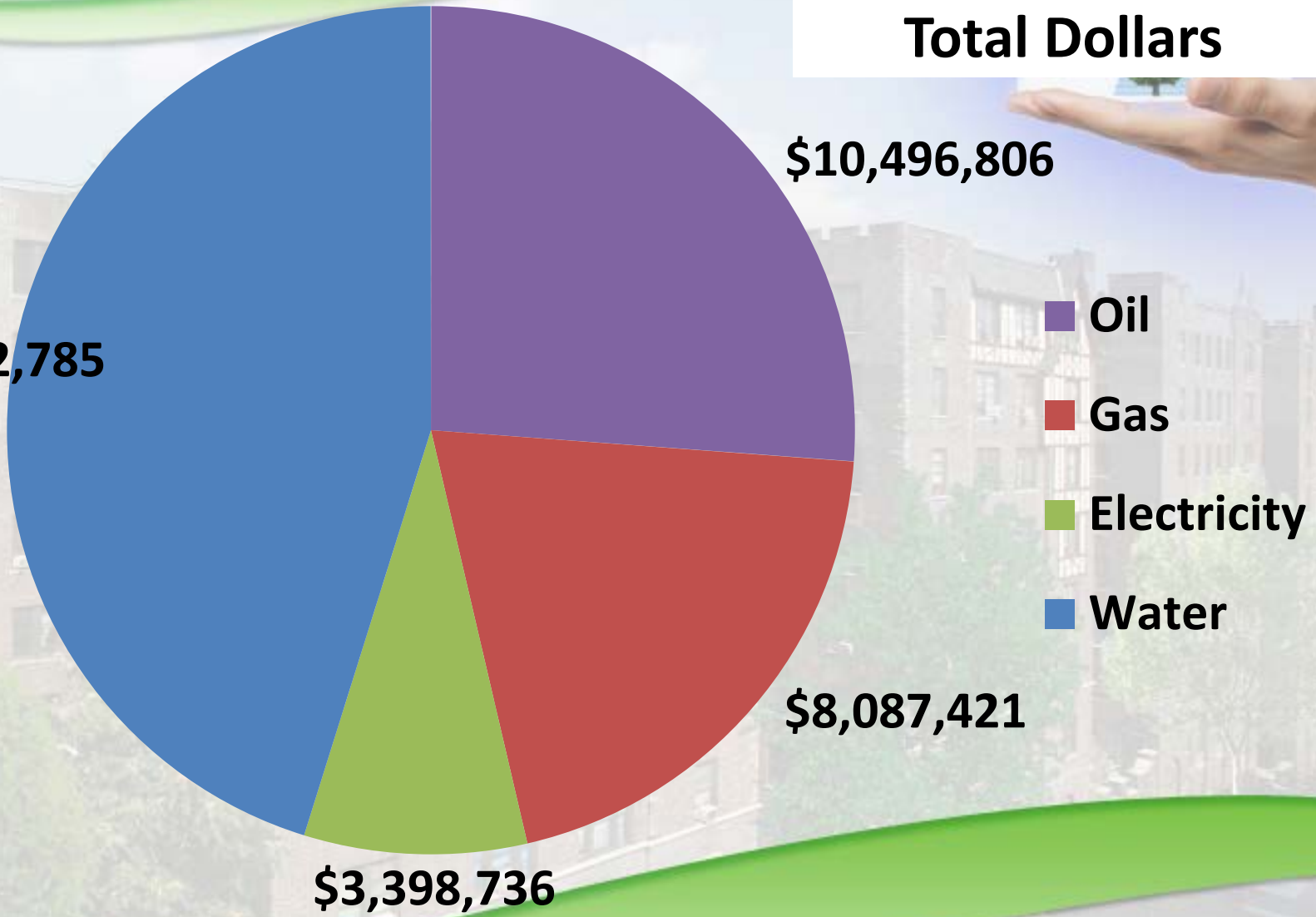
CPC M&O Data 2012
Total Dollars



Simple Swaps, Major Savings

Don't get left underwater! New York City water costs around $.01 a gallon, plus an extra penny to heat each gallon. In order to help you cut down on costs, CPC developed a convenient worksheet to help you save on water and heating expenses in your multi-family building. Our simple solutions quickly reduce your overhead without large capital expenditures and could lead to an annual savings of over $303 per tenant.

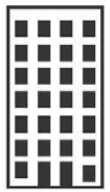
Showerhead Switch from 2.5gpm to 1.75gpm

Those long hot showers are nice but a typical bathroom has a 2.5 gpm showerhead and many older models waste 5 or more gallons per minute (gpm). Upgrade existing showerheads to a 1.75 gpm showerhead and save 7.5 gallons per 10 minute shower. Per person, that's an annual savings of 2,738 gallons of water and $54 in water and related heating costs per year.

2,738 gal/year

$54

Individual



354,506 gal/year

$7,006

50-unit multi-family building

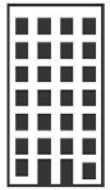
Sink Aerators Switch from 2.5gpm to .5gpm

Replace old bathroom sink aerators with 0.5 gpm high efficiency pressure compensating aerators (PCA) and save 7,300 gallons of water and $144 in water and related heating costs year/person. ADDITIONAL SAVINGS: Update your kitchen sink to a 1.5gpm aerator and save 3,650 gallons and $72 year/person.

7,300 gal/year

$144

Individual



945,350 gal/year

$18,680

50-unit multi-family building

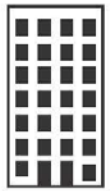
Toilet Switch from 3.5gpf to 1.28gpf

Most old toilets use 3.5 gallons per flush (gpf) while some pre-1980 models use 5 gallons or more. Install high efficiency 1.28 gallon WaterSense certified toilets and save 2.22 gpf. For a typical household, you can save approximately 8,605 gallons per year and about $85 in water costs by replacing that old 3.55 gallon toilet.

3,322 gal/year

$33

Individual



430,228 gal/year

$4,302

50-unit multi-family building

The Community Preservation Corporation (CPC) is a not-for-profit mortgage lender that finances affordable multi-family housing throughout New York.
www.communitycp.com • (212) 869-5300 • 28 East 28th Street • New York • New York • 10016

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A Dirty Word:

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LANDLORD.

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So why are owner/investors such energy pigs?

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Fund name	YTD returns as of 7/25/2014	Average annual total return** as of 06/30/2014	
		1-Year	5-Year
CLOSED Vanguard Prime Money Mkt Fund	0.01%	0.02%	0.05%
Vanguard Retirement Savings Trust	0.89% a	1.68%	2.46%
Vanguard Total Bond Mkt Index Inv	4.03%	4.15%	4.63%
Vanguard Balanced Index Fund Inv	6.00%	16.23%	13.50%
Vanguard 500 Index Fund Inv	8.14%	24.39%	18.67%
✔ Vanguard REIT Index Fund Inv	19.44%	13.21%	23.62%

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How do you know that you've entered a building that is poorly maintained?


Michelle’s quote

Fuck this shithole.
moving up to Bigger
and Better things.
shove da apartment
up ya ass!!
Raul

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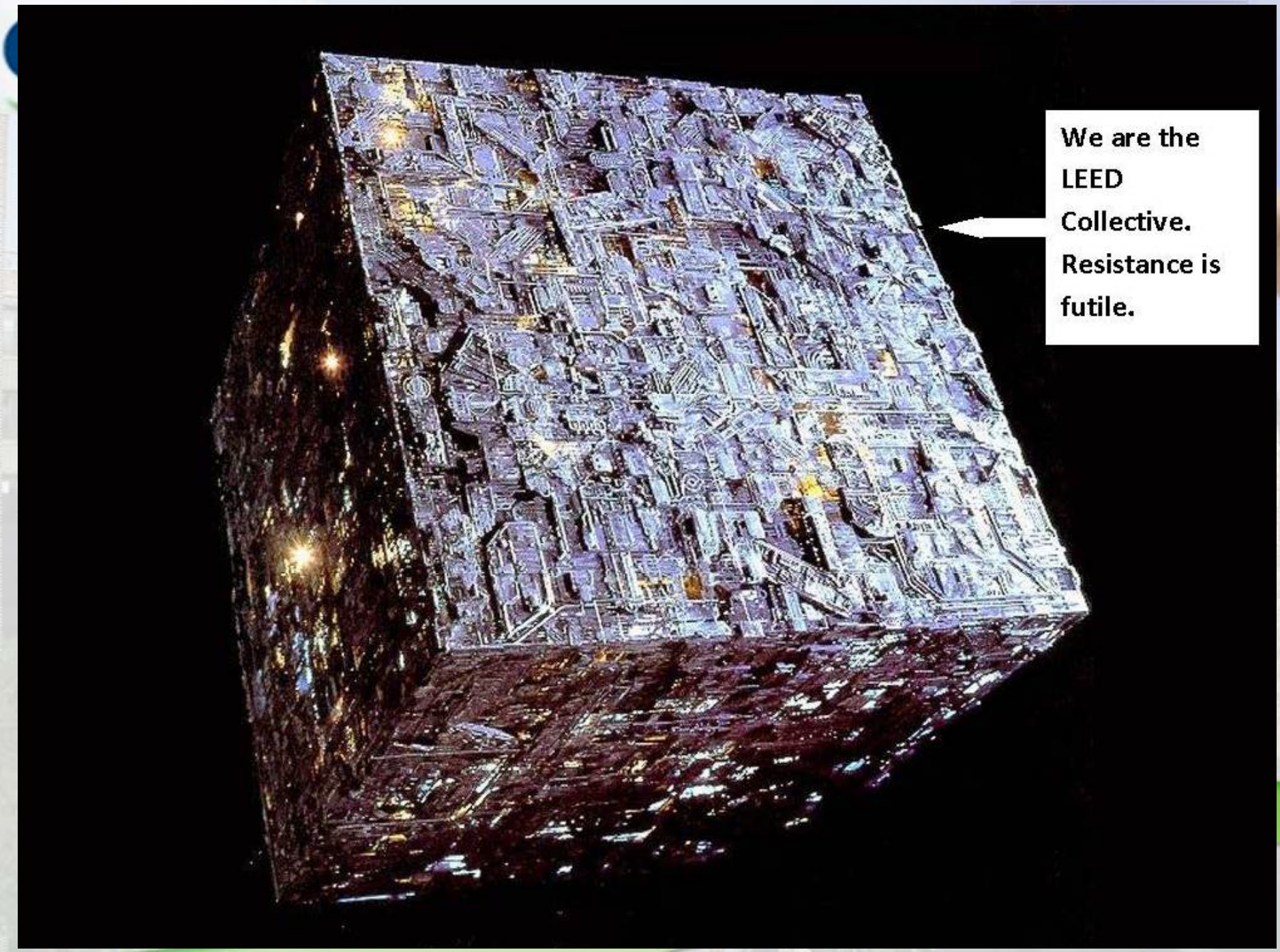
So why are "Green" buildings using more energy?


We are the LEED Collective. Resistance is futile.

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Fans vs. None

And not a lot of these…….

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A/C?

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MY STUFF.

Item	Electricity use/year (kwh)	Cost/Year
ES 18ft^3 refrig	385	$96
Non ES Computer 24 hrs/week	58	$15
Samsung 74” TV	200	$50
10-9.5w LED x 2hrs	70	$18
1 window A/C 11 SEER 180 hrs	446 w x 6hrs x 60 days =161kwh	$40
Totals	874	$350

From Date	To Date	Elec Use (Kwh)	Con Ed Electric Bill Amt	Gas Use (Therm)	Con Ed Gas Bill Amt	Total Bill Amt
5/21/2014	6/20/2014	70	$36.19	1	$21.65	$57.84
4/22/2014	5/21/2014	40	$27.85	1	$21.20	$49.05
3/24/2014	4/22/2014	70	$33.61	1	$21.23	$54.84
2/21/2014	3/24/2014	80	$41.97	2	$23.54	$65.51
1/22/2014	2/21/2014	100	$50.76	3	$23.69	$74.45
12/20/2013	1/22/2014	80	$41.58	2	$24.43	$66.01
11/19/2013	12/20/2013	90	$41.58	1	$22.32	$63.90
10/21/2013	11/19/2013	70	$33.45	2	$21.67	$55.12
9/19/2013	10/21/2013	90	$40.04	2	$23.71	$63.75
8/20/2013	9/19/2013	130	$52.86	1	$21.61	$74.47
7/22/2013	8/20/2013	120	$42.92	1	$20.95	$63.87
6/20/2013	7/22/2013	200	$71.43	1	$23.04	$94.47
5/21/2013	6/20/2013	70	$35.13	1	$20.85	$55.98
4/22/2013	5/21/2013	70	$33.62	1	$21.09	$54.71
3/22/2013	4/22/2013	70	$33.24	2	$23.20	$56.44
2/21/2013	3/22/2013	70	$31.83	1	$21.19	$53.02
1/22/2013	2/21/2013	60	$34.85	2	$22.54	$57.39
12/20/2012	1/22/2013	0	$19.58	3	$25.30	$44.88
11/19/2012	12/20/2012	160	$51.45	2	$23.21	$74.66
10/19/2012	11/19/2012	70	$34.71	1	$22.46	$57.17
9/19/2012	10/19/2012	80	$35.47	1	$21.31	$56.78
8/20/2012	9/19/2012	150	$55.68	1	$20.65	$76.33
7/20/2012	8/20/2012	50	$29.35	0	$20.77	$50.12
6/20/2012	7/20/2012	420	$119.35	1	$20.60	$139.95

Note:
Huge Drop
In Electricity
Consumption
After 7/20/12

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THEIR STUFF.

Item	Electricity use/ year (kwh)	Cost/Year
3 Samsung 74”	600	120
3 set top boxes	525	$131
ES side by side 30ft3 refrig with thru door water and ice	632	$159
ES 20 ft^3 freezer	690	$172
ES 3 ft^3 compact (wine) fridge	338	$85
ES Dishwasher	250	$63
ES Top Load washer	250	$63
4 ES computers	1200	$300
20 40W inc. high hats 4 hrs/day	1168	$292
Central Air	1000 ?	$250
Totals	6403 (7.33x)	$1600

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HOW ABOUT:

- Simultaneous H/C
- Alarm Systems
- Water recycle/filtration
- Pumps, Pumps, pumps
- Fans, Fans, Fans
- Decorative fountains
- Designer sinks
- In unit washer/dryer
- Grocery Storage Walk-in
- Basketball Court
- Full Gym
- Heated Swimming Pools
- Underground Parking
- Day Care
- Doggy Day Care
- MovieTheater (in/outdoor)

Deutsche Bank
Corporate Social Responsibility

Passion to Perform

Recognizing the Benefits of Energy Efficiency in Multifamily Underwriting

January 2012

In conjunction with:

LIVING CITIES
INNOVATE ▸ INVEST ▸ LEAD

Prepared by:

Steven Winter Associates

HR&A Advisors

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Conclusion #1

1. Building retrofits save energy.

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Conclusion #2

2. Fuel measures save more than electric measures.

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Conclusion #3

3. Actual savings are strongly correlated with pre-retrofit fuel usage.

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The study analyzed a wide range of building characteristics and retrofit scope measures to examine how they impacted savings. While a number of weaker correlations existed, only one factor was significantly related to post-retrofit performance: pre-retrofit fuel use intensity (the amount of fuel a building consumes in kBTU per square foot of heated building area). Higher pre-retrofit fuel use intensity translated to greater savings potential; ***the buildings that consumed the most fuel on a per square foot basis pre-retrofit often achieved greater savings***. Furthermore, the team found that heating system type and building vintage are good proxies for fuel use intensity.

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So What Can We Do?

(According to Affordable Housing Providers)

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- Ground Source Heat Pumps
- Solar Energy
- Green Roofs
- Wind

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Buildings that are retrofitted
for energy efficiency
as part of refinancing
can save energy
if we target excessive usage
and retrofit accordingly.

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"Why would a bank be interested in a building they're loaning money to saving energy?"

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The answer came from Charles Ottoman (5th grade), who answered “because they’ll save money in their building and be able to pay your loan back faster.”

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CPC's Benchmarking Spreadsheet

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Benchmarking 102

- What we just demonstrated was looking at heating and hot water usage separately
- Then looking at water usage and common area electricity usage separately
- In Local Law 84 (LL84) owners must use EPA's Portfolio Manager software to combine all of that usage plus apartment usage to give a total Energy Utilization Index (EUI), where tenant usage can become a dominant use
- Our Mortgage Officers asked us to invent a "report card" for owners that compared their building's usage to all others

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Multifamily Building Fuel Usage Calculator (BTU/Sq-FT/HDD)

into yellow fields (following directions in blue text. Do not alter any white or gray cells.)

Input Fuel Type and Usage Information

st below	#4 Oil
l Type Units	Gallons

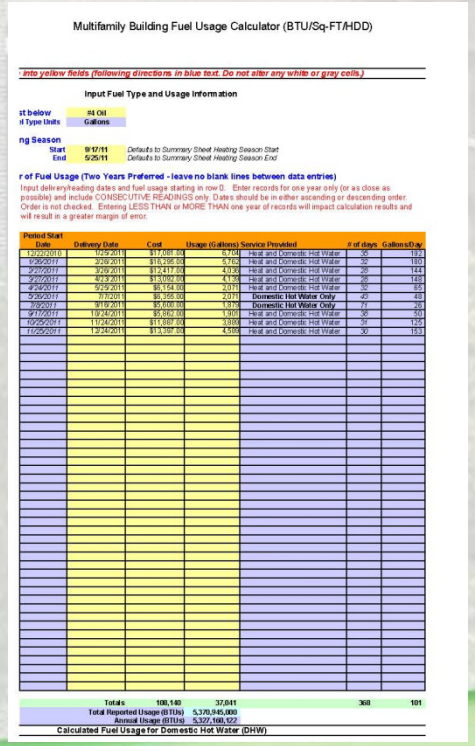
ng Season

Start	9/17/11	*Defaults to Summary Sheet Heating Season Start*
End	5/25/11	*Defaults to Summary Sheet Heating Season End*

r of Fuel Usage (Two Years Preferred - leave no blank lines between data entries)

Input delivery/reading dates and fuel usage starting in row 0. Enter records for one year only (or as close as possible) and include CONSECUTIVE READINGS only. Dates should be in either ascending or descending order. Order is not checked. Entering LESS THAN or MORE THAN one year of records will impact calculation results and will result in a greater margin of error.

Period Start Date	Delivery Date	Cost	Usage (Gallons)	Service Provided	# of days	Gallons/Day
12/22/2010	1/25/2011	$17,081.00	6,704	Heat and Domestic Hot Water	35	192
1/26/2011	2/26/2011	$16,295.00	5,762	Heat and Domestic Hot Water	32	180
2/27/2011	3/26/2011	$12,417.00	4,036	Heat and Domestic Hot Water	28	144
3/27/2011	4/23/2011	$13,092.00	4,139	Heat and Domestic Hot Water	28	148
4/24/2011	5/25/2011	$6,154.00	2,071	Heat and Domestic Hot Water	32	65
5/26/2011	7/7/2011	$6,355.00	2,071	**Domestic Hot Water Only**	43	48
7/8/2011	9/16/2011	$5,600.00	1,879	**Domestic Hot Water Only**	71	26
9/17/2011	10/24/2011	$5,862.00	1,901	Heat and Domestic Hot Water	38	50
10/25/2011	11/24/2011	$11,887.00	3,889	Heat and Domestic Hot Water	31	125
11/25/2011	12/24/2011	$13,397.00	4,589	Heat and Domestic Hot Water	30	153



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The Community Preservation Corporation Green Loan Program

Multifamily Building Electricity Usage Calculator KWH/Unit/Day and KWH/SqFt/Day)

24-32 Arden Street, New York, NY 10040

Instructions: Enter information into yellow fields (following directions in blue text. Do not alter any white or gray cells.)

Input Electricity Usage Information (KWH)

1. Input a Minimum of One Year of Electricity Usage (Two Years Preferred - leave no blank lines between data entries)

#	Reading Date	KWH	Cost	# of days	KWH/Unit/Day	KWH/SqFt/Day
0	12/29/2011	6,354	$625.00	30	3.11	0.00
1	11/29/2011	6,300	$622.00	30	3.09	0.00
2	10/27/2011	5,508	$729.00	33	2.45	0.00
3	9/27/2011	5,868	$669.00	30	2.88	0.00
4	8/26/2011	5,508	$652.00	32	2.53	0.00
5	7/28/2011	5,814	$593.00	29	2.95	0.00
6	6/28/2011	6,120	$590.00	30	3.00	0.00
7	5/27/2011	5,382	$538.00	32	2.47	0.00
8	4/28/2011	5,544	$572.00	29	2.81	0.00
9	3/30/2011	5,562	$519.00	29	2.82	0.00
10	3/1/2011	6,606	$595.00	29	3.35	0.00
11	1/28/2011	6,156	$569.00	32	2.83	0.00
12	12/29/2010	6,282		30	3.08	0.00
13	11/29/2010	6,102		30	2.99	0.00
14	10/27/2010	5,346		33	2.38	0.00
15	9/27/2010	6,102		30	2.99	0.00
16	8/26/2010	5,418		32	2.49	0.00
17	7/28/2010	5,544		29	2.81	0.00
18	6/28/2010	5,976		30	2.93	0.00
19	5/27/2010	5,022		32	2.31	0.00
20	4/29/2010	5,292		28	2.78	0.00
21	3/31/2010	5,598		29	2.84	0.00
22	3/2/2010	6,498		29	3.30	0.00
23	1/29/2010	6,246		32	2.87	0.00
24						
Total Reported Usage (2.00 years)		**140,148**	**7,273**	**729**	**2.82**	**0.00**

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The Community Preservation Corporation Green Loan Progr

Multifamily Building Water Usage Calculator (GAL/Unit/Day)

24-32 Arden Street, New York, NY 10040

Instructions: Enter information into yellow fields (following directions in blue text. Do not alter any white or gray

Input Water Usage Information

1. Select Meter Measure Gallons

2. Input a Minimum of One Year of Water Usage (Two Years Preferred - leave no blank lines between data entries

#	Reading Date	Usage (Gallons)	Cost	# of days	Gallons/Unit/Day
0	*12/31/2010*				
1	*12/31/2011*	*4,051,500*		*365*	163.24
2					
3					
4					
5					
6					
7					
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17					
18					

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SUSTAINABLE

The Community Preservation Corporation
Green Loan Program

CPC Benchmark Plus Report Card For:
24-32 Arden Street, New York, NY 10040

Number of Residential Units	68
Building Square Footage	58,030

CPC has analyzed your building's fuel, water, and electricity usage, and here's your CPC Benchmark Plus Report Card:

Your building's fuel usage (#4 Oil) for heating is 13.2 BTU/SqFt/HDD
and according to our scorecard, your building is a **C**

Your building's fuel usage (#4 Oil) for hot water is 73.9 BTU/Apt/Day
and according to our scorecard, your building is a **B**

Your building's common area electric usage is 1.2 KWH/SqFt/Year
and according to our scorecard, your building is a **B**

Your building's water usage is 69.8 Gallons/SqFt/Year
and according to our scorecard, your building is a **C**

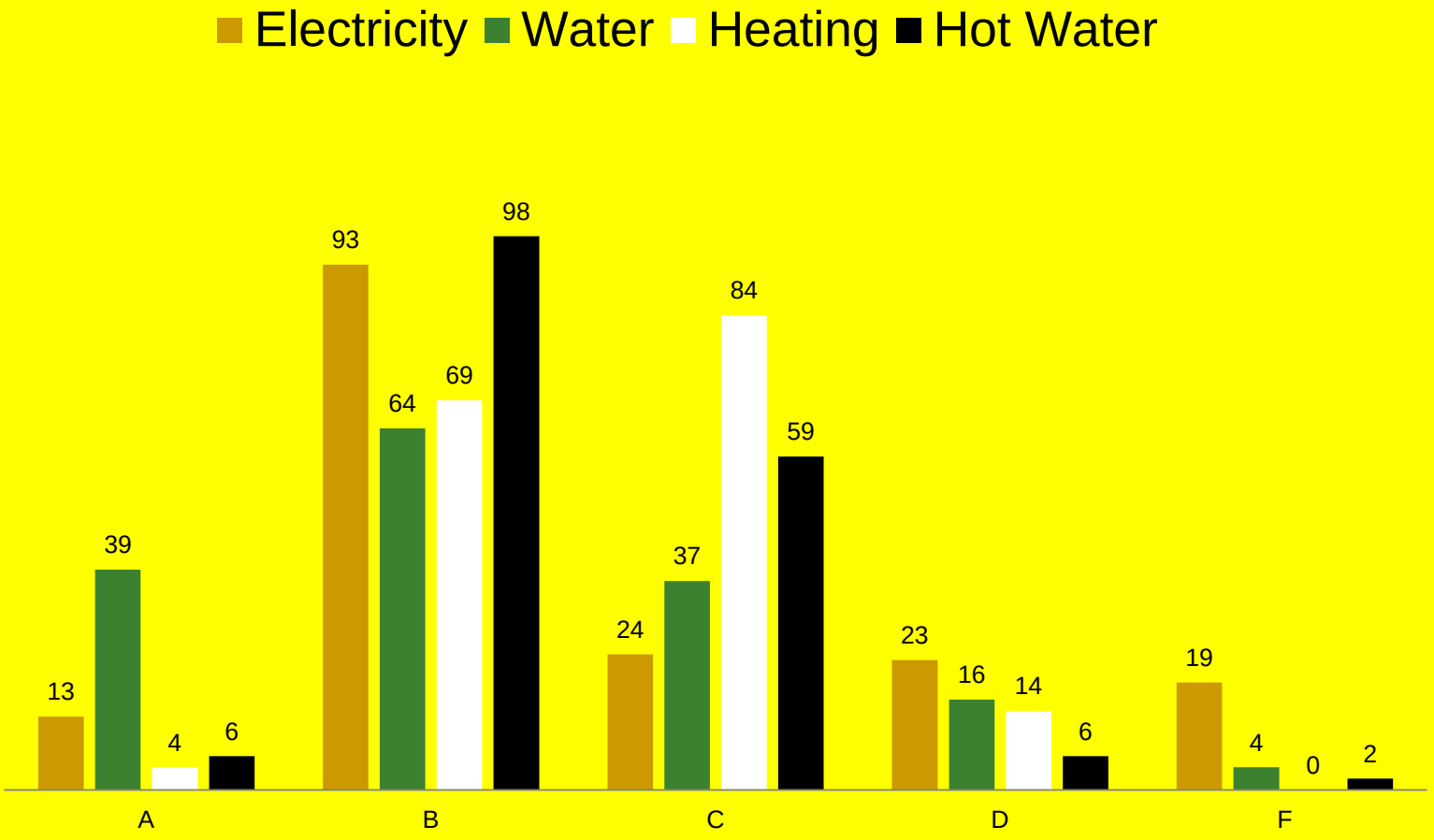
The Green Benchmarking Cheat Sheet

(or, is my building an energy hog?)

1. HEATING FUEL ANALYSIS	Btu/ft2/ HDD	Btu/ft2/ HDD	Btu/ft2/ HDD	Btu/ft2/ HDD	Btu/ft2/ HDD
My Heating Fuel is:					
OIL	<5	5-10	10-18	18-25	25+
GAS	<5	5-10	10-18	18-25	25+
Con Ed Steam	<4	4-8	8-15	15-20	20+
Electric	<4	4-8	8-15	15-20	20+
So My Grade is:	A	B	C	D	F
2. HOT WATER FUEL ANALYSIS	K Btu/ Apt/day	K Btu/ Apt/day	K Btu/ Apt/day	K Btu/ Apt/day	K Btu/ Apt/day
My hot water fuel is:					
OIL	15-25	25-75	75-125	125-175	175+
GAS	15-25	25-75	75-125	125-175	175+
Con Ed Steam	10-20	20-60	60-100	100-150	150+
Electric	10-20	20-60	60-100	100-150	150+
So My Grade is:	A	B	C	D	F
3. My common area Electric usage Divided by gross Building ft^2	Kwh/ Gross ft^2 /year	Kwh/ Gross ft^2 /year	Kwh/ Gross ft^2 /year	Kwh/ Gross ft^2 /year	Kwh/ Gross ft^2 /year
Common Area Electricity	<.5	.5-1.5	1.5-2.5	2.5-4.5	4.5+
So My Grade is:	A	B	C	D	F
4. My building total annual water usage divided by gross building ft^2	Gallons/ Gross ft^2 /year	Gallons/ Gross ft^2 /year	Gallons/ Gross ft^2 /year	Gallons/ Gross ft^2 /year	Gallons/ Gross ft^2 /year
Total Building Water	<30	30-50	50-90	90-125	125+
So My Grade is:	A	B	C	D	F

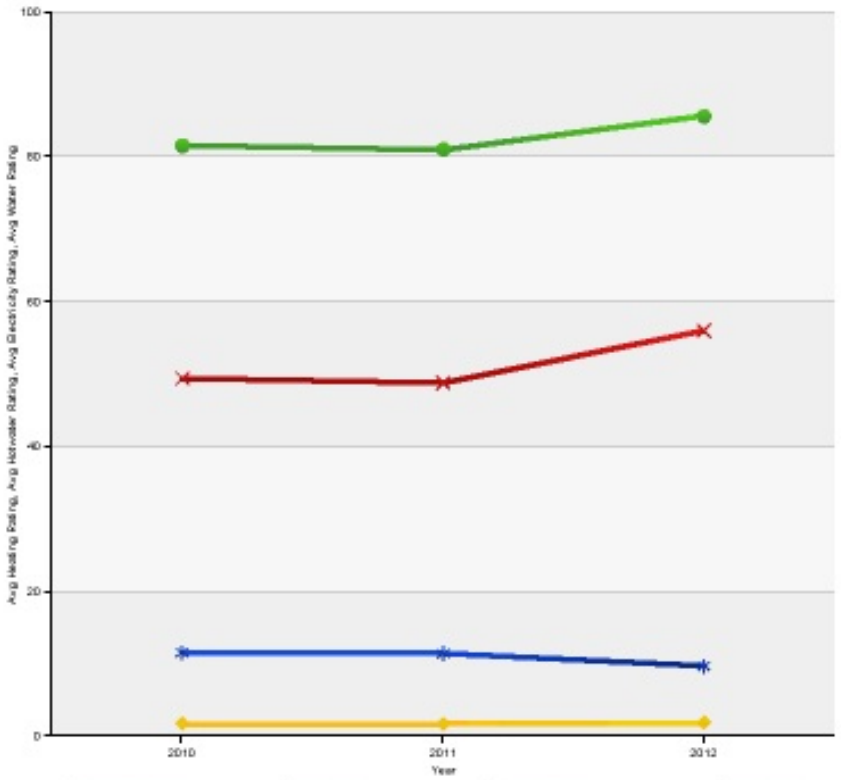
Revised 9/28/2010

CPC Report Card Grades



Rubric based off " The Green Benchmarking Cheat Sheet"

Do buildings that are benchmarked save energy?



	Heating Rating in BTU/SqFt/HDD	Hotw ater Rating in BTU/AptYear	Electricity Rating in KWH/SqFt/Year	Water Rating in Gallons/SqFt/Year
2010	11.6	81.6	1.8	49.5
2011	11.5	81.1	1.8	48.8
2012	9.7	85.6	1.9	56.0

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PCV/ST vs. Solaire

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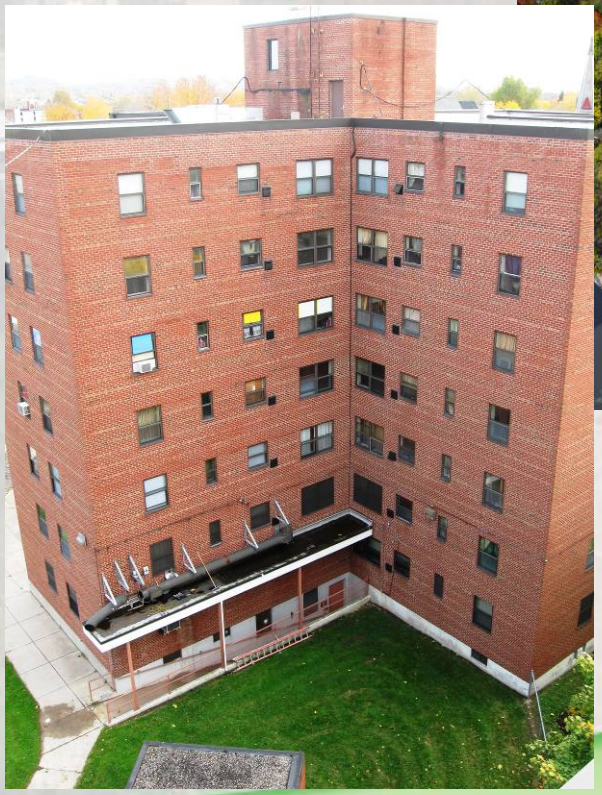
Rehab and Retrofit By the Community Preservation Corporation

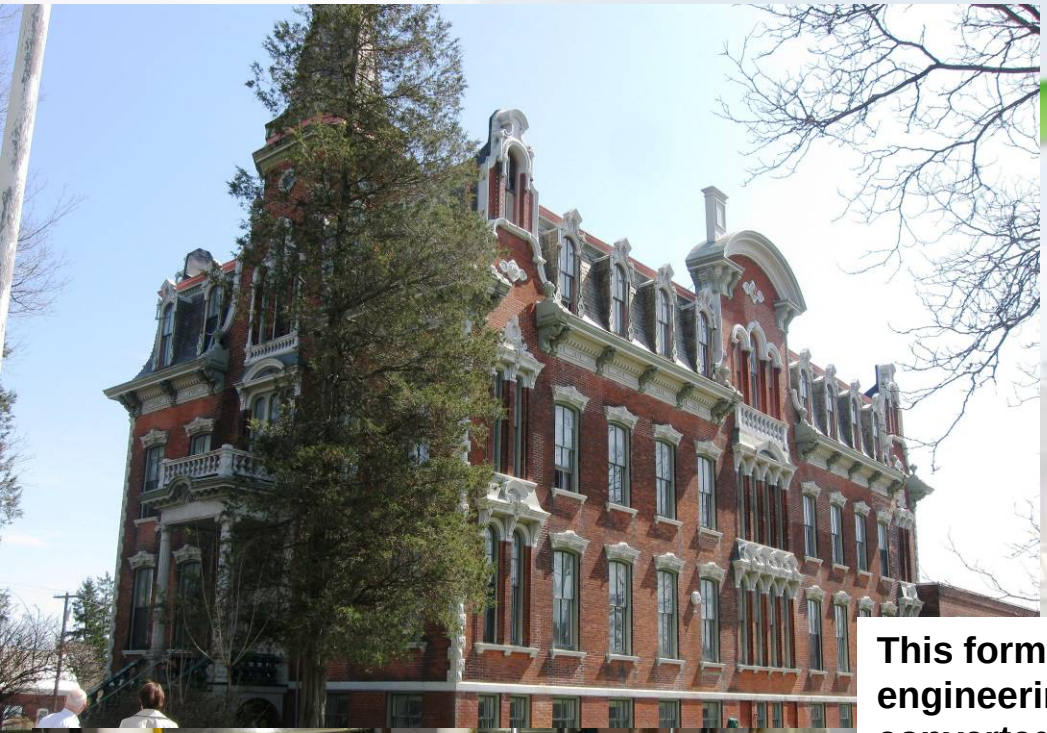
- CPC strongly believes that energy efficiency (EE) should be part of all refinancing of affordable housing
- All Multifamily Refi = Title + Engineering + Environmental Reports
- Why not add benchmarking to all buildings and….
- If energy usage is high, add Energy Audit as 4th report?

The next few slides show buildings that CPC benchmarked and did energy audits for; in all cases, Weatherization dollars were added to the retrofit/rehab/refinance to make the package better.

The Auburn Housing Authority worked with CPC to replace every 1950's furnace and hot water maker in every unit, and replaced 19 roofs using HA funds. Lighting and refrigerators were also done in every apartment. Master metered for gas and electric, CPC has documented savings of 26.2% reduction in heating gas usage and 54.8% reduction in hot water and stove usage. All this considering since the retrofit, vacancy has gone from 20% to 3%.

James Geddes Houses, a two block complex of the Syracuse Housing Authority that includes both low rise and towers, was retrofitted with sealed combustion furnaces, hot water makers, and wall insulation in the low rise buildings; lighting, refrigerators, showerheads and aerators in all apartments. Another master metered building for gas heat and tenant electric, and another building where local private crews were kept employed. Buildings showed 26 to 41% reduction in base usage, and up to 23% reduction of heating usage.

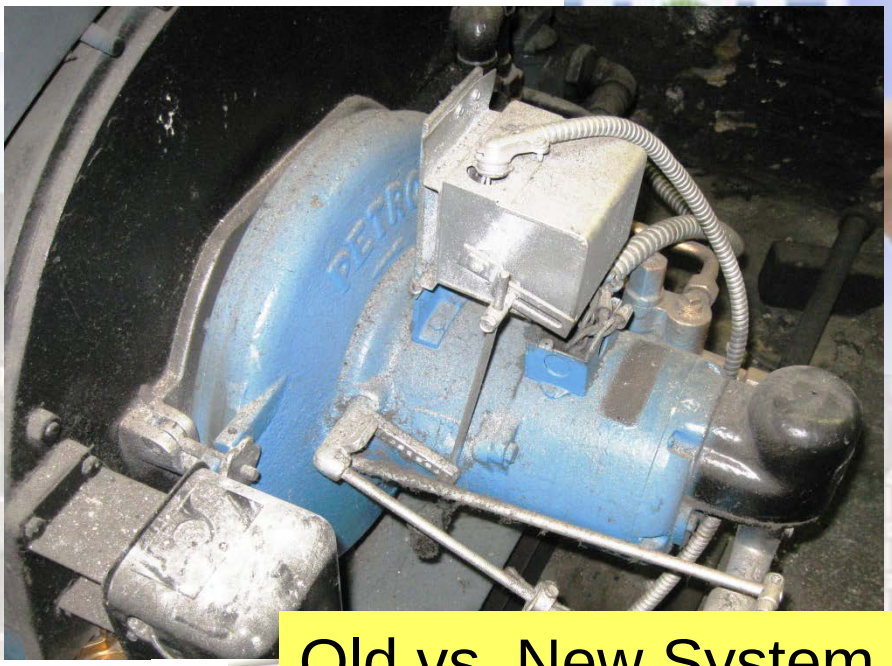




This former 1873 engineering school converted to senior housing got attic air sealing and insulation, and heating/DHW replacement without raising historic preservation flags south of Albany NY. Last winter, they saved over 20% in heating costs even adjusted for a significantly warmer winter.

This 131 unit electric heated, individually metered building had apartment airsealing performed and saw an average CFM 50pa reduction of 24%. New gas hot water makers were installed to replace older models. Common area and apartment lighting, refrigerators, and low flow showerheads and aerators were also installed. In less than one month, the building saw a 46% reduction in gas usage and 21% reduction in water usage. Apartment electric bills reduced by 25%. Heating and baseload savings should be completed by late this year. North Street Apartments Canandaguia, NY

Rehab/Refi Huge Success



Old vs. New System

This typical NYC 1920 walkup building (35 apts, 36,000 ft2) was going through a “checkerboard” Mod rehab, but added a full weatherization package ($4000/apt). Post-retrofit heating and hot water fuel use declined (weather adjusted) 63.7%. In dollars, the building went from $119,636 to $43,448 or a savings of $76,188 ($2177/apartment) per year.

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What's Next?

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Thank you for your time!

Questions?