Better Buildings
U.S. DEPARTMENT OF ENERGY

Workshop on Multifamily Efficiency Programs

May 29, 2014

U.S. DEPARTMENT OF ENERGY

Using Data to Engage Owners To Implement Energy Efficiency in Multifamily Housing

Toby Ast-Preservation of Affordable Housing
Ed Connelly-New Ecology Inc.

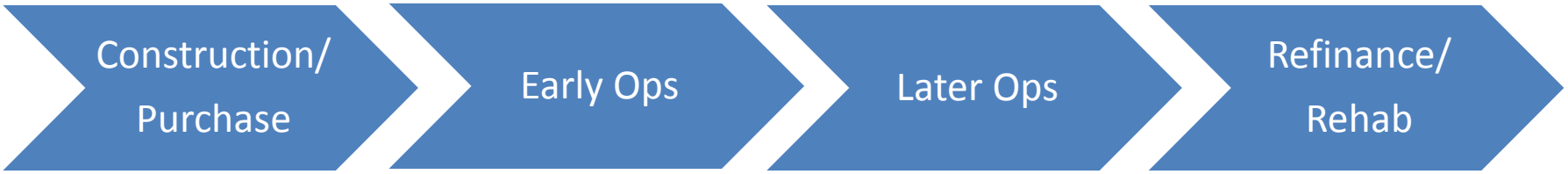
Part 1:

What do building owners (aka customers) want?

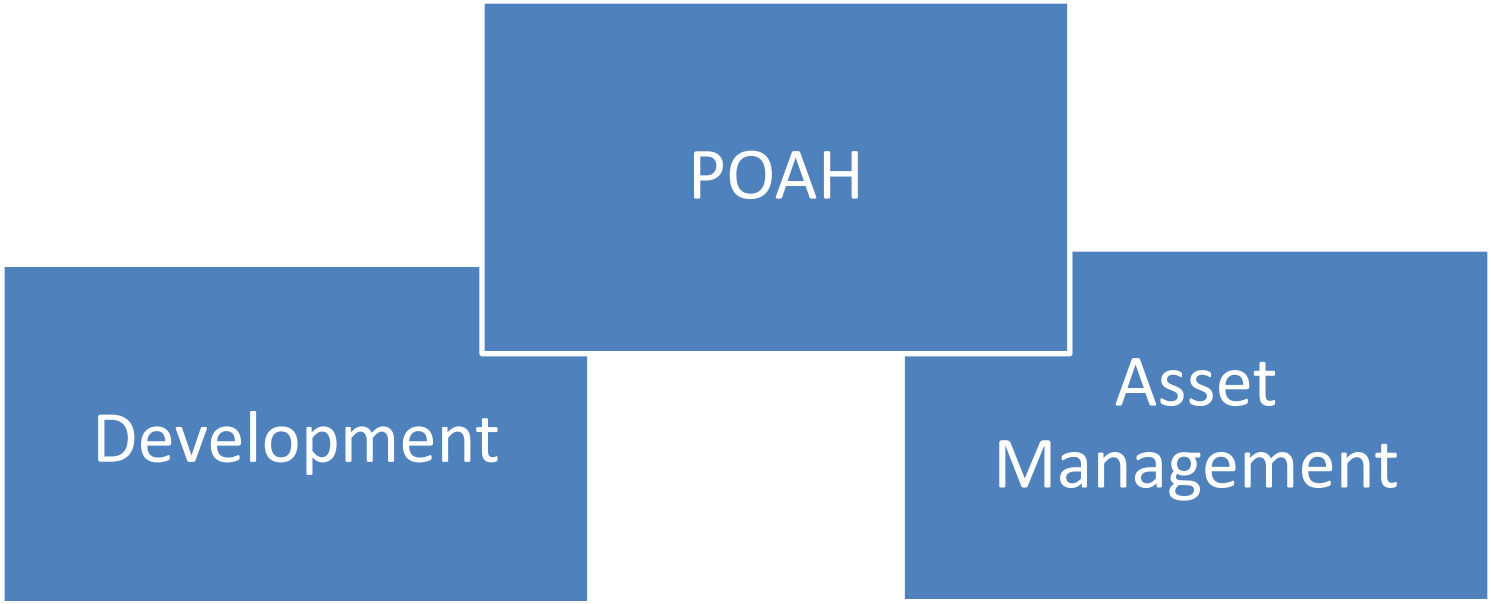
Part 2:

How does data help make satisfied customers?

1A. Benchmarking and Portfolio Analysis- Tying into the Ownership Cycle

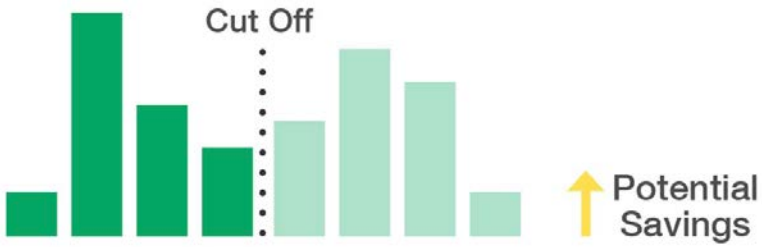


1A. Benchmarking and Portfolio Analysis- Tying into the Ownership Cycle

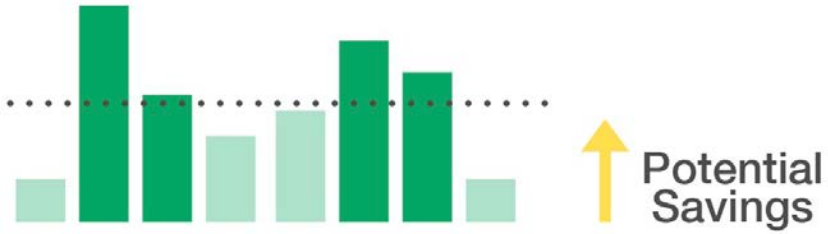


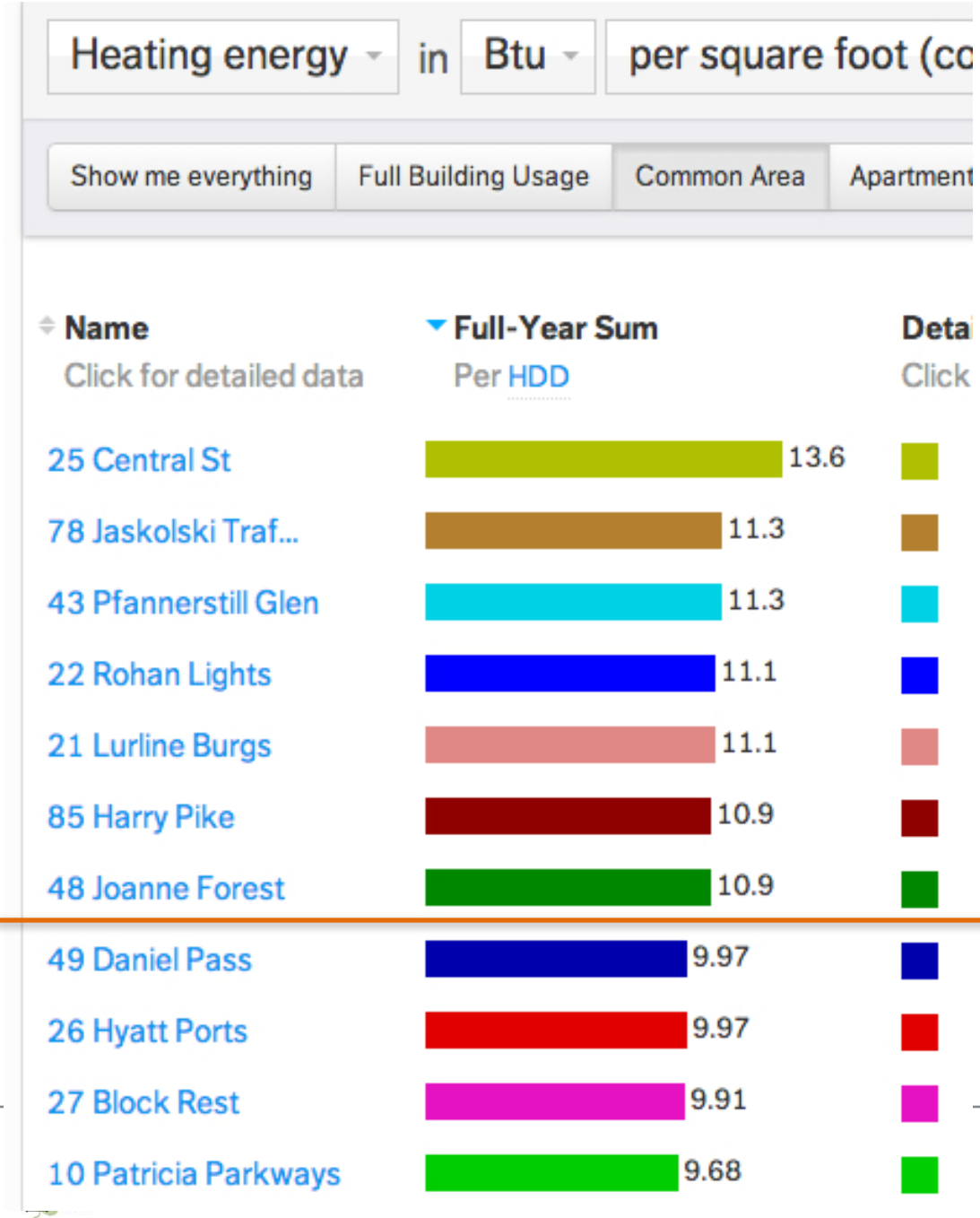
1B. Using Benchmarking To Maximize Program Savings

Typical Approach to Retrofits



A Better Approach




Heating energy
in
Btu
per square foot (co
Show me everything
Full Building Usage
Common Area
Apartment
Name
Click for detailed data
Full-Year Sum
Per HDD
Deta
Click
25 Central St
13.6
78 Jaskolski Traf...
11.3
43 Pfannerstill Glen
11.3
22 Rohan Lights
11.1
21 Lurline Burgs
11.1
85 Harry Pike
10.9
48 Joanne Forest
10.9
49 Daniel Pass
9.97
26 Hyatt Ports
9.97
27 Block Rest
9.91
10 Patricia Parkways
9.68

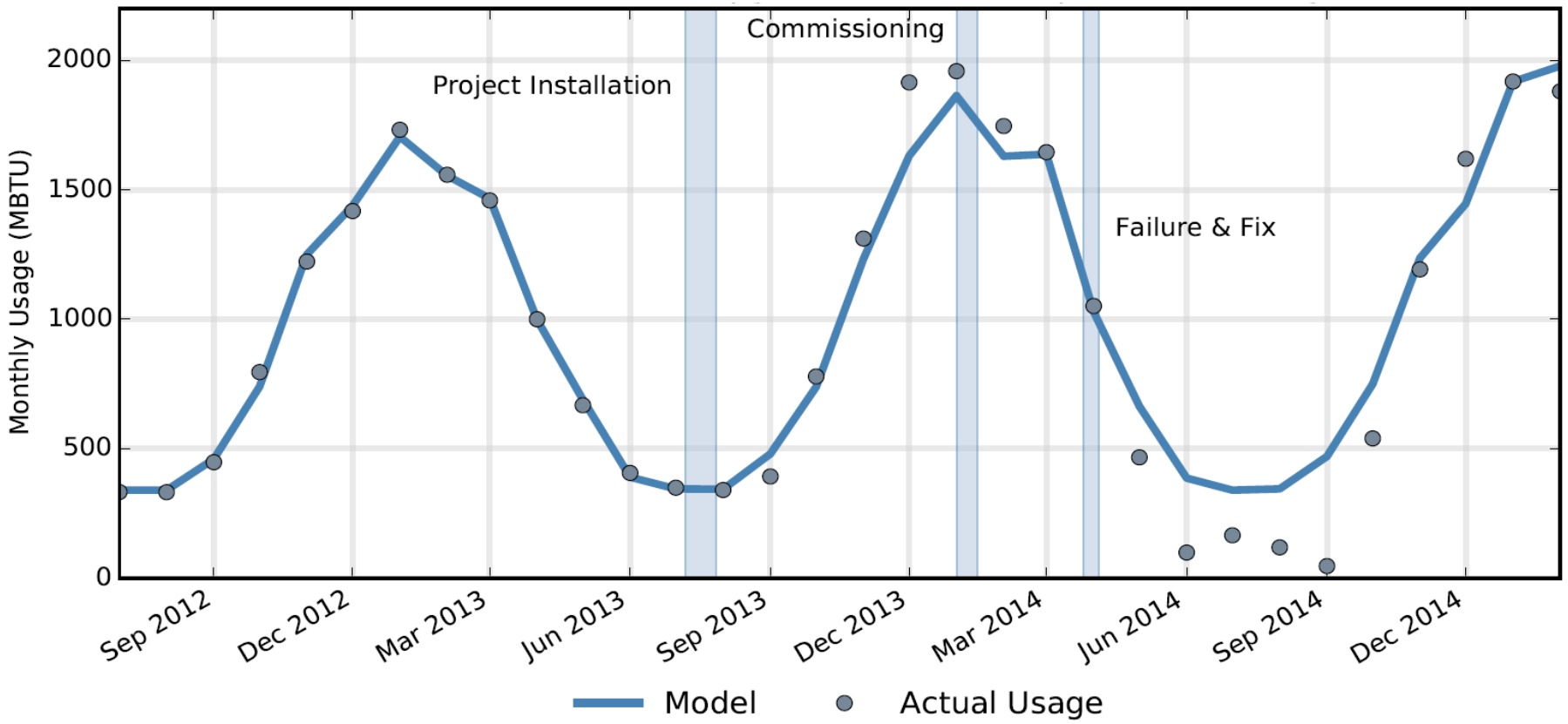
2A. Using Building Level Data To Figure Out What To Do

east
fficient

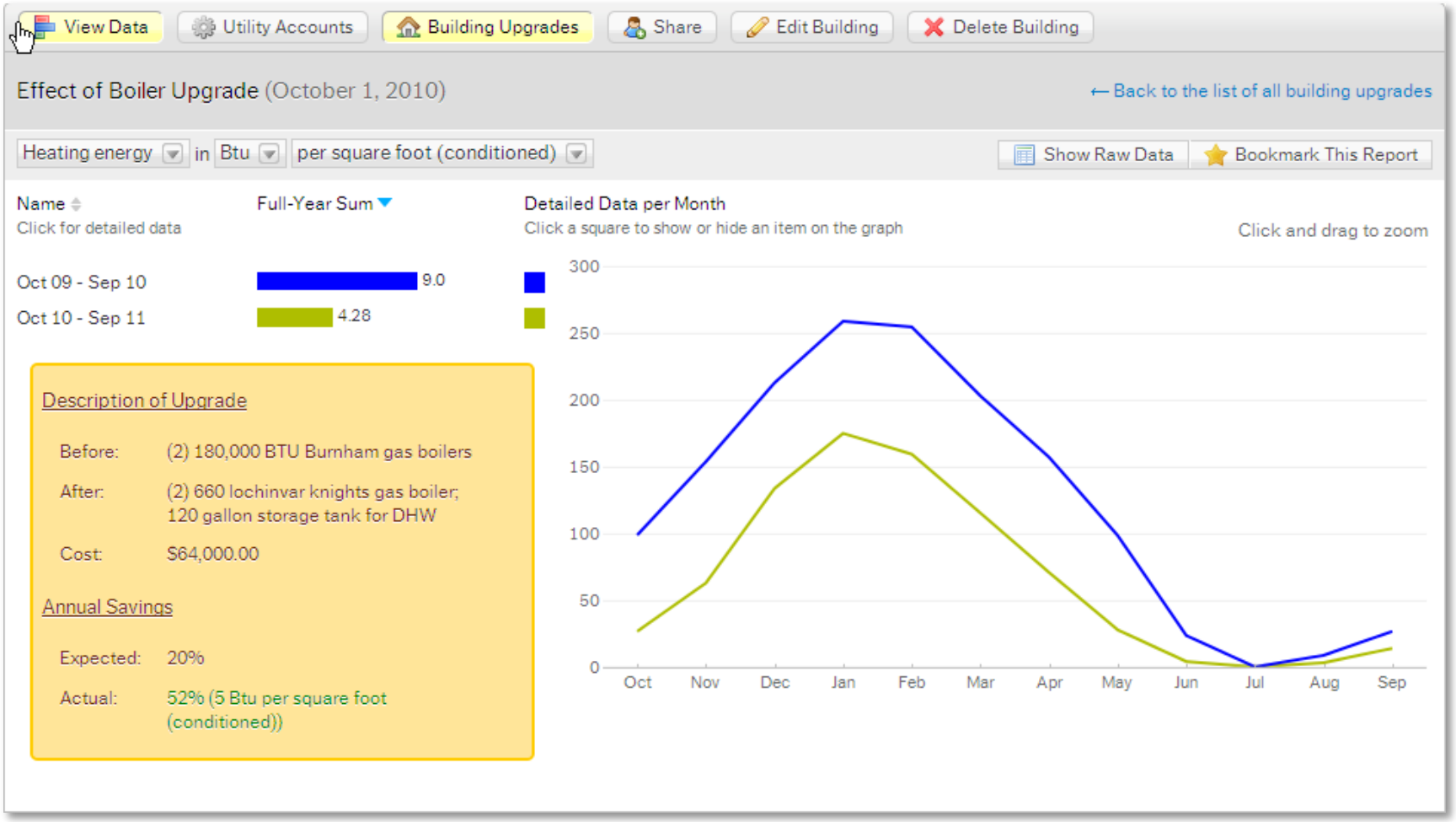
Efficient

80
60
40
20

2B. Using Data To Verify Results and Measure Savings



2B. Using Data To Verify Results and Measure Savings



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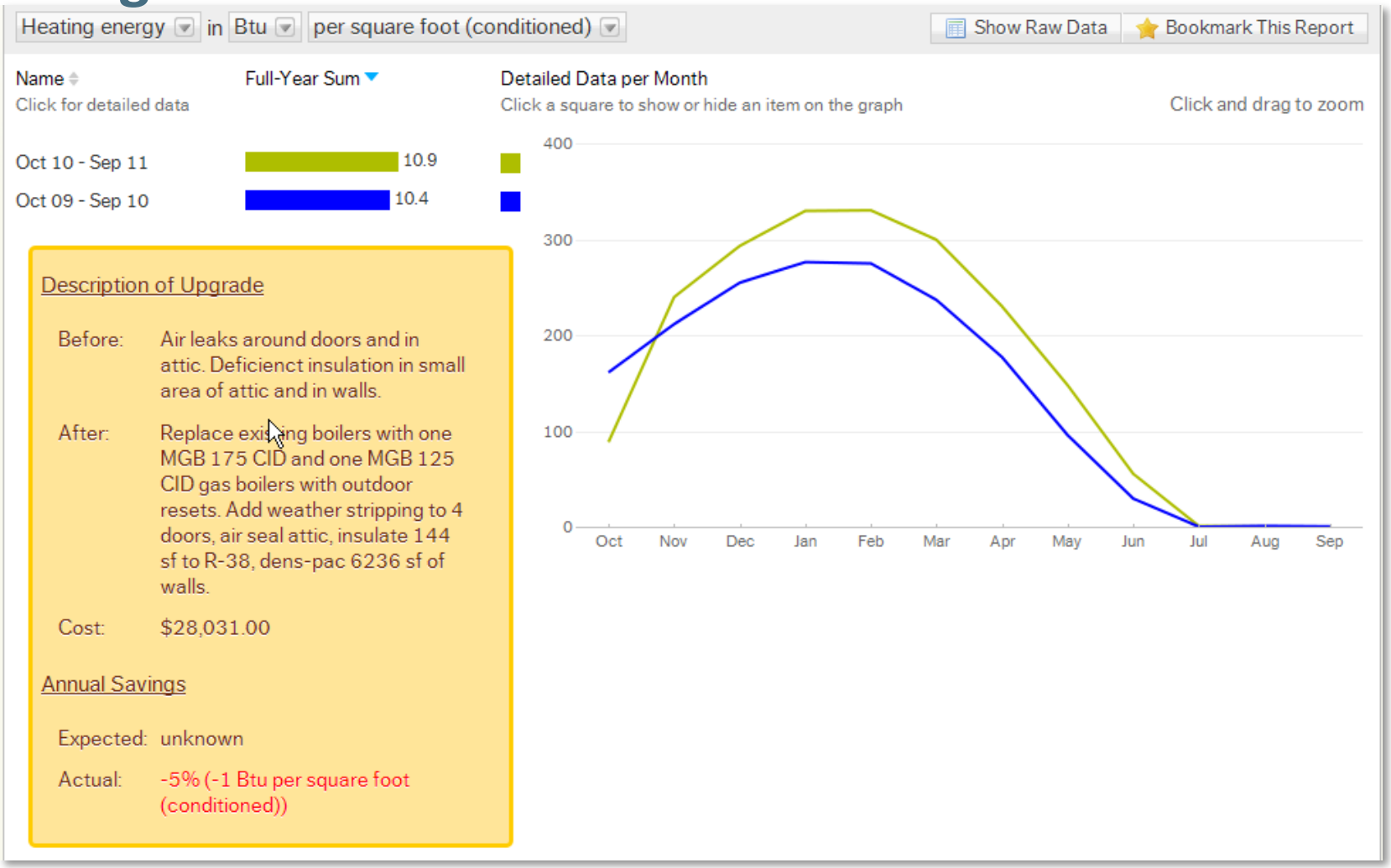
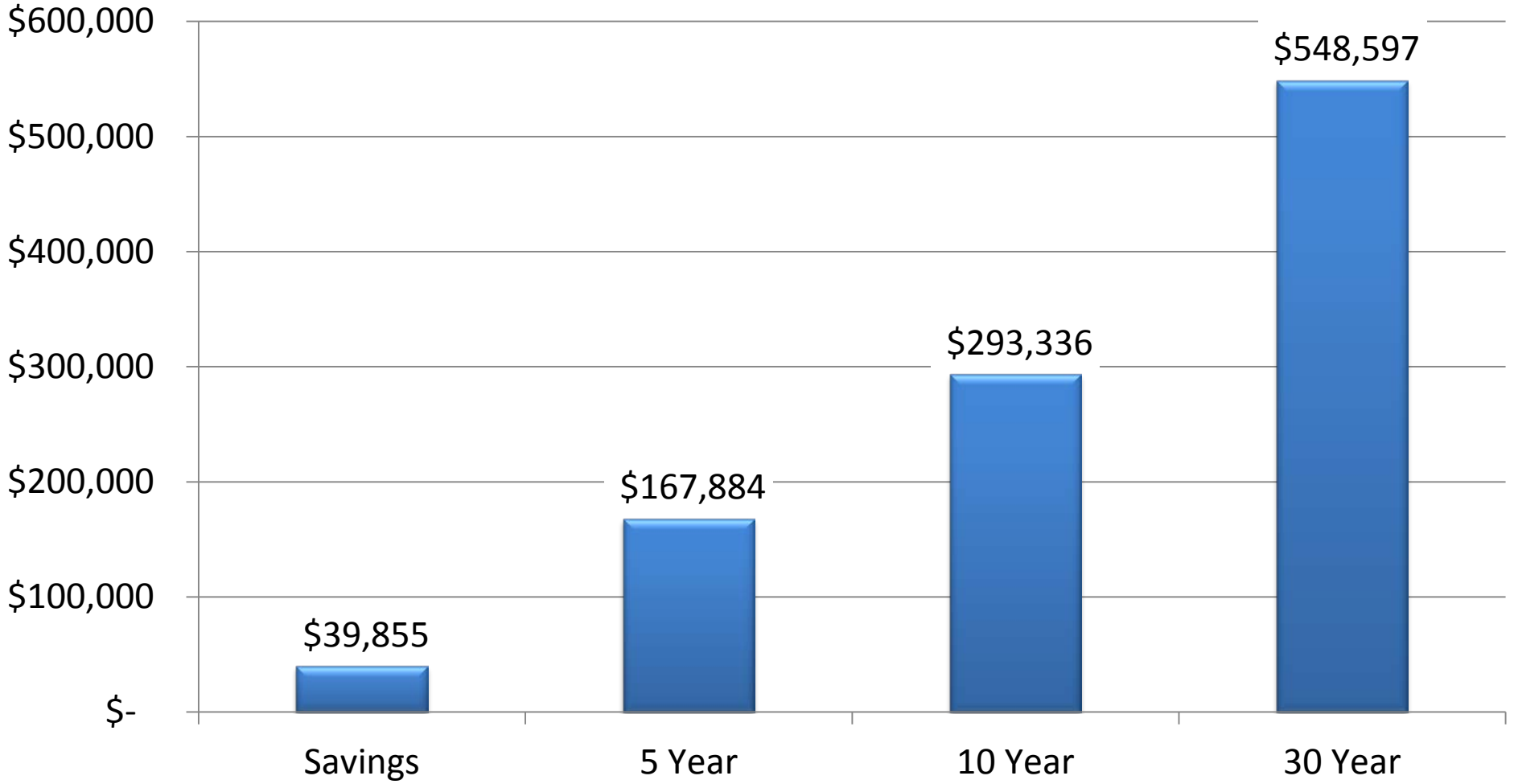


4A. Using Performance Data To Figure Out How Much To Finance

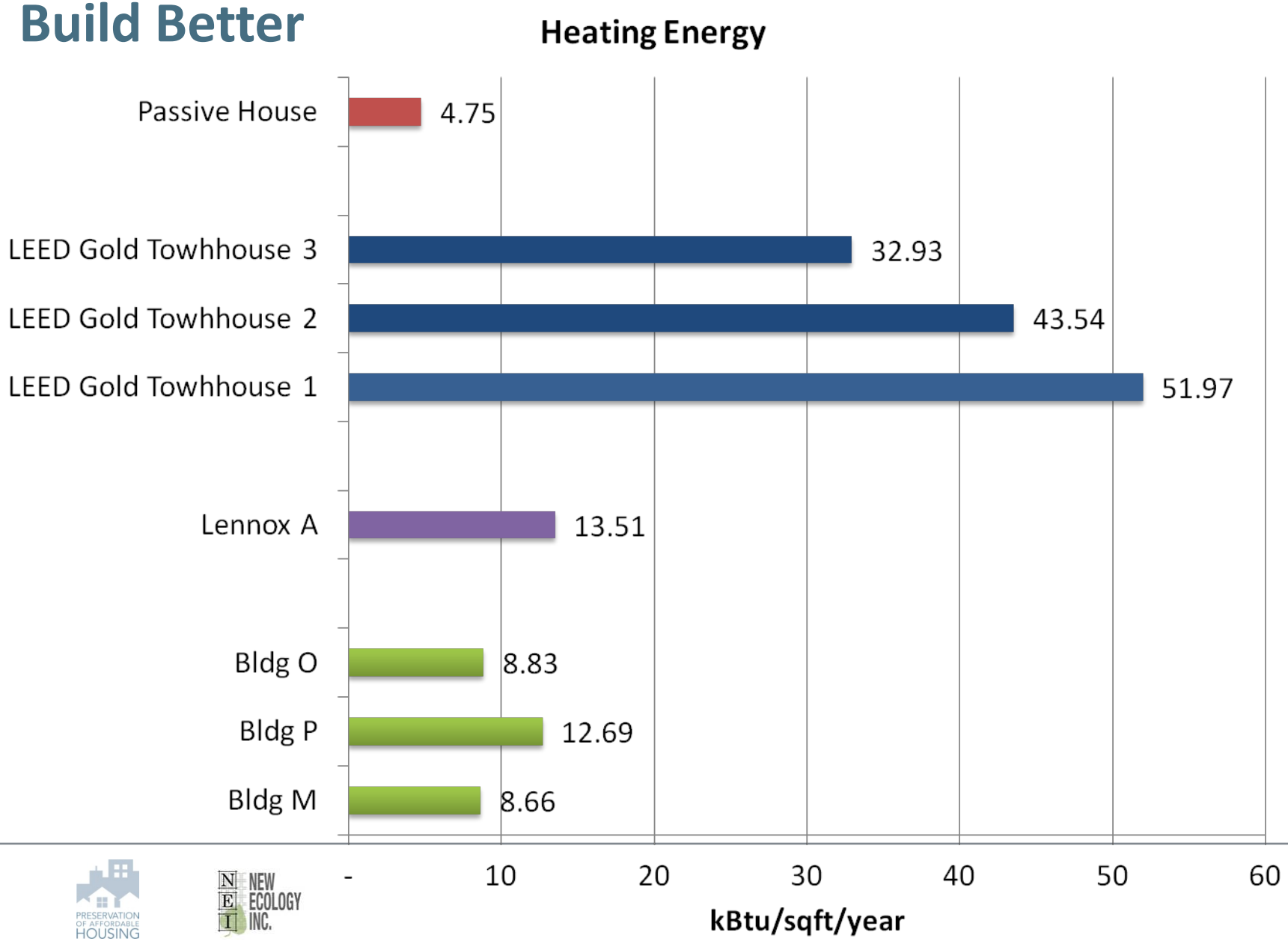


4A. Using Performance Data To Figure Out How Much To Finance

Groton Commons (pre-retrofit gas costs)	$ 0.36/sf
Savings (37% reduction of gas costs)	$ 0.23/sf
Savings over 26,586 SF/YR	$ 6,008
Simple payback on cost of $35,397	5.89 YRS
Gas Savings over 15 years	$ 90,124
NPV 15 years	$ 73,878
Annual P&I Payment of loan for 100% of the job ($35,397) at 5% for 15 years	$ 3,359
Cumulative Cash Flow (No inc. in gas costs: $90,124 - $50,385)	$ 39,739

Could have borrowed ~$70,000 and cash flowed

4B. Using Performance Data To Figure Out How To Build Better



PRESERVATION OF AFFORDABLE HOUSING

NEI NEW ECOLOGY INC.

5A. Solving Data Access Issues-Owner Accounts

Water & Sewer FY 2015 Customer Copy

Account #	Bill #	Parcel ID	Bill Date	Due Date	Past Due
M89991	916351	150308	04/02/2015	04/23/2015	$0.00
Service Location					Interest on Past Due
12 POPE STREET					$0.00

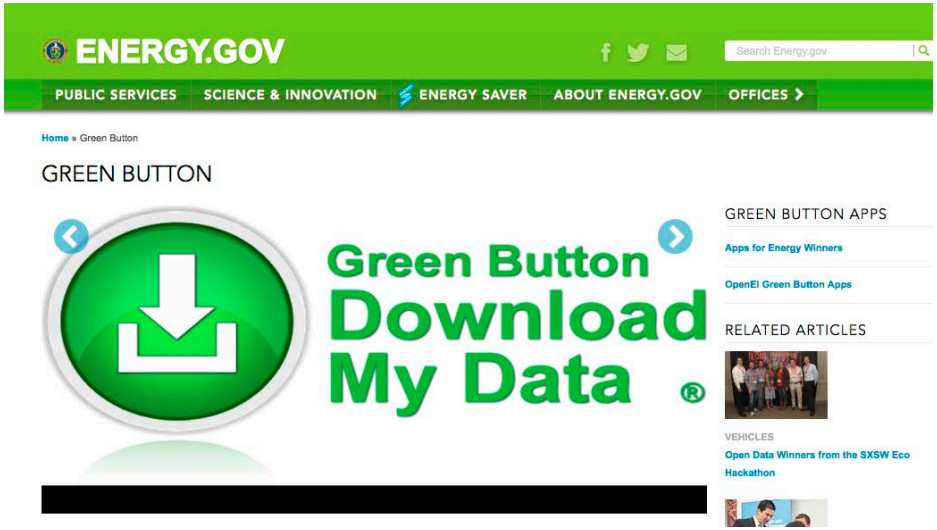
Service Type	Previous Read Date	Current Read Date	Read Code	Previous Reading	Current Reading	Usage (c.f.)	Charges	Current Total
MO W 4.0 RS	02/25/2015	03/24/2015	A	2788748	2871479	82731	$4,122.15	**$12,537.62**
MO W 4.0 RS	02/25/2015	03/24/2015	A	698190	758094	59904		**Total Amount Due**
MO S 4.0 RS			A			142635	$8,415.47	**$12,537.62**
								Discounted amount due if paid on or before 04/08/2015
			REPLACED METER USAGE			0		**$12,125.40**

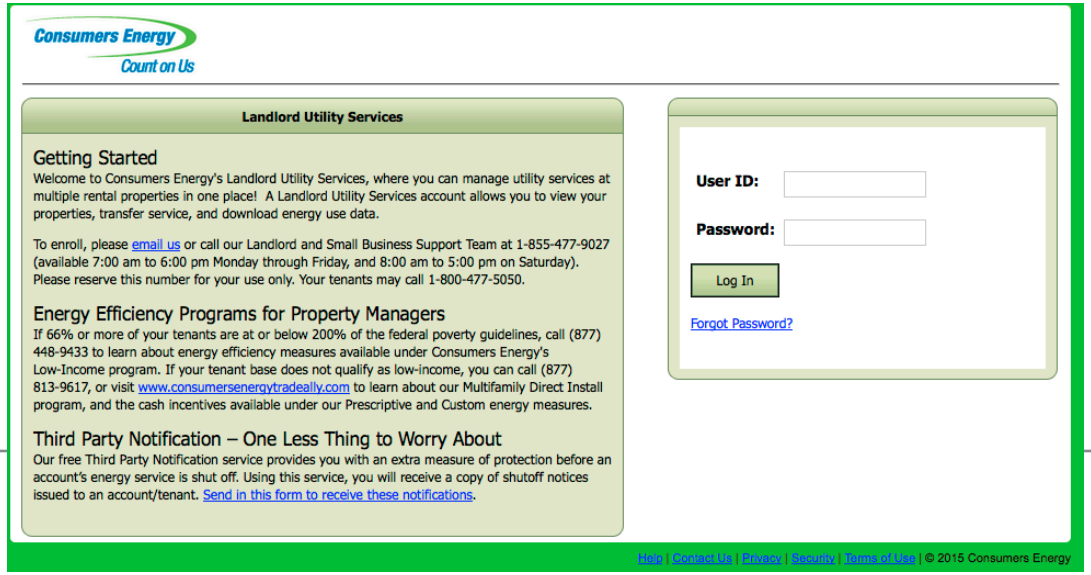
READING / USAGE CODE		CTS' ISSUE DATES
A - ACTUAL	O - ACTUAL READ, M	OCTOBER, JANUARY, APRIL, JULY
E - SYSTEM ESTIMATE	T - **TROUBLESHOOT**	DISTRICT B: BILLS ISSUED AUGUST, NOVEMBER, FEBRUARY, MAY
P - IN-HOUSE ESTIMATE	H - NON-RESPONSIVE - **METER REPLACEMENT**	DISTRICT C: BILLS ISSUED SEPTEMBER, DECEMBER, MARCH, JUNE

PRESERVATION OF AFFORDABLE HOUSING

NEI NEW ECOLOGY INC.

5A. Solving Data Access Issues-Tenant Accounts





PRESERVATION OF AFFORDABLE HOUSING

NEI NEW ECOLOGY INC.

5A. Solving Data Access Issues-Tenant Accounts

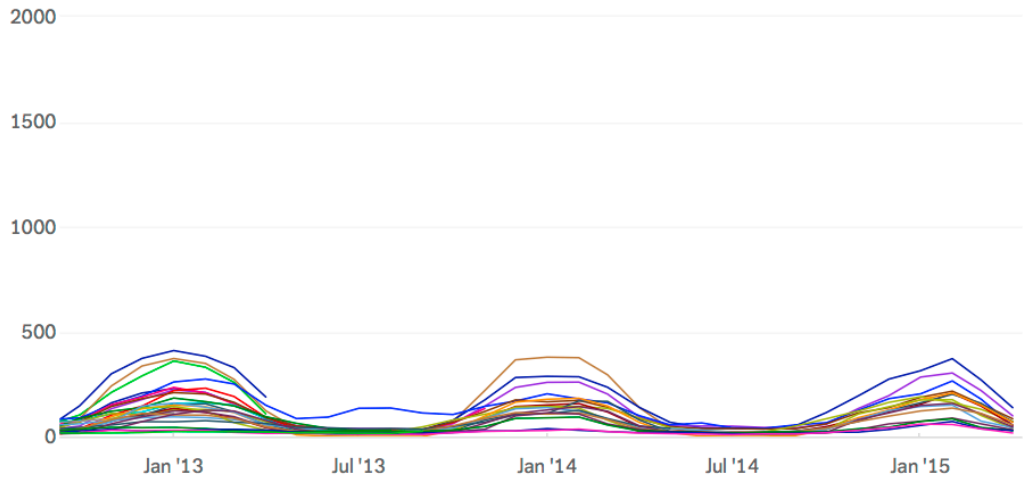
Natural gas use in **Btu** **per square foot**

Graph Table

Name	Full-Year Sum
Apt. 324 Gas #481907...	69.2K
Apt. 222 Gas #605607...	59K
Apt. 313 Gas #693017...	58.4K
Apt. 219 Gas #223607...	57.6K
Apt. 218 Gas #091407...	53.8K
Apt. 311 Gas #620807...	51.7K
Apt. 111 Gas #654207...	45.9K
Apt. 302 Gas #894307...	44.8K
Apt. 109 Gas #428507...	44.3K
Apt. 201 Gas #405307...	39.9K
Apt. 313 Gas #467307...	39K
Apt. 104 Gas #625207...	38.9K
Apt. 212 Gas #846907...	37.7K
Apt. 213 Gas #615107...	36K
Apt. 319 Gas #873807...	35.4K

Detailed data per month

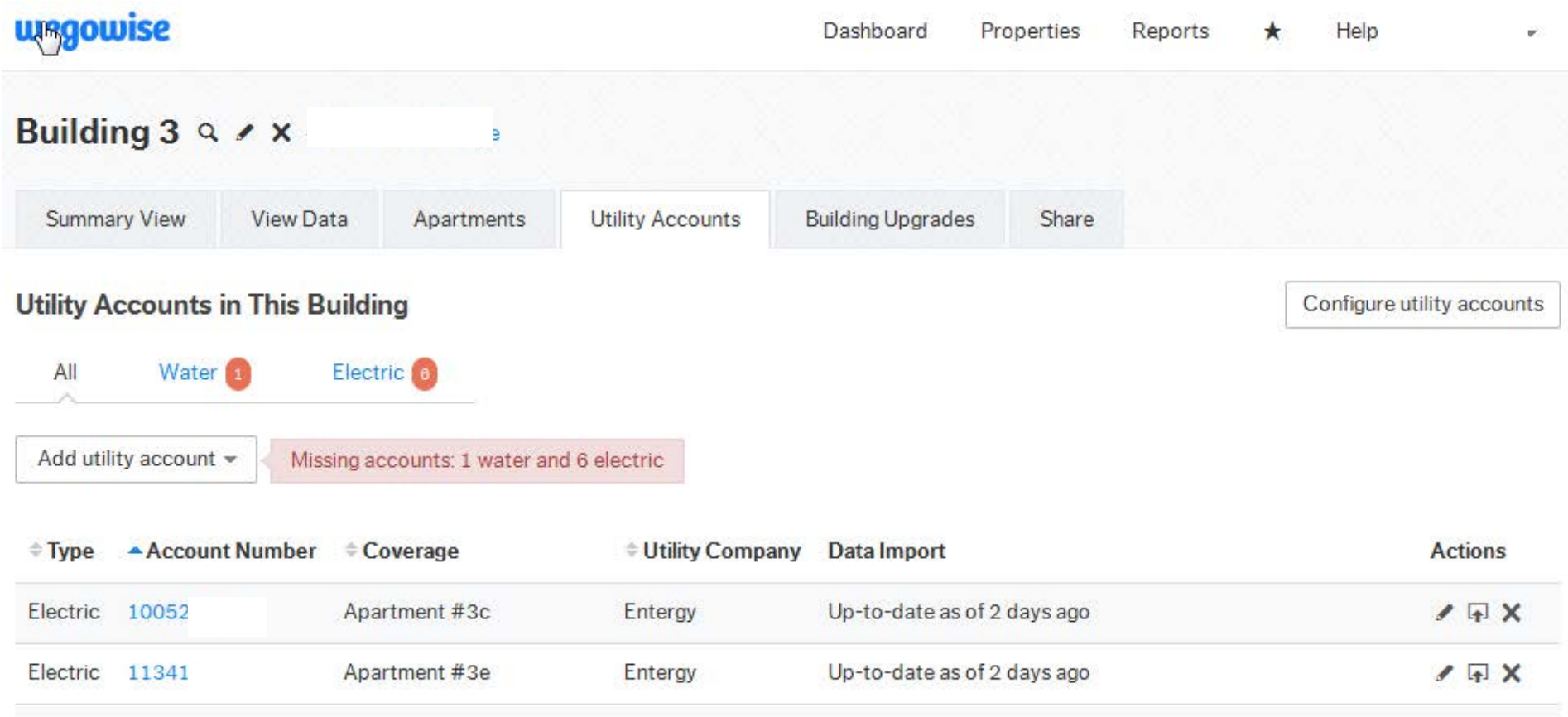
Zoom out



PRESERVATION OF AFFORDABLE HOUSING

NEI NEW ECOLOGY INC.

Automatic Data Retrieval



5A. Solving Data Access Issues-Tenant Accounts

SAMPLE RELEASE OF TENANT UTILITY INFORMATION

DATE:

TO: (Name of Utility Provider Address)

FROM: (Name Owner/Agent Address)

SUBJECT: Request for Utility Information

Dear Sir/Madam:

The person named below receives housing assistance under a program of the U.S. Department of Housing and Urban Development (HUD). The Department provides utility allowances to properties receiving subsidy assistance where all or some utilities are paid directly by the tenants. These utility allowances are adjusted each year and supported by an owner's analysis of the property's utility costs and consumption data.

In order to perform this utility analysis and better estimate the allowance provided to our tenants, your cooperation is requested in providing cost and/or consumption data for the below individual for the previous 12 months. Please return this information to the person listed at the top of the page. Below you will find the tenant's consent to release this information.

Thank you for your help with HUD's mission to create strong, sustainable, inclusive communities and quality affordable homes for all.

Request for Utility Information for: NAME: _____

ADDRESS: _____

_____

PLEASE RETURN THIS UTILITY INFORMATION TO THE PERSON LISTED ABOVE

PRESERVATION OF AFFORDABLE HOUSING

NEW ECOLOGY INC.

5A. Solving Data Access Issues-Tenant Accounts

Utility Allowance Calculations/Reports

00-0115	1LG-1-E-A	11.159	92.29	122.461	118.86	119.119	104.619	140.209	130.198	54.4	31.596	31.967	38.95	12		83.0	
00-0116	1LG-1-E-A	182.467	169.112	189.534	195.[illegible]	216.57	199.353	225.21	211.982	192.297	181.363	170.635	176.398	12		192.5	192.5
00-0201	1LG-1-E-A	266.661	225.642	325.876	5[illegible]37	588.432	364.93	254.618	244.501	238.397	255.282	271.096	256.438	12		321.8	321.8
00-0202	1LG-1-E-A	255.472	265.899	144.455	[illegible]41	272.618	341.864	448.998	252.248	162.108	208.82	297.353	278.54	12		255.3	255.3
00-0215	1LG-1-E-A	234.506	211.749	238.36	2[illegible]	212.218	202.648	247.422	243.564	219.727	240.381	233.474	232.836	12		228.0	228.0
00-0216	1LG-1-E-A	80.43	177.547	239.582	22[illegible]	393.705	550.278	610.686	629.001	537.128	465.067	416.835	374.569	12		391.6	
00-0301	1LG-1-E-A	266.484	468.526	559.461	512.0[illegible]	273.951	540.393	583.608	583.693	576.383	614.766	407.09	218.438	12		492.1	
00-0302	1LG-1-E-A	211.249	185.385	170.673	150.778[illegible]	0.15	128.508	213.118	190.949	202.288	208.785	216.375	156.217	12		182.9	182.9
00-0315	1LG-1-E-A	258.732	253.641	214.656	189.712	[illegible]19		275.794	269.579	214.975	216.891	218.617	206.438	12		230.5	230.5
00-0316	1LG-1-E-A	166.674	163.709	144.862	108.677	[illegible]	154.748	153.623	133.651	144.18	139.906	169.426		12		141.8	141.8
00-0401	1LG-1-E-A	135.6[illegible]	115.373	135.438	153.504	15[illegible]	255.918	208.509	152.827	138.075	147.112	171.384		12		167.1	167.1
00-0402	1LG-1-E-A	240.32[illegible]	196.879	252.309	271.88	20[illegible]	382.21	221.989	164.584	217.512	222.645	230.798		12		234.7	234.7
00-0415	1LG-1-E-A	339.725	[illegible]14.827	380.967	519.974	[illegible]	26.561	166.09	89.263	70.802	108.127	111.052		12		263.8	263.8
00-0416	1LG-1-E-A	60.079	[illegible]	66.212	82.939	[illegible]	[illegible]86	72.568	102.751	110.412	96.013	74.14		12		81.7	
00-0501	1LG-1-E-A	48.424	[illegible]	[illegible]313	47.11[illegible]	[illegible]	[illegible]2	52.681	46.879	47.048	43.313	42.919		12		47.7	
00-0502	1LG-1-E-A	107.261	[illegible]	[illegible]	151.143	[illegible]	[illegible]	[illegible]57.122	196.513	89.095	99.019	117.493		12		259.8	259.8
00-0515	1LG-1-E-A	185.704	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]027	145.698	168.498	142.117	143.243		12		140.0	140.0
00-0516	1LG-1-E-A	180.087	173.5	52[illegible]	[illegible]	[illegible]	[illegible]35.706	[illegible]	[illegible]51.164	393.391	312.377	291.525		12		386.2	
00-0601	1LG-1-E-A	168.023	141.524	150.816	[illegible]	[illegible]	[illegible]62.127	248[illegible]	[illegible]	156.874	124	113.276		12		172.1	172.1
00-0602	1LG-1-E-A	345.012	284.266	280.336	2[illegible]	[illegible]	305.226	294.05	[illegible]	376.357	259.737	274.04		12		284.5	284.5
00-0615	1LG-1-E-A	172.994	136.58	135.113	169.[illegible]	[illegible]	216.905	186.363	154.855	132.797	158.957	155.687		12		178.3	178.3
00-0616	1LG-1-E-A	285.2	331.128	290.045	373.687	[illegible]5	627.392	586.427	414.596	350	327.761	413.212		12		421.3	
00-0701	1LG-1-E-A	232.65	227.772	217.671	210.312	[illegible]97	329.698	219.465	239.564	253.35	246.667	257.515		12		238.0	238.0
00-0702	1LG-1-E-A	142.552	131.462	143.754	129.969	[illegible]	120.[illegible]1	141.326	172.639	140.583	136.143	147.112	177.259	12		143.0	143.0
00-0715	1LG-1-E-A	319.563	238.235	209.998	251.101	[illegible]	262.783	206.007	267.354	229.403	414.467	402.767	291.3	12		277.3	277.3
00-0716	1LG-1-E-A	769.727	770.97	811.829	624.056	[illegible]	474.493	601.756	531.287	467.342	476.864	256.781	234.018	12		553.8	
00-0801	1LG-1-E-A	255.119	254.418	78.2	109.783	[illegible]	177.934	184.123	171.801	137.995	134.246	74.332	86.546	12		150.8	150.8
00-0802	1LG-1-E-A	200.204	192.164	217.424	211.666	[illegible]	214.181	228.028	179.814	226.707	251.66	205.584	195.603	12		213.2	213.2
00-0815	1LG-1-E-A	104.929	104.749	110.952	112.935	[illegible]	132.627	182.645	168.957	141.634	162.186	135.317	135.625	12		135.7	135.7
00-0816	1LG-1-E-A	174.555	213.37	162.172	177.285	[illegible]	165.578	197.306	172.969	159.014	166.669	152.113	184.019	12		176.1	176.1
00-0901	1LG-1-E-A	157.257	171.452	145.183	154.512	[illegible]	170.521	200.296	156.357	94.035	168.291	133.204	127.175	12		152.7	152.7
00-0902	1LG-1-E-A	83.807	64.104	306.999	415.533	[illegible]	457.192	479.212	460.539	191.055	89.406	93.185	116.742	12		267.3	267.3
00-0915	1LG-1-E-A	73.647	90.045	140.572	49.631	[illegible]	54.369	46.957	33.721	43.897	141.317	162.831	211.382	12		92.6	
00-0916	1LG-1-E-A	251.949	276.135	274.563	274.741	[illegible]	288.32	322.987	297.899	293.696	287.843	292.031	314.49	12		287.8	287.8
00-1001	1LG-1-E-A	230.63	167.004	379.015	336.873	[illegible]	45.831	37.578	349.637	488.453	508.666	473.341	483.699	12		317.8	317.8
00-1002	1LG-1-E-A	131.789	91.848	72.627	63.841	[illegible]	79.906	93.612	96.235	84.111	73.47	78.367	99.789	12		87.0	
00-1015	1LG-1-E-A	276.717	260.273	269.08	261.683	30[illegible]2	273.492	321.046	293.919	271.305	482.245	500.953		11			
00-1016	1LG-1-E-A	191.159	159.489	280.135	516.597	53[illegible]	476.14	356.621	311.492	258.196	215.925	183.157	160.944	12		303.7	303.7
00-1101	1LG-1-E-A	59.737	118.883	49.729	57.088	14[illegible]	183.701	228.488	204.1	167.016	141.835	138.008	183.914	12		140.2	140.2
00-1102	1LG-1-E-A	542.441	246.675	157.225	266.507	292.[illegible]	261.959	279.788	280.625	240.183	219.754	294.563	314.168	12		283.0	283.0
00-1115	1LG-1-E-A	84.622	80.501	84.962	94.913	128.601	116.975	121.752	114.413	101.356	93.303	95.04	88.841	12		100.4	
00-1116	1LG-1-E-A	240.027	243.272	183.358	158.885	188.761	186.996	247.183	259.89	196.452	180.122	219.208	232.407	12		211.4	211.4
SUMMARY OF 1LGBED, 1BATH, ELDERLY APTS										%COMPLETE:	97.6%	(41 / 42 units)		Ave		226.5	218.4
														St.Dev		110.4	

Tenant Education

PRESERVATION OF AFFORDABLE HOUSING

NEI NEW ECOLOGY INC.

THANK YOU!

Edward Connelly

President - New Ecology Inc.

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Toby Ast

Director of Energy Management

Preservation of Affordable Housing Inc.

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Elevate Energy Multifamily Energy Efficiency Program

Abigail Corso, P.E.

May 29, 2015

ELEVATE ENERGY

Smarter energy use for all

Our Mission

We promote smarter energy use for all.

We give people the resources they need to make informed energy choices.

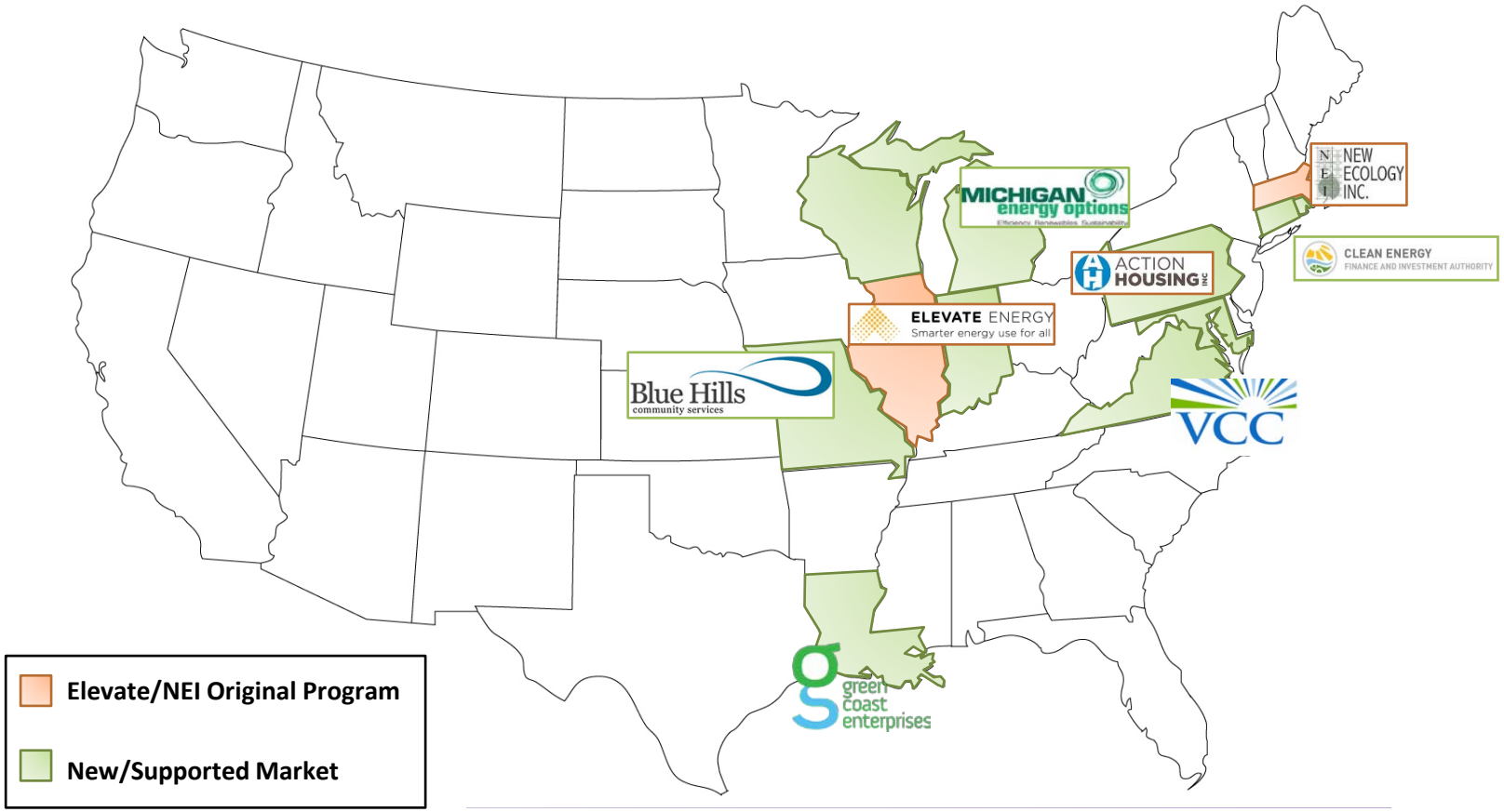
We design and implement efficiency programs that lower costs, and protect the environment.

We ensure the benefits of energy efficiency reach those who need them most.

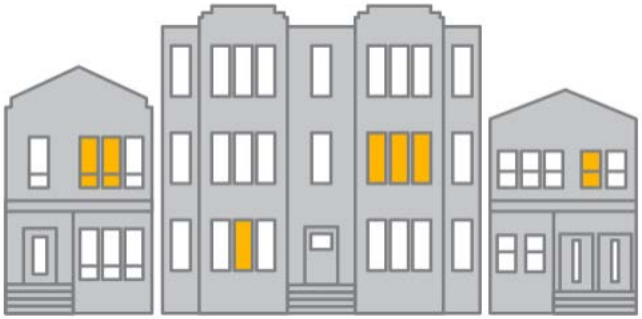
Areas of Focus

- Smart grid benefits and dynamic electricity pricing in **homes**
- Energy efficient **buildings**
- **Community**-level programs
- Research, policy and innovation

New Markets and Partners



Market Need



10.5 million units of affordable multifamily housing in the US

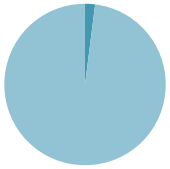
$3.4B could be saved through multifamily energy efficiency improvements

Multifamily Energy Expenditure

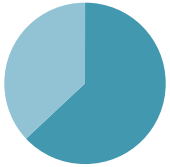
13.5% of monthly income spent on energy
(compared to median household: 7%)

23% energy cost increase from 2001 to 2009
(compared to rent increase: 7.5%)

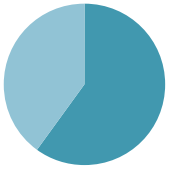
Multifamily Building Characteristics



2% of MF 5+ units have received an energy audit



63% of MF 5+ units are poorly or only adequately insulated



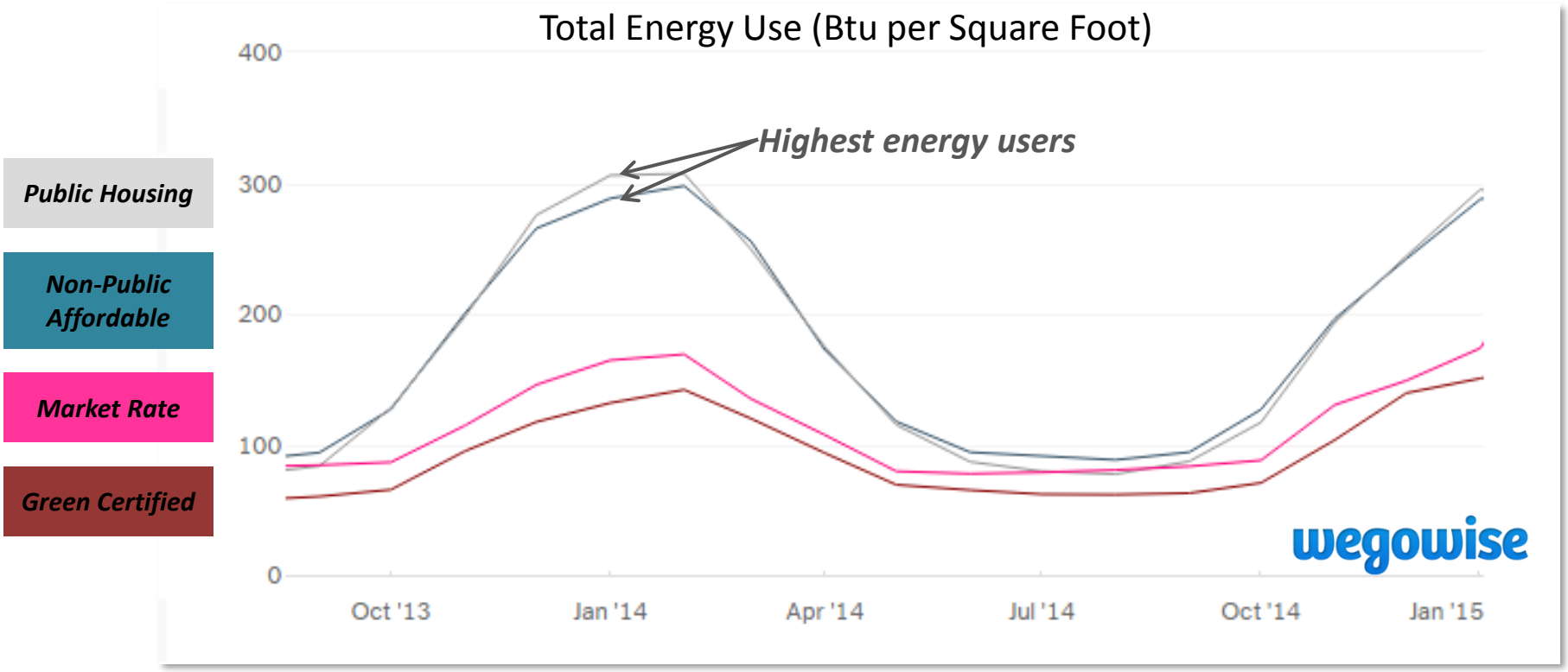
60% of MF 5+ units have heating equipment not routinely maintained (in last year)

ELEVATE ENERGY

Sources: EIA, Residential Energy Consumption Survey (RECS) 2009; US Census American Community Survey, 2007-2011, 5-Year Estimates; Elevate Energy & ACEEE, "Engaging as Partners in Energy Efficiency: Multifamily Housing and Utilities," 2012; Benningfield Group for The Energy Foundation, "Addendum Report: U.S. Multifamily Housing Stock Energy Efficiency Potential," 2010; Deutsche Bank, "The Benefits of Energy Efficiency in Multifamily Affordable Housing," 2012.

Affordable Multifamily Savings Opportunity

Data shows that **affordable multifamily buildings utilize more energy** than market rate buildings



Efficiency Benefits for Building Owners

Lower energy costs help building owners:

Tenant Retention → Positive Cash Flow → Improved O&M

Efficiency Benefits for Residents

Lower energy costs help low-income families avoid:

Unstable Housing → Food Insecurity → Health Problems

For a very low-income family, the average savings due to energy upgrades is 3% of their income – helping to reduce housing costs and the impact of rising energy costs.[1]

When families spend less of their income on housing and utility costs, they can spend more on food, healthcare, child enrichment,[2] and other household needs.

When the burden of utility bills is reduced, infants and toddlers are 23% less likely to be at nutritional risk for growth problems[3] and adults experience an 18% decrease in hypertension rates.[4]

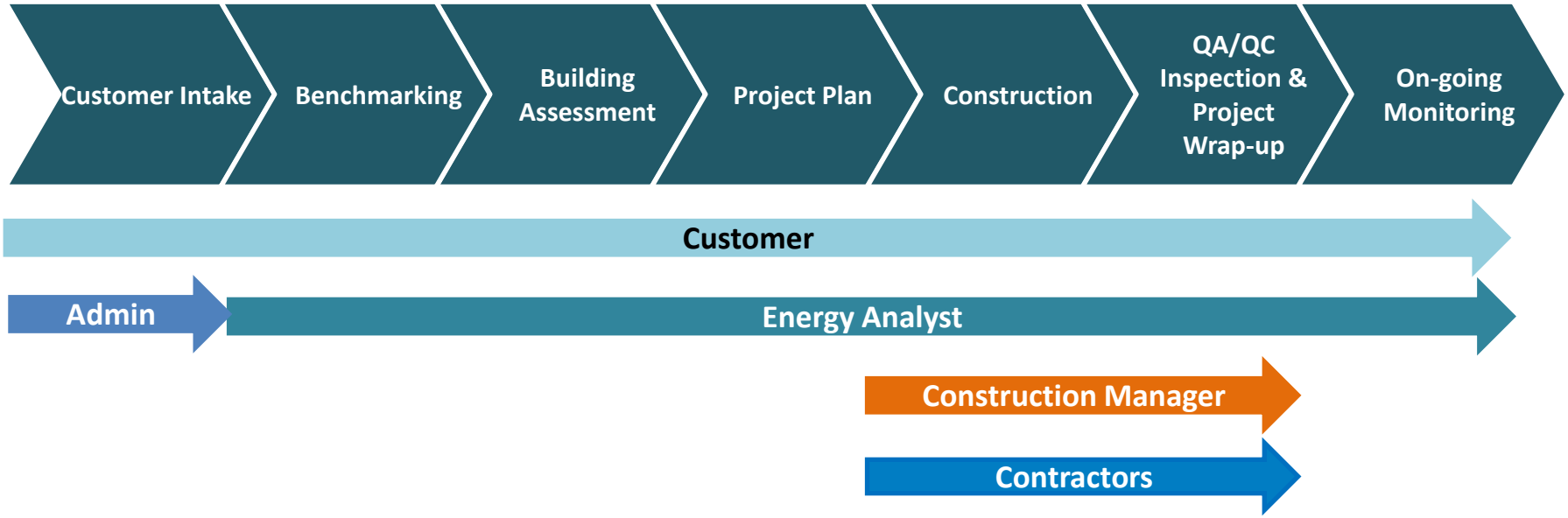
ELEVATE ENERGY

1. U.S. Bureau of Labor Statistics, Consumer Expenditure Report
2. Newman, S. and Holupka, C.S. Housing Affordability and Child Well-Being. Housing Policy Debate, 2014.
3. Frank, et al. "Heat or Eat," *Pediatrics* 2006. Meyers, et al. "Subsidized Housing and LIHEAP: Improved Outcomes in Children of Color" Presentation at Annual Conference of the American Public Health Association 2007.
4. Wilson, et al. Watts-to-Wellbeing: does residential energy conservation improve health? Energy Efficiency, February 2014, Volume 7, Issue 1, pp 151-160.

A flexible, *one-stop shop* process addresses the barriers that multifamily owners face.

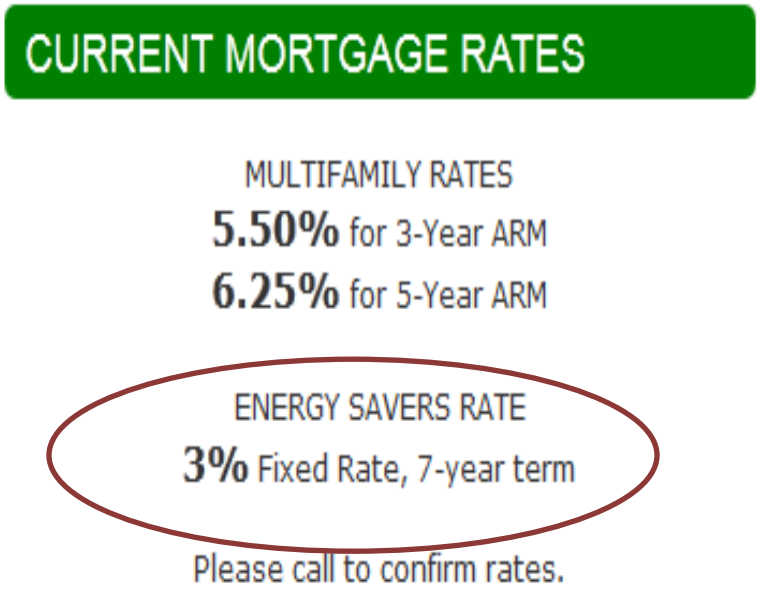
Barriers to Energy Efficiency Investments	***Key Program Design Elements***
Limited awareness of applicable programs	Single point of contact to support owners throughout the energy upgrade process
Lack of energy use data and comparison benchmarks	Portfolio Benchmarking (through Wegowise)
Lack of knowledge of cost-effective efficiency upgrades	Energy analysis, onsite building assessment, and cost-effective energy savings recommendations
Lack of access to low-cost capital	Access to low-cost energy efficiency financing products and any available state, local, or utility incentives or grants
Lack of time and knowledge to oversee construction and ensure high quality work	Contractor bid solicitation, construction oversight, and QA/QC provided
Lack of mechanisms to track post-retrofit savings	Post-retrofit energy use monitoring and reports

One-Stop Shop Program Key To Success: Streamlined process to help owners access all services



- *High quality customer service through a <u>single point of contact</u>*
- *Strong construction management with 100% QA of jobs*
- *Robust data to support energy savings and monitor post-retrofit results*

CIC's loan product is secured often as a second mortgage on the property



Energy Savers Loan Terms:

- Second mortgage loan often behind CIC first mortgage
- Personal recourse
- 3% (money obtained at 1%)
- 1.15 DSCR (debt service coverage ratio- ***after retrofit***)
- 90% LTV (loan to value- recent appraisal)
- 7 year term
- 7-10 year amortization

Elevate Energy – Chicago Multifamily Program

Program Statistics - 2008 through March 18, 2015		
	Buildings	Units
Applications	1,441	54,871
Assessments	1,176	47,020
Upgrades	502	20,642
Jobs created	519	
CIC Loans	$13,935,726	

Elevate Energy – Chicago Multifamily Program

Program	Annual Budget	Annual Participation	Annual Savings per unit	Levelized cost of saved energy ($/kWh and therm)	Benefit-cost ratios
Elevate Energy Multifamily Program*	$2,505,952	Units: 4,126 Projects: 110	650 kWh 240 therms	Electric: $0.10 Gas: $1.00	TRC: 2.10 gas

*DC SEU had not completed a full program year at time of report publication in 2013.
**Elevate Energy was formerly known as CNT Energy in January 2014.
SOURCE: ACEEE – Kate Johnson, *Apartment Hunters: Programs Searching for Savings in Multifamily Buildings.* December 2013.

Impacts on Properties

Jeffery Parkway, retrofitted by Elevate Energy, is **one of the first 17 existing multifamily** properties nationwide to become **Energy Star certified**

"We were facing, just on the gas bill, a $60,000 bill a year. As of last year, our bill was $18,000. It was unbelievable savings…By putting more upfront funds [in our building], our tenant retention is much better... It's something to tell tenants, that we care about the building."

Quote from **Sandeep Sood**, owner of Jeffery Parkway, in the November 24, 2014 *Chicago Tribune* article "South Side apartment building among 3 Chicago energy efficiency stars."

High-Quality Program Characteristics

- ✓ Encourage and incentivize deep whole-building retrofits (vs. direct-install programs that focus on one measure).
- ✓ Improve efficiency of all energy end uses, regardless of energy source, with behind-the-scenes incentive and savings attribution.
- ✓ Provide incentives to motivate action by both owners and residents.
- ✓ Deliver high levels of customer service to building owners and managers.
- ✓ Ensure rigorous quality control and a strong focus on measurement and verification.

Thank You

Abigail Corso, P.E. LEED AP O+M
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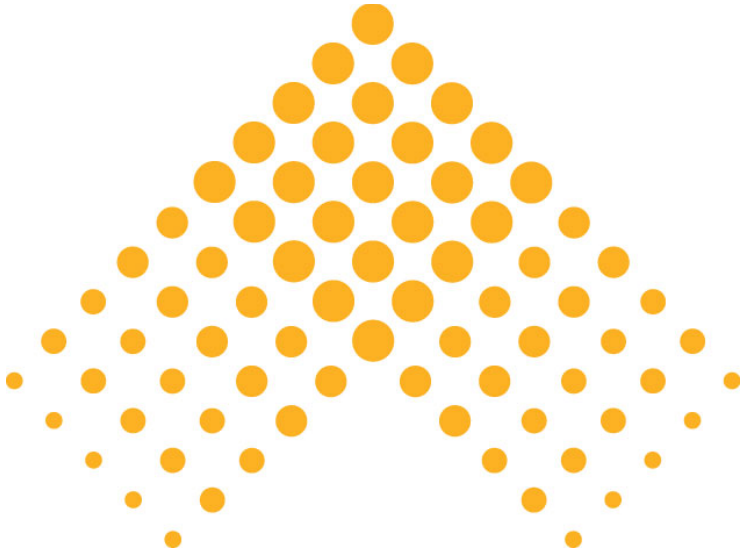
773.321.2663



Building Assessment

Elevate provides building owners with a summary of the energy savings opportunities

energy savers

A one-stop energy efficiency shop for multifamily building owners

Energy Assessment &

Completed for: Illinois Ap
2000 W I
Aurora, Il

Total projected ener

Estimated current yearly natural gas u
- Estimated post-retrofit yearly natural g
Estimated yearly natural gas cost sa

Table 1 Recommended retrofits

Recommendation	Cost ($)	Savings (therms/year)	Savings* (kWh/year)	Savings* ($/year)	Simple payback (years)	Retrofit lifetime (year)	SIR
1. Insulate all accessible heating hot water pipe with all sleeve jacket fiberglass (R-6)	3,200	700	-	700	4.6	25	5.5
2. Roof cavity: Air seal roof cavity perimeter and all penetrations, gaps and bypasses with foam, and insulate with blown-in cellulose (R-49)	64,000	12,600	-	12,600	5.1	25	4.9
3. Insulate all accessible domestic hot water pipe with all sleeve jacket fiberglass (R-4.5)	800	150	-	150	5.3	25	4.7
4. Install low-flow shower heads (1.5 GPM) and faucet aerators (1.5 GPM kitchen, 1.0 GPM bathroom)	12,800	5,300	-	5,300	2.4	10	4.1
5. Install new high-efficiency (90%+ AFUE) heating hot water boiler with indoor averaging temperature sensors and outdoor cutoff	105,000	12,600	-	12,600	8.3	20	2.5
6. Convert incandescent exit sign bulbs to LEDs	4,900	-	8,750	875	5.6	10	1.8
7. Install new high efficiency (90%+ AFUE) domestic hot water heater	45,000	2,900	-	2,900	15.5	20	1.3
TOTAL	**$235,700**	**34,250**	**8,750**	**$35,125**	**6.7**	-	-

* Assumes $1.00 per therm of natural gas or $0.10 per kWh of electricity. 1 therm = 29 kWh

ELEVATE ENERGY

Building Assessment

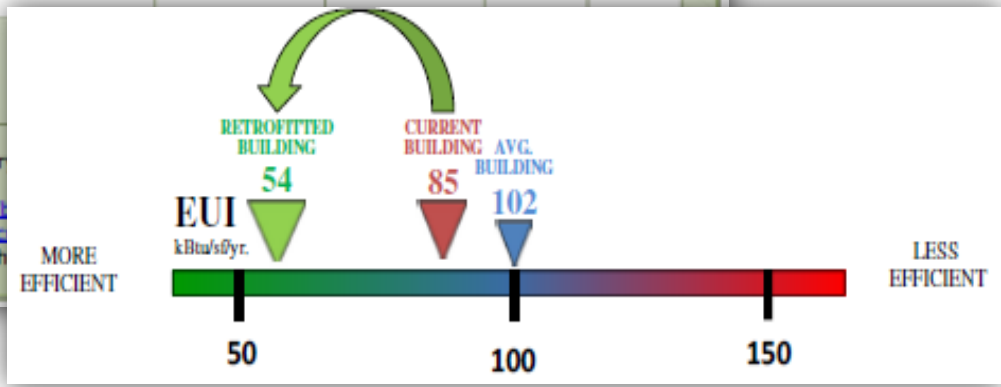
We summarize the incentives to provide a complete picture of the opportunity

Table 2 Rebates for select measures *

Rebate	Estimated rebate ($)	Cost after rebate ($)	Cost reduction (%)	Simple payback after rebate (years)	SIR after rebate)
Heating hot water pipe insulation Nicor Gas Energy Efficiency Rebates Minimum of 1-inch thick insulation	320	2,880	10%	4.1	6.1
Roof cavity insulation Nicor Gas Business Custom Incentive Program $1.00/thermsaved	12,600	51,400	20%	4.1	6.1
DHW pipe insulation Nicor Gas Energy Efficiency Rebates Minimum of 1-inch thick insulation	320	480	40%	3.2	7.8
Showerheads and faucets Nicor Multi-Family Home Energy Savings Program Direct installed at no cost to owner	12,800 Value	Free Direct Install			
Heating Hot Water Boiler Replacement Nicor Gas Energy Efficiency Rebates $5,000 per boiler, AFUE must be 90%+	20,000	85,000	19%	6.7	3.0
LED exit signs ComEd Small Business Program Requires pre-inspection	2,450	2,450	50%	2.8	3.6
DHW replacement Nicor Gas Energy Efficiency Rebates DHW must be 90%+ AFUE; ≥ 75 MBH					

* Rebate amounts are estimated. Actual rebate amount may var

Prescriptive Rebates: http://nicorgasrebates.com/index.php/
Custom Rebates: http://nicorgasrebates.com/index.php/bus-c
Direct Install: http://www.nicorgasrebates.com/programs/mfh



mercy HOUSING

Live in Hope

ONE STOP SHOP MODEL
ENERGY OUTREACH COLORADO

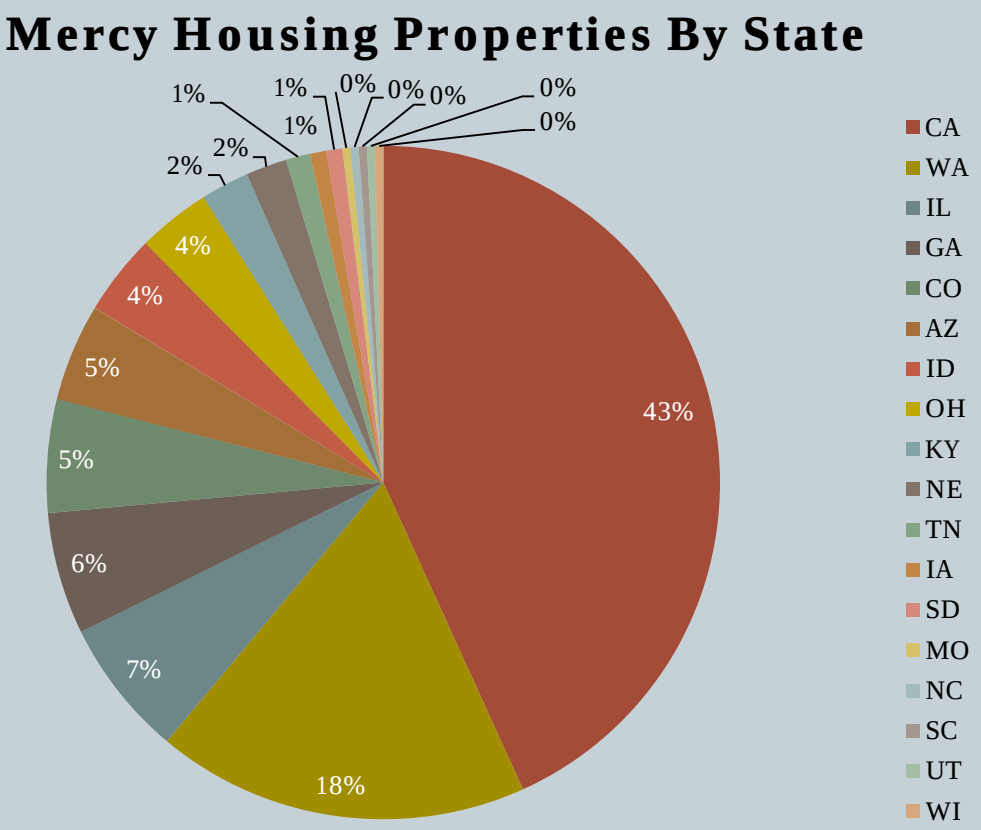
MAY 29, 2015

CAITLIN ROOD
MERCY HOUSING

SUSTAINABILITY MANAGER

Mercy Housing Overview

- Affordable Housing Nonprofit
- ~280 owned properties
- ~18,000 units
- ~16.5M sf (owned)
- 18 States
- Mostly LIHTC, Section 202, Section 8, USDA RD
- BBC
- Enterprise Call to Action



What Stops Us

- Non Fungible Savings
- Properties that Don't Cash Flow
- Split Incentives
  - Owner v HUD
  - Owner v Tenant
  - Developer v Manager
- Payback Periods
- LOC Adversity or Inability

Who is Energy Outreach Colorado?

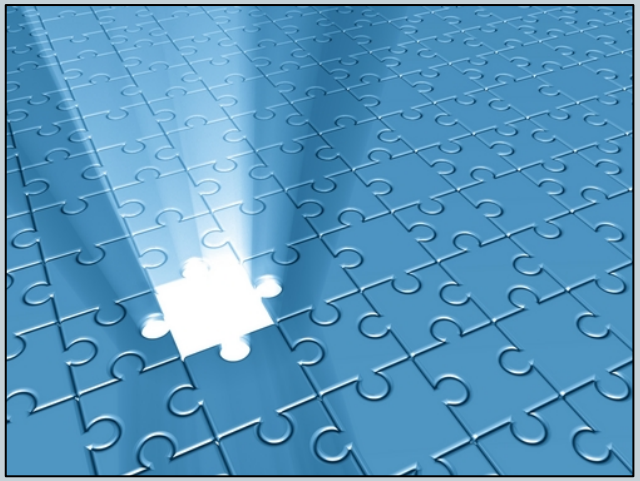
- Mission
  - Ensure all Colorado households have access to affordable home energy
- Have distributed more than $220 Million
- Programs
  - Bill payment assistance
  - Energy efficiency
  - Resident engagement
  - Advocacy

- Strong utility partnerships across the state
- Staff serve on Governor appointed energy committees
- Actively intervene at the Colorado Public Utilities Commission

Energy Outreach Colorado

The EOC Model

- Why It Works
  - Turnkey
    - Energy Audit
    - Deep knowledge of efficiency programs/relationships in CO
      - Access to addition program funding
    - Utility/local program applications, agreements, other paperwork
    - Contractor selection, relationships, oversight, & commissioning
    - Resident Engagement
  - It's what they do-mission driven
- What It's Missing
  - Financing limited by incentives
  - Replication in other states



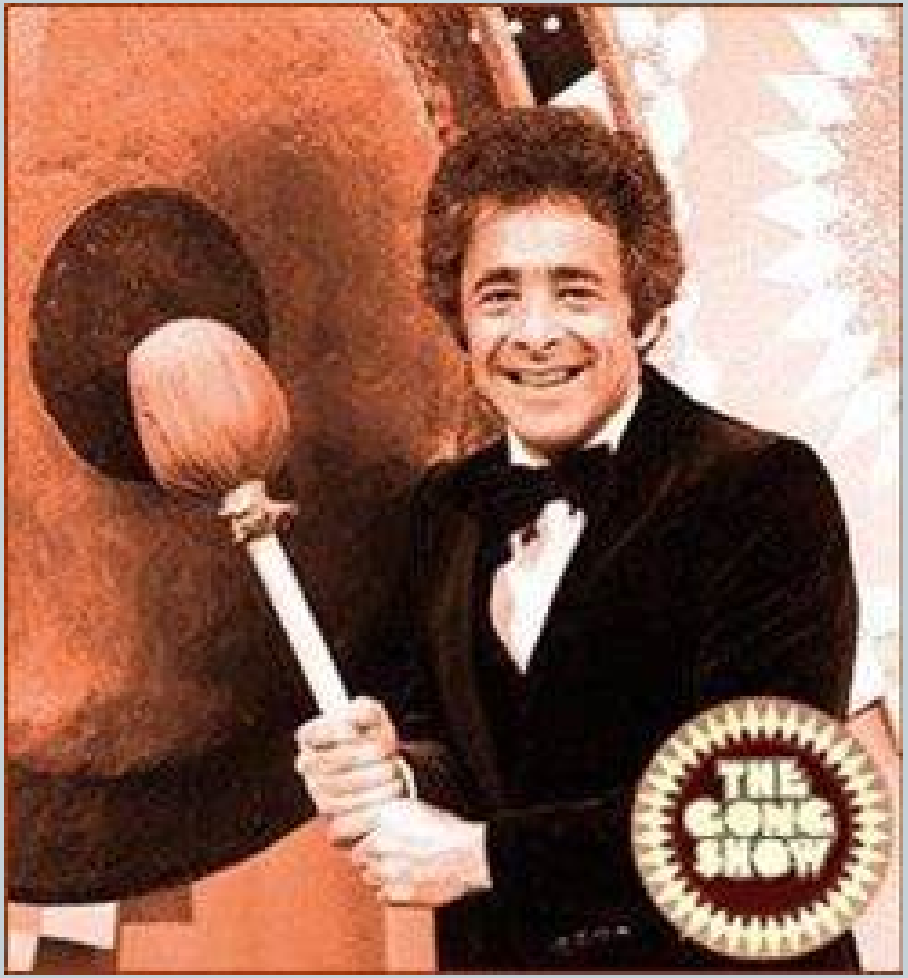
Barriers to Utility-Driven Financing

- Low energy cost environment means less cost effective for customer and utility
- Utility programs must be leveraged
- Custom evaluation of low income programs; patience pays off!
- “Word of Mouth” marketing and quick fix installs
- Average rebate:$0.40/KWH & $45/Dth

Grace Apartments

- 53 Unit family apartments built in 1960
- Replace 2 Boilers and DHW Heaters (>$140K)
- Lighting and light fixtures, common and in unit
- Low flow faucets aerators and showerheads
- $120K from DOSP and Xcel, $65K from Mercy

Grace Apartments Proposal from EOC



Holly Park East and West

- 168 Unit, 15 building family apartments built in 1973
- Federal WAP
- Replace 5 Boilers and DHW Heaters and 9 additional DHW, water treatment
- Lighting and light fixtures, common and in unit

- Low flow faucets aerators and showerheads
- Exhaust fans
- $540K from DOE and EOC, $80K from Mercy

Questions?

Caitlin Rood

Sustainability Manager

Mercy Housing

crood@mercyhousing.org

303-830-6213

PROGRAMMATIC OFFERING	Elevate Energy	EOC
Benchmarking	x	x
No cost audit/opportunity identification	x	x
Access to rebates NOT available to public		x
Central location/deep knowledge of rebates throughout service territory	x	x
Manage rebate application and reporting and other paperwork	x	x
Contractor selection, relationships, and oversight	x	x
Energy education and behavior change program for residents		x
Advocacy in state, local, and national government	local/state	x
Administer LEAP		x
Administer NEEP		x
Energy Bill Assistance Program		x
Home Furnace Repair Program		x
Exclusive low income focus	x	x
Single family and multifamily	x	x
Non-profit	x	x
Administer Federal WAP		x
Low interest energy efficiency financing partnerships	x	
QA/QC	x	x
Post retrofit monitoring	x	x

Washington State
Sustainable Energy Program:

Timeline and Opportunities

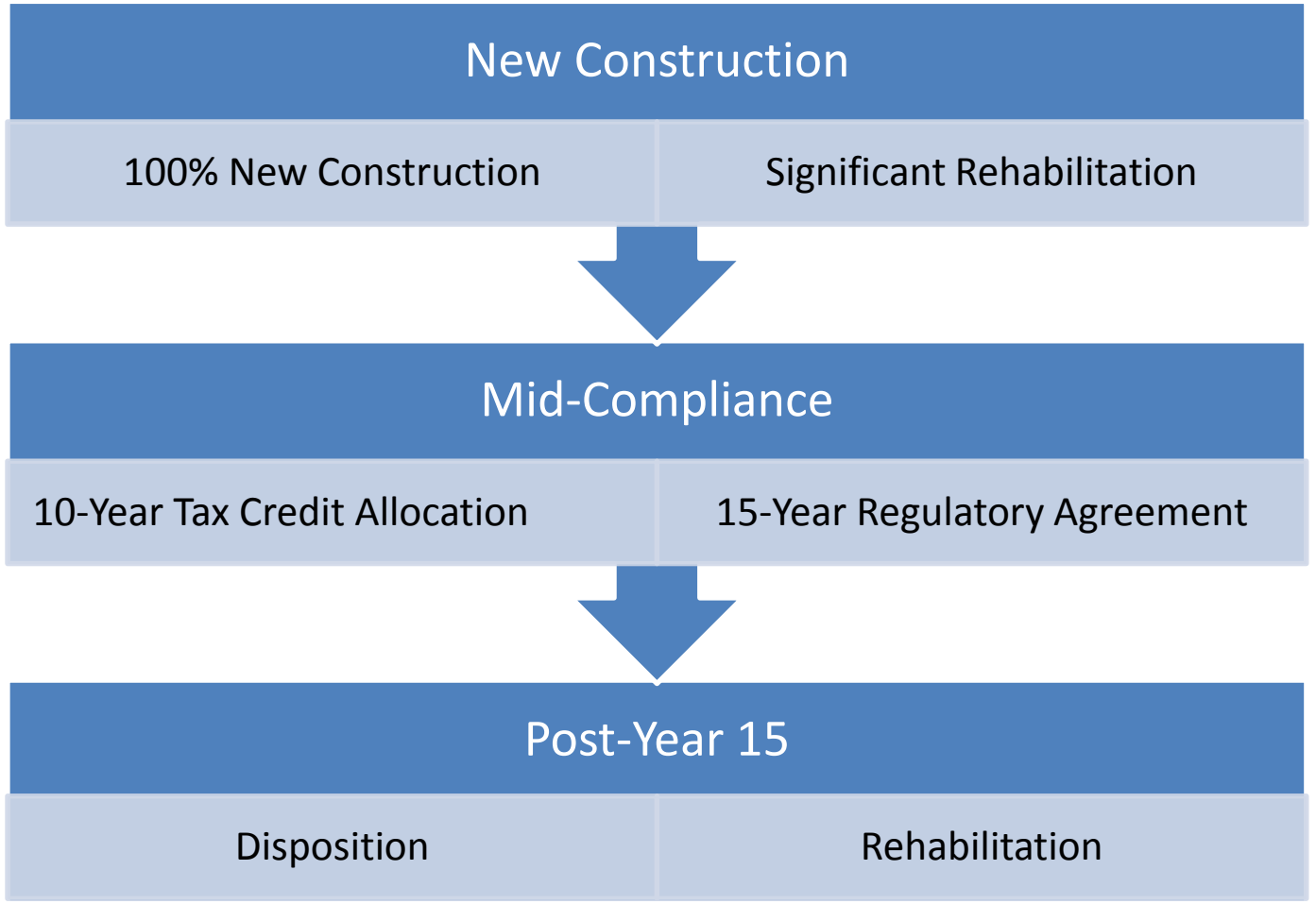
Ainsley Close
Senior Sustainable Energy Lead
Multifamily Housing and Community Facilities Division
Washington State Housing Finance Commission

WASHINGTON STATE
HOUSING FINANCE
COMMISSION

Opening doors to a better life

SUSTAINABLE
ENERGY
PROGRAM

Multifamily Affordable Tax Credit Lifecycle



WASHINGTON STATE HOUSING FINANCE COMMISSION

Opening doors to a better life

SUSTAINABLE ENERGY PROGRAM

New Construction/ Significant Rehab

4% Tax Credit

- Non-competitive so long as there is sufficient tax-exempt bond cap authority
- Must meet state standards
- May require local and/or state green-building standards

9% Tax Credits

- Competitive for credit allocation
- States follow a Qualified Allocation Plan which varies widely; some encourage Energy Efficiency
- May follow green-building standards

Partnership Opportunities

Beyond Code Improvements

Built Smart Program

BUILT SMART

Lifecycle Cost Assessment

Can yield significant operational savings for building owners

Evergreen Sustainable Development Standard

Information Sharing

Formal and informal training and information-sharing networks are critical

HOUSING DEVELOPMENT *consortium*

WASHINGTON STATE HOUSING FINANCE COMMISSION

Opening doors to a better life

SUSTAINABLE ENERGY PROGRAM

Mid-Compliance

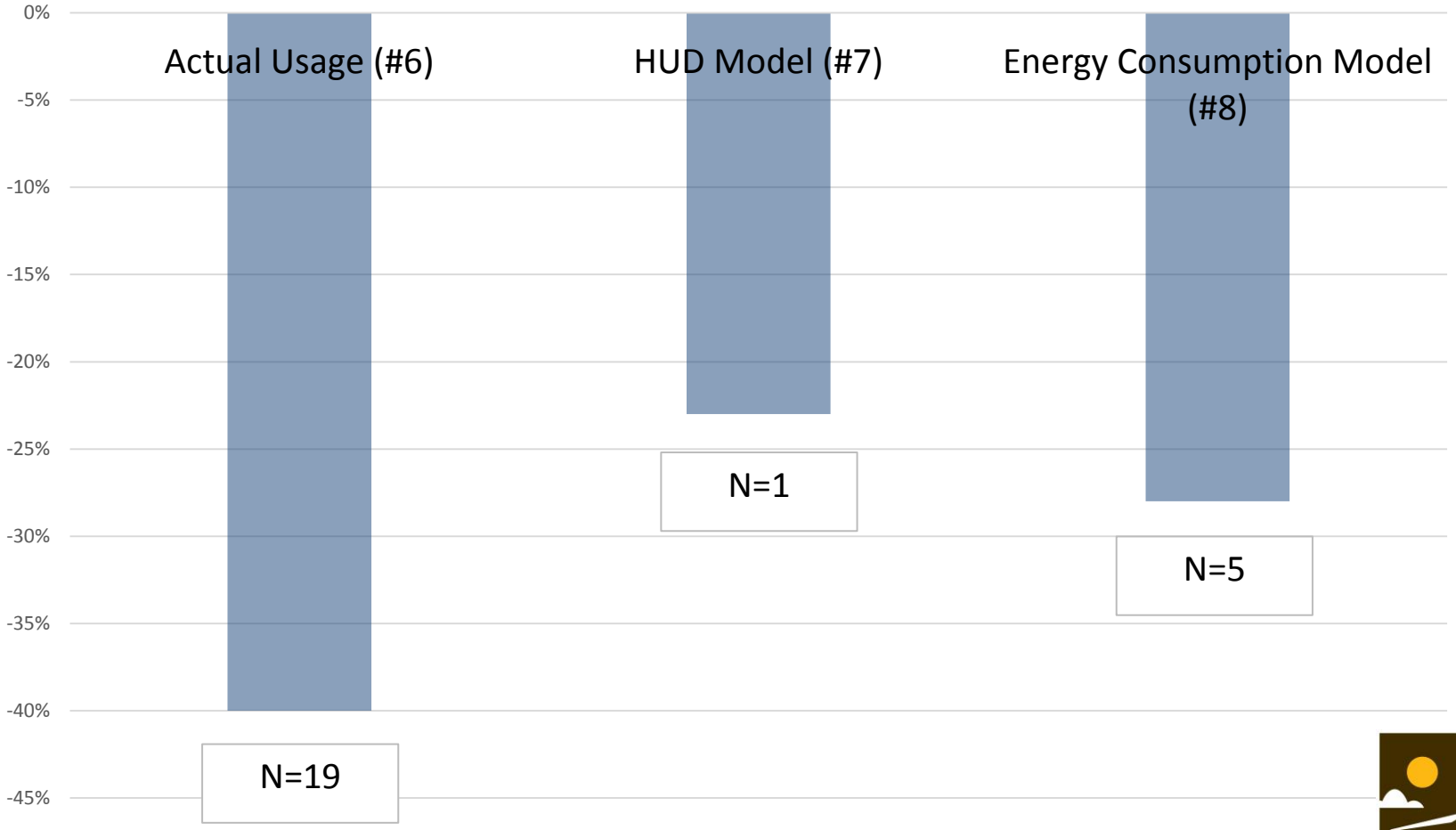
Challenges

- Tax Credit compliance restrictions with investors and other lenders
- Money available in reserves for emergency replacement
- Lack of capacity
- Often need to include energy and water improvements

Opportunities

- Low-interest, nonrecourse loans
- On-bill repayment
- Increasing analysis on loan bundling
- WSHFC partnering with SCL to pilot loan with on-bill for tax credit properties and nonprofits
- **Utility Allowance adjustment**

Washington State Utility Allowance Adjustments *(from PHA) 2009-2014*



WASHINGTON STATE HOUSING FINANCE COMMISSION

Opening doors to a better life

SUSTAINABLE ENERGY PROGRAM

Year 15 and Beyond

- Goals:
  - Preservation of affordable housing
  - Opportunity for significant rehabilitation
- Data and information at HFA on timing of projects being placed in service
- Focus on upgrades that help reduce long-term operations and maintenance costs

Lyon Building, Downtown Emergency Services Center

Challenges by the Numbers

- **~$0.08**/kWh
- **59** electric power providers
- **28** public utility districts in Washington State
- **5** investor-owned utilities
- **1** housing finance agency per state

WASHINGTON STATE
HOUSING FINANCE
COMMISSION

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SUSTAINABLE
ENERGY
PROGRAM

Contact us!

www.wshfc.org

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Senior Sustainable Energy Lead

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(206) 254-5359

WASHINGTON STATE
HOUSING FINANCE
COMMISSION

Opening doors to a better life

SUSTAINABLE
ENERGY
PROGRAM

Green Solutions
for Customers

PSE&G
We make things work for you.

PSE&G Multifamily Housing Program

Rachael P Fredericks

PSE&G Program Manager

Energy Services

Newark NJ

Rachael.fredericks@pseg.com

- Formed in 1903 as a combination of 400 utilities and transportation companies. Became PSE&G (largest subsidiary of PSEG) in 1948
- ¾ of the total state population
- 2,600 square miles- 6 largest cities
- 1.8 million gas customers
- 2.2 million electric

Program Funding and History

- ✓ Three rounds of approved program funding
- ✓ 2009= 19 million- partnership with NJHMFA
  - ✓ Important component- very viable pipeline
- ✓ 2012= 20 million – open to market
  - ✓ Wide variety of opportunity
- ✓ Third Program filed August 2014 approved in 2015= 35 million- address large waiting list – mix of properties
- ✓ A comparable program is not currently available for multi family in New Jersey
- ✓ PSE&G Investment. Rate Recovery Process every July to recover investment ---- PSE&G takes “risk” in investment into market sector

Green Solutions
for Customers

PSE&G
We make things work for you.

Results of our Multi Family Program to Date…

- 39 million total to invest: Almost all is committed (36 million +) Admin spend is about 4 million
- 45-50 project to be completed - Average size project is $800,000 +
- Well over 10K units and 280 buildings (many senior low income)
- On Bill Program Repayment is working- customers are repaying
- Energy savings will be well over 700Kw, over 8 million kWh and 2 million Therms.
- Cost per saved energy currently is .04 cents with $/kWh = 0.58
- Most savings are around 30-40 % **DEEP APPROACH= DEEP SAVINGS**

PSE&G's Service Territory Ideal Target Market But Multi Family Market Faces Steep Market Barriers

- Thin operating margins
- Deferred maintenance with poor building conditions, ongoing deterioration
- Market sector consistently overlooked and underserved by existing energy efficiency programs
- Relatively high energy usage
- Lack of available capital for improvements
- Aging mechanical equipment
- Need to preserve affordability
- Lack of knowledge about energy efficiency

Green Solutions for Customers

PSE&G We make things work for you.

Essential Program Elements

Turn Key approach –
Soup to nuts- audit to closeout

Utility acts like the bank

- ✓ PSE&G provides funds for approved construction scope **UPFRONT** and buy down incentive on whole project.
- ✓ Free audit
- ✓ Master metered and NON master metered buildings accepted
- ✓ Resident **and** common areas **all considered offered as a package**
- ✓ Diversity of building types
- ✓ Agreements and negotiations with building **owner** only - Removes split incentive issue

- ✓ **Incentive is offered to buy down the project with customer paying an average of 30 % of the total project including the soft costs ie: design etc..**

- ✓ **On bill 0 % interest pay back on owner portion**

Multifamily Program Incentive Structure

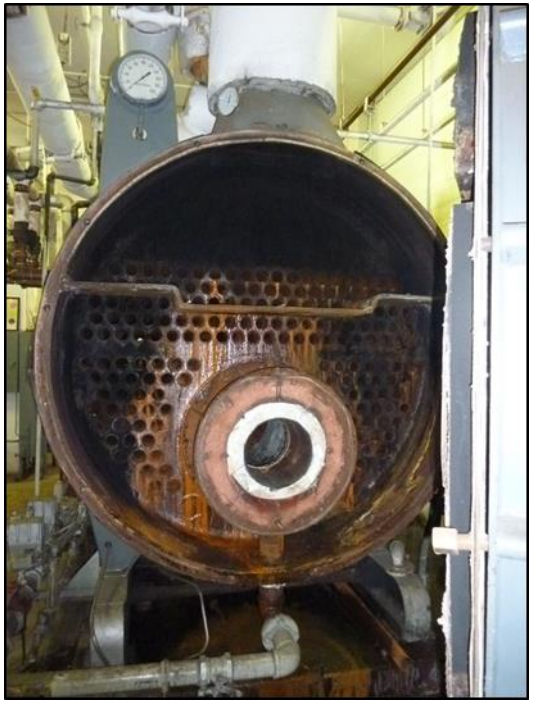
- 15 year simple payback on each measures but offered as package
- Total project incentive (not on a per measure basis) will **buy down** project cost by 6 yrs., but not to less than 3 years.. PSE&G applies cost effective test to whole project
- Typical project the customer is responsible for 30%- 40 % of total project cost

Most attractive element:

Program funds **entire project upfront** and customer finances their portion of project costs i.e.: Customer repays share of costs at 0% interest on customers' utility bill over a period **of 5 years** (10 years if HFMA mortgaged properties).

Common Measures

- Boiler optimization / replacement
- DHW improvements / replacement
- Ventilation improvements
- HVAC
- Insulation & air sealing
- Common area lighting and lighting controls
- Refrigerators
- Water saving devices
  - low flow aerators and shower heads
- Lighting in units



The more the better....

Green Solutions for Customers

PSE&G We make things work for you.

Northgate One Camden							
Item	Measure Description	Measure Cost	Measure Savings ($)	Project Payback (yrs)	PSE&G Buydown ($)	Customer Total Share	Customer Monthly Payment
1	Thermostatic Controls in apartments	$240,791	$24,371				
2	Insulation of steam DHW- pipes and tanks	$81,990	$56,592				
4	DHW heater Improvements	$83,299	$11,667				
5	Basement steam trap repair	$38,685	$1,490				
6	Optimize boiler efficiency	$99,442	$9,678				
7	CFLs in apartments	$1,828	$1,186				
8	1.5 gpm showerhead, aerators	$3,360	$2,422				
9	Energy Star Fridges	$44,729	$4,043				
10	Common area & kitchen T8 fixture, lamp and ballast upgrade. CFL replacement in stairwells. LED EXIT signs.	$183,870	$18,818				
11	LED & T8 fixture, lamp and ballast upgrade for exterior lighting.	$29,347	$3,603				
12	LED parking fixtures with integral photocells. Induction spotlights.	$15,250	$1,468				
14	EC motors for rooftop fan assemblies	$40,125	$13,683				
	Project Total	$862,716	$149,020	5.79	$564,676	$298,040	$4,967

CUSTOMER SUMMARY TABLE	
Customer Payback from Savings	2.0
Measure Savings	$149,020
Annual Loan Repayment	$59,608
Annual Net Cash Flow	$89,412
MONTHLY CASH FLOW	$7,451

Lessons Learned

- ✓ Audit approach flexibility depth needed to realize savings
- ✓ Measure life is critical to cost effectiveness- bundle where we can
- ✓ Customer education and owner involvement important
- ✓ Dialogue with management firms & owners
- ✓ Accurate site energy analysis (baseline energy data) Overcoming site / access issues to move project to completion during and after audit and into construction

- ✓ Close out Process is Critical
- ✓ Accurate documentation
- ✓ Commitment to Cx
- ✓ **Continued M & V**
- ✓ **Benchmarking before and after**

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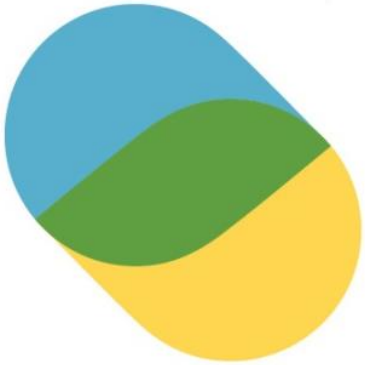


DC
SUSTAINABLE ENERGY
UTILITY

Incorporating Energy Efficiency into Multifamily Retrofits, Renovations & New Construction

Jogchum Poodt
jpoodt@dcseu.com
May 29, 2015

Talking Points

- Overcoming split incentive barriers
- Case study: one project's incorporation of ECMs and how the deal worked out
- The DCSEU's methodology and goals in forming partnerships with government agencies, affordable housing developers, and market place

Overcoming Split Incentive Barriers

- Building owner or manager reluctant to invest in energy efficiency because the renter is the beneficiary of lower utility bills.
- Developer with no long-term ownership interest less likely to invest in efficient technologies.
- Split incentives combine to discourage efficiency investments because investor reaps no direct reward.

Case Study at Channel Square

- Owners/Developers
- Property Management
- Architect
- General Contractor/Subs
- MEP Engineers
- Energy Consultant
- DCSEU

$500k Buyers Credit

Energy Efficiency Upgrades

Value Add:

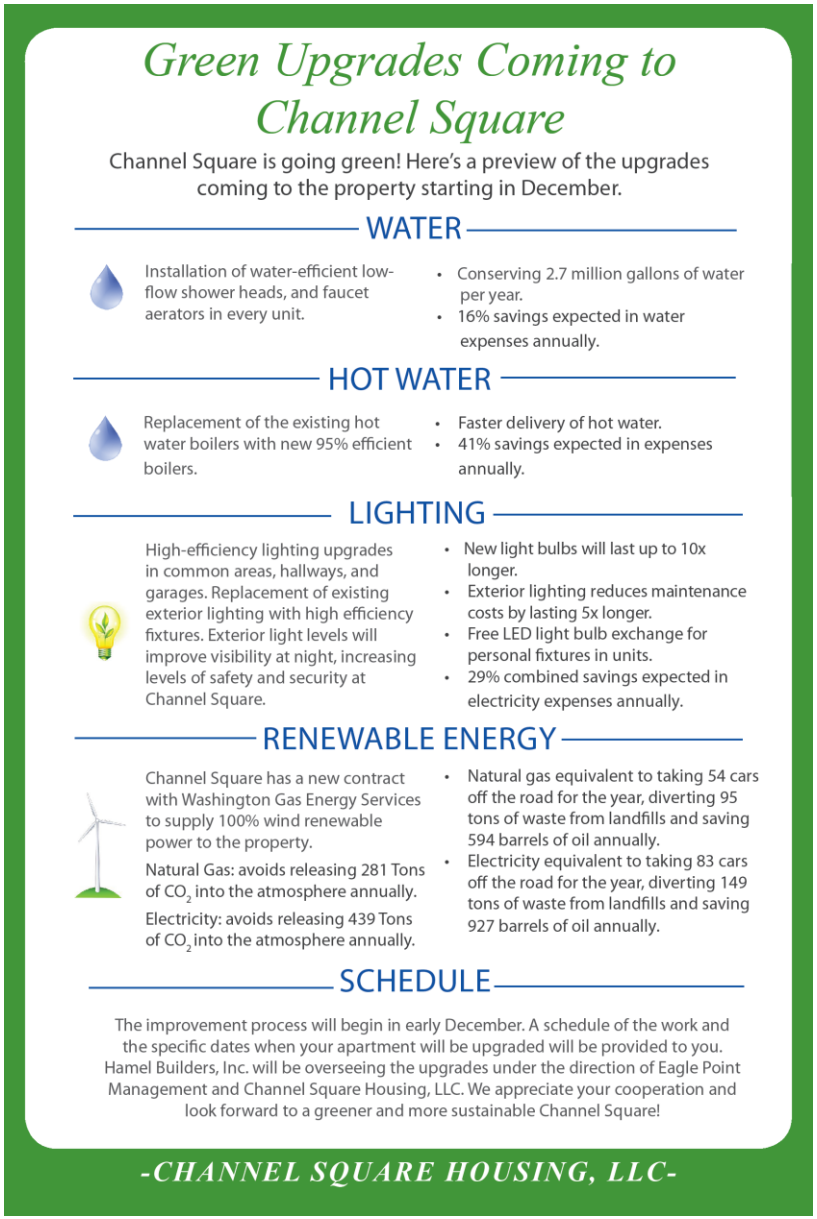
Lower Utility Costs

Increase NOI

Increase Value

Increase Supportable Debt

- Low-flow shower heads and faucet aerators
- Efficient hot water boilers with new VFD pumps
- High-efficiency interior/exterior lighting upgrades
- Washington Gas Energy Services to supply 100% wind renewable power



Green Upgrades Coming to Channel Square

Channel Square is going green! Here's a preview of the upgrades coming to the property starting in December.

WATER

Installation of water-efficient low-flow shower heads, and faucet aerators in every unit.

- Conserving 2.7 million gallons of water per year.
- 16% savings expected in water expenses annually.

HOT WATER

Replacement of the existing hot water boilers with new 95% efficient boilers.

- Faster delivery of hot water.
- 41% savings expected in expenses annually.

LIGHTING

High-efficiency lighting upgrades in common areas, hallways, and garages. Replacement of existing exterior lighting with high efficiency fixtures. Exterior light levels will improve visibility at night, increasing levels of safety and security at Channel Square.

- New light bulbs will last up to 10x longer.
- Exterior lighting reduces maintenance costs by lasting 5x longer.
- Free LED light bulb exchange for personal fixtures in units.
- 29% combined savings expected in electricity expenses annually.

RENEWABLE ENERGY

Channel Square has a new contract with Washington Gas Energy Services to supply 100% wind renewable power to the property.

Natural Gas: avoids releasing 281 Tons of CO_2 into the atmosphere annually.

Electricity: avoids releasing 439 Tons of CO_2 into the atmosphere annually.

- Natural gas equivalent to taking 54 cars off the road for the year, diverting 95 tons of waste from landfills and saving 594 barrels of oil annually.
- Electricity equivalent to taking 83 cars off the road for the year, diverting 149 tons of waste from landfills and saving 927 barrels of oil annually.

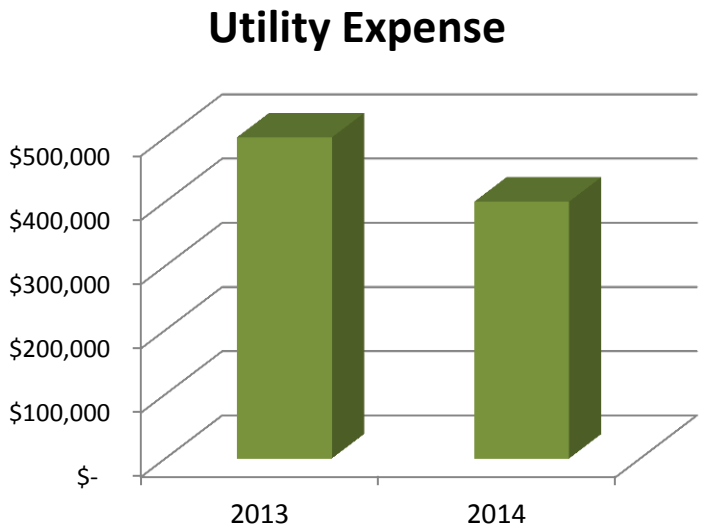
SCHEDULE

The improvement process will begin in early December. A schedule of the work and the specific dates when your apartment will be upgraded will be provided to you. Hamel Builders, Inc. will be overseeing the upgrades under the direction of Eagle Point Management and Channel Square Housing, LLC. We appreciate your cooperation and look forward to a greener and more sustainable Channel Square!

-CHANNEL SQUARE HOUSING, LLC-

Goals

- 20% reduction in utility costs
- Complete work in short timeframe
- Perform work with quickest paybacks
- Minimal inconvenience to residents



Approach

- **Project Scoping Process**
  - Identify potential energy and water savings activities
  - Determine potential energy and water savings
  - Decide preliminary scope
  - Submit to contractor for actual pricing
  - Engage DCSEU and others for gap funding
  - Adjust scope based on actual cost and incentive
  - Update final paybacks

Potential Energy & Water Measures

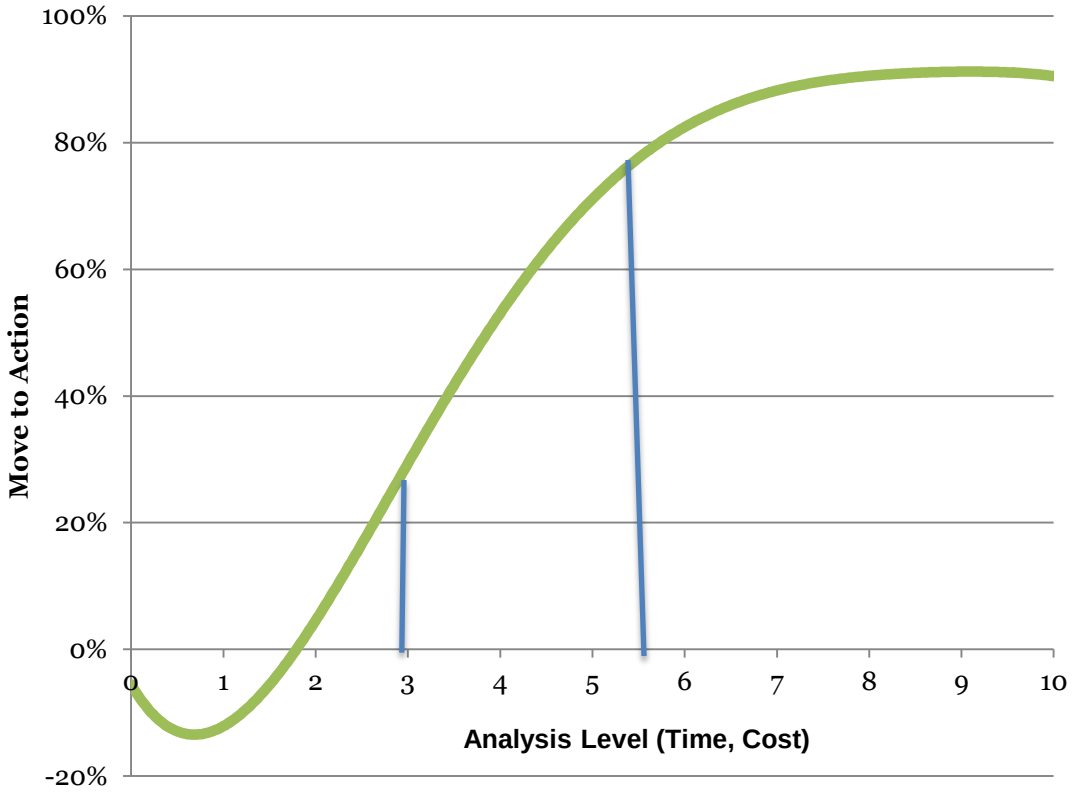
- Window and Sliding Door Replace
- Water Efficiency (Showerheads, aerators, toilets)
- Solar Hot Water and Photovoltaic Systems
- Convector Unit Replacement
- Boiler Upgrade
- Variable Frequency Drives (VFD's) and controls
- Add economizer to Rooftop Air Handler
- Replace dampers
- Insulate Exterior walls and ceilings
- Air Sealing Measures
- Lighting Upgrades
- Heat Recovery on waste lines

By the Numbers

Measure	Total Cost	Utility Rate Savings	% Utility Savings	Simple Pay Back (Years)
Central Plant Upgrades	$512,000	$32,500	6.0%	15.8
VFD Pumps	$69,000	$8,000	1.5%	8.6
Common Area Lighting	$160,000	$19,500	3.6%	8.2
Water Fixtures	$3,000	$19,900	3.7%	0.2
In-Unit Screw-In Light Bulbs	$0	$4,000	0.7%	0.0
TOTAL:	**$744,000**	**$83,900**	**15%**	

Physical Analysis

Value Proposition



Balance Points

- % Confidence
- % Action
- $ Analysis
- $ Time
- Type of Measure
- Shifting the Curve

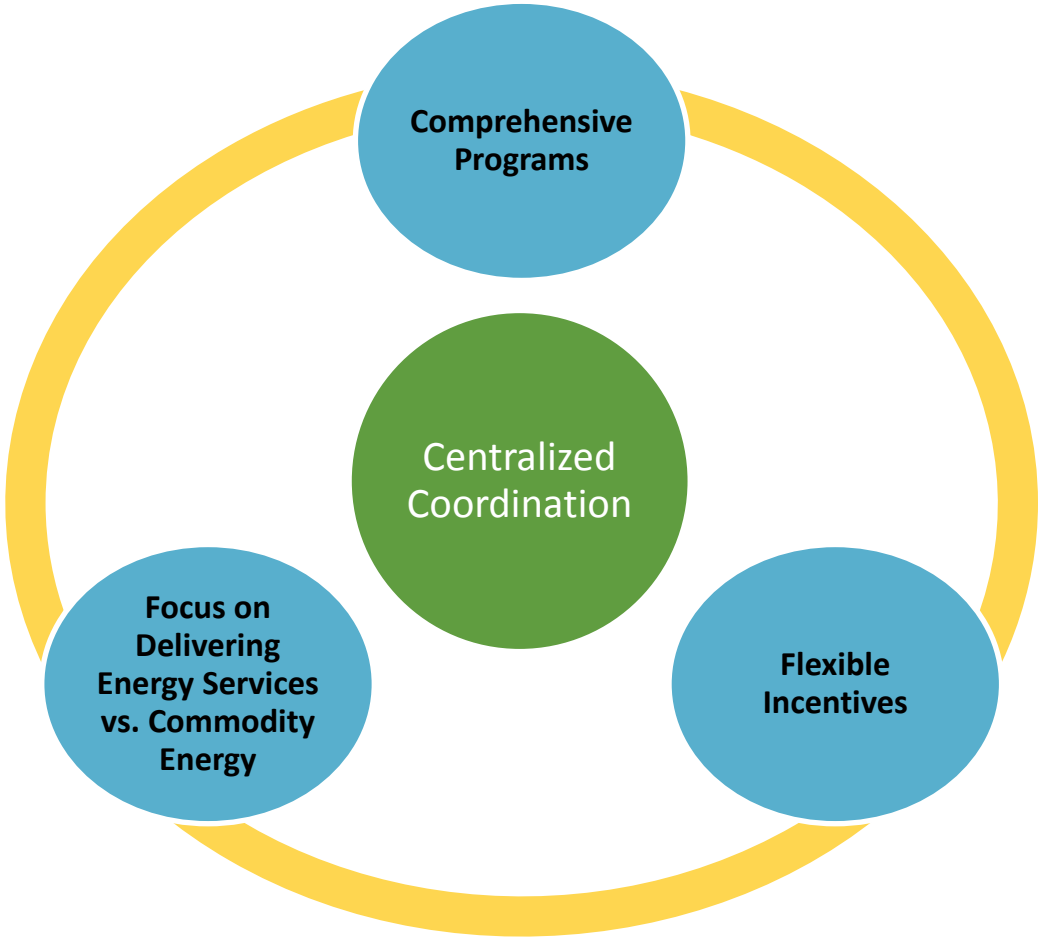
Energy Analysis Responsibility

- Your responsibility as a consumer of Energy Analysis
  - Establish clear expectations early on
  - Be engaged (parties involved)
  - Rough Order Magnitude (relative impact seem reasonable)
  - Benchmarking & utilities (understand where the $ is going)
  - Look at the package of measures (diversity)

DCSEU Mission

- Reduce energy use throughout the District
- Create green jobs for District residents
- Stimulate the local economy
- Improve the efficiency of housing for low-income residents
- Reduce the growth rate of peak electricity demand
- Increase renewable energy generating capacity

DCSEU Model


Comprehensive Programs
Centralized Coordination
Focus on Delivering Energy Services vs. Commodity Energy
Flexible Incentives

What sets DCSEU apart

- Account Management
- Not-for-profit
- Accessibility
- Sense of community
- Local focus

THE SUSTAINABLE ENERGY PARTNERSHIP

The DC Sustainable Energy Utility is a project of the Sustainable Energy Partnership under contract to the District Department of the Environment (DDOE).

District Of Columbia Housing Authority
Office of Capital Programs and
Construction Services Administration, LLC

Energy Capital Improvement Program

Better Buildings Summit

Workshop on Multifamily Efficiency Programs

Adrianne Todman, Executive Director, DCHA

Merrick Malone, Director OCP, DCHA

May 29, 2015

Discussion Points

- Program Background
- Program Analysis
- Economic Analysis
- Moving Forward

Energy Capital Improvement Program (ECIP)

- ECIP is a capital improvement program designed to financially leverage the energy and water savings associated with the replacement of aging equipment and infrastructure.
- Using established HUD subsidy incentives, DCHA funded the program from energy and water savings.

Program Goals

- Provide safe, comfortable, and affordable housing that improves the quality of life for the Residents;
- Reduce DCHA energy consumption;
- Reduce DCHA operations, emergency repair and maintenance costs; and to
- Increase DCHA staff capabilities, system-wide.

DCHA ECIP Profile

- 31 Properties
- 5,444 Units
- ≈ 28,000 Residents affected
- Average $16 million annual utility budget
- Achieve $3.9 million in annual savings (24% reduction)
- Complete $21.1 million in critical infrastructure & equipment replacements

ECIP Scope of Work

Energy Conservation Measures (ECM)

- Boilers
- Chillers
- Hot Water Systems
- Fan Coils
- Water Saving Devices
- Lighting/Appliances

Central Energy Management System

- Automation/New Technologies
- Metering & Communication
- Preventive Maintenance
- Commissioning

Comparing ECIP Financing Options

	Rate	Fees	Flexibility	Term
Commercial Bank Loan	Mid-level	High	Full	Short
Bonds (via DCHFA)	Lowest	High	Limited	Long
Taxable Master Equipment Lease	High	Low	Full	Long
Tax-Exempt Master Equipment Lease	Low	Low	Limited	Long
Energy Savings Performance Contract	Highest	Highest	None	Mid-level

Tax-Exempt Master Equipment Lease

- Acceptable form of Competitively procured Non-HUD financing
- DCHA acquires all equipment with the funds raised to complete the program
- DCHA makes “Rental Payments” pursuant to the terms of the Master Lease Agreement
- Interest rates are slightly higher than Bonds; issuance costs are much lower.
- Assets owned by Financier and sold to DCHA for $1.00 at end of Term
- Use of Proceeds can include reimbursing DCHA for self-funded construction work

Self Performance Economic Analysis

- **ECIP Capital Cost - $21.1 million**
- **Industry/ HUD Program Soft Costs - 76%**
  - **$21.1 X 76% = $16.0 M + $21.1 M = $37.1 M (Total Cost)**
- **CSA/OCP Program Costs - 22%**
  - **$21.1 X 22% = $4.6 M + $21.1 M = $25.7 M (Total Cost)**
- **DCHA Project Savings - $11.4 million**
- **O&M avoided costs - $2.4 million**

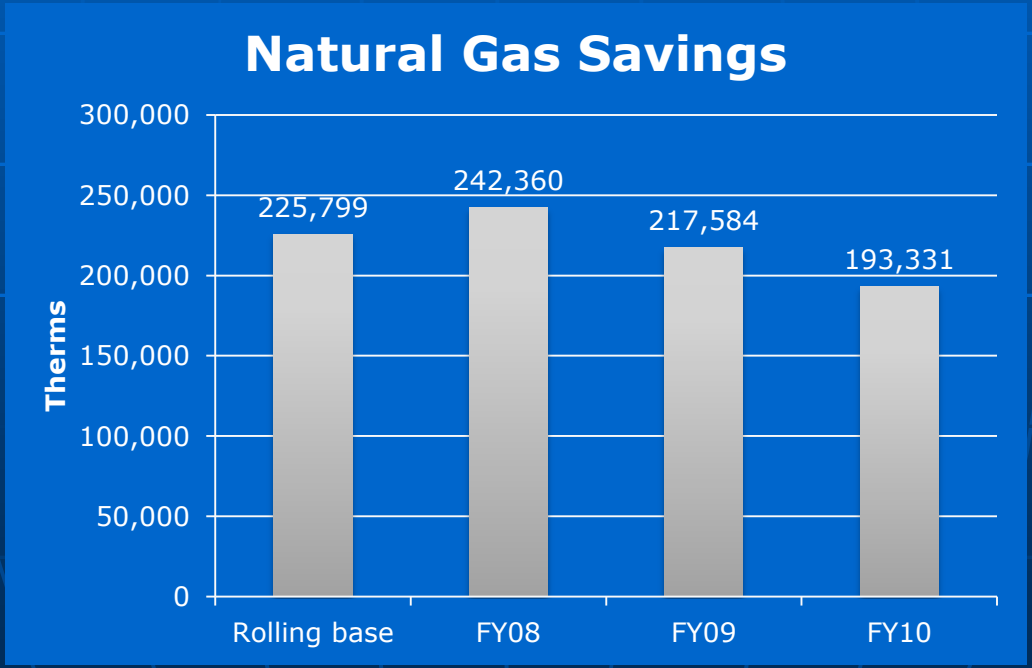
ECIP IN ACTION
Energy Efficiency Upgrades

New Energy Efficient Heating and Cooling Pumps

Demonstrated Savings

Greenleaf Gardens – Natural Gas

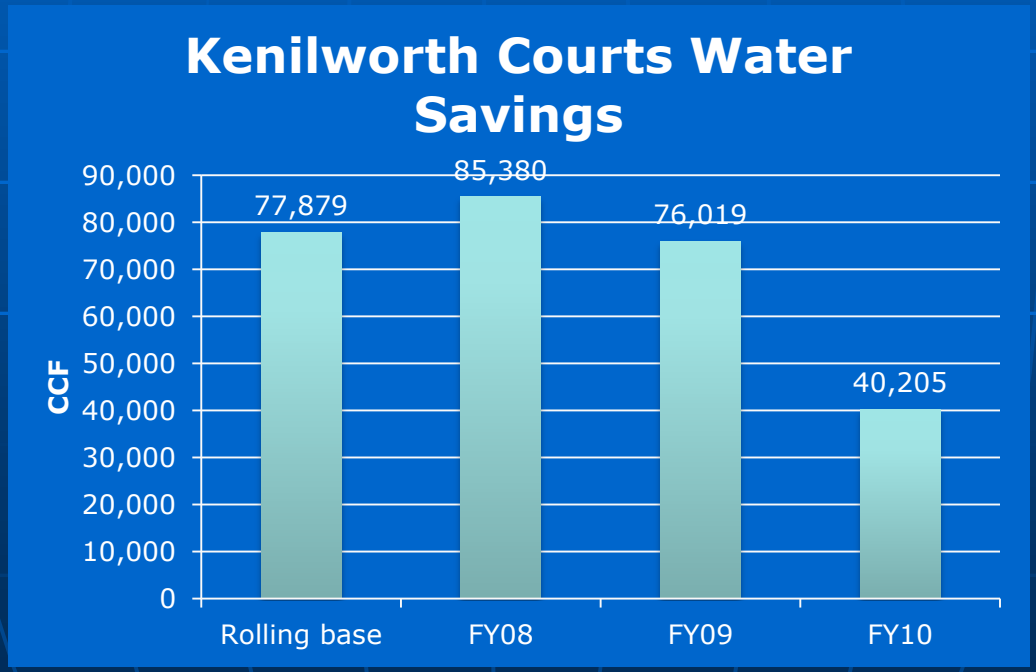
- Completed boiler retrofit
- 14% Reduction



Demonstrated Savings

Kenilworth Courts - Water

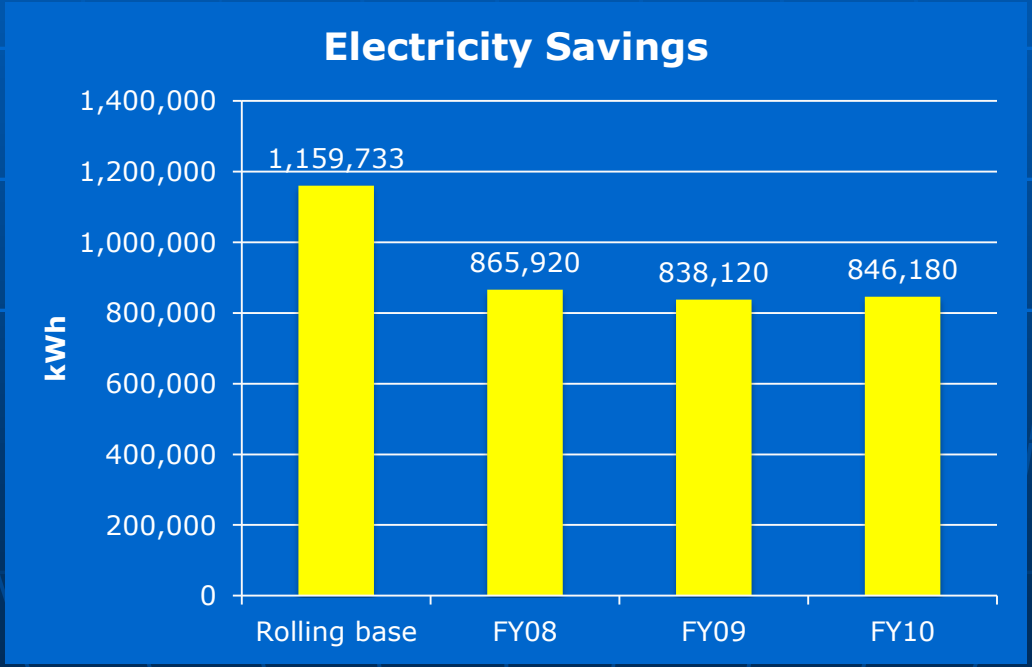
- Completed replacement of water fixtures
- Current reduction of 51%+ in rolling base water consumption data



Demonstrated Savings

Kentucky Courts - Electric

- Completed chiller retrofit
- 27% reduction



Summary

- Modernized Infrastructure
- New Technologies
- $4 million/year in cost efficiencies
- Completed in 36 Months
- Established DCHA's Energy & Environmental Leadership

Program Results / Milestones

Electricity Savings: 1,047,093 Average Annual Kilowatt Hours Saved, equal to 722 Metric Tons, Carbon Dioxide Equivalent

Natural Gas Savings: 635,346 Therms Saved, equal to 3,369 Metric Tons, Carbon Dioxide Equivalent

Total Combined Savings: 4,091 Metric Tons, Carbon Dioxide Equivalent

Equal To:

The reduction of 9,740,476 Passenger Miles Driven Annually

Moving Forward

Innovative Technologies to Improve Energy Efficiency

Moving Forward

Solar Technologies

Moving Forward

Micro Turbines and Fuel Cells for Electricity Production

Moving Forward

High Efficiency Heating and Hot Water Boiler Installations

Thank You!

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