



# Managing Utility Usage: Vital Lessons from Apartment Operators

## Moderator

Scott Wilkerson, Chief Investment Officer, Ginkgo Residential

## Speakers

Mary Nitschke, Director of Ancillary Services, Prometheus

Lori Reeves, Vice President, Strategic Business Services, Forest City Residential Management

Tom Spangler, Energy Manager – Procurement and Sustainability, Greystar Real Estate Partners

# ENERGY STAR Portfolio Manager

- Software Tool is FREE!
- Getting Data into Tool costs money
  - Online manual data entry (wizard)
  - Upload spreadsheets (template)
  - Integrated data feed from
    - Service and Product Provider (SPP)
    - Utility providers



# Score Requirements

- 20+ units
- Whole building data (common area and resident usage)
- 12/13 calendar months of bills
- Property use details
  - Gross Floor Area
  - Total Number of Residential Living Units
    - Breakdown by low/mid/high-rise
  - Total Number of Bedrooms
  - Zip Code

# Score Calculation

- Baseline is 322 props from Fannie Mae survey
- Actual vs. Predicted Source EUI (kBtu/ft<sup>2</sup>)
- Adjustments for:
  - Unit Density (above/below 1.215)
  - Bedrooms per Unit (above/below 1.238)
  - Heating Degree Days (above/below 4,233)
  - Cooling Degree Days (above/below 1,364)
  - Low Rise (Y = lower usage expected)

# Limitations of ENERGY STAR Score

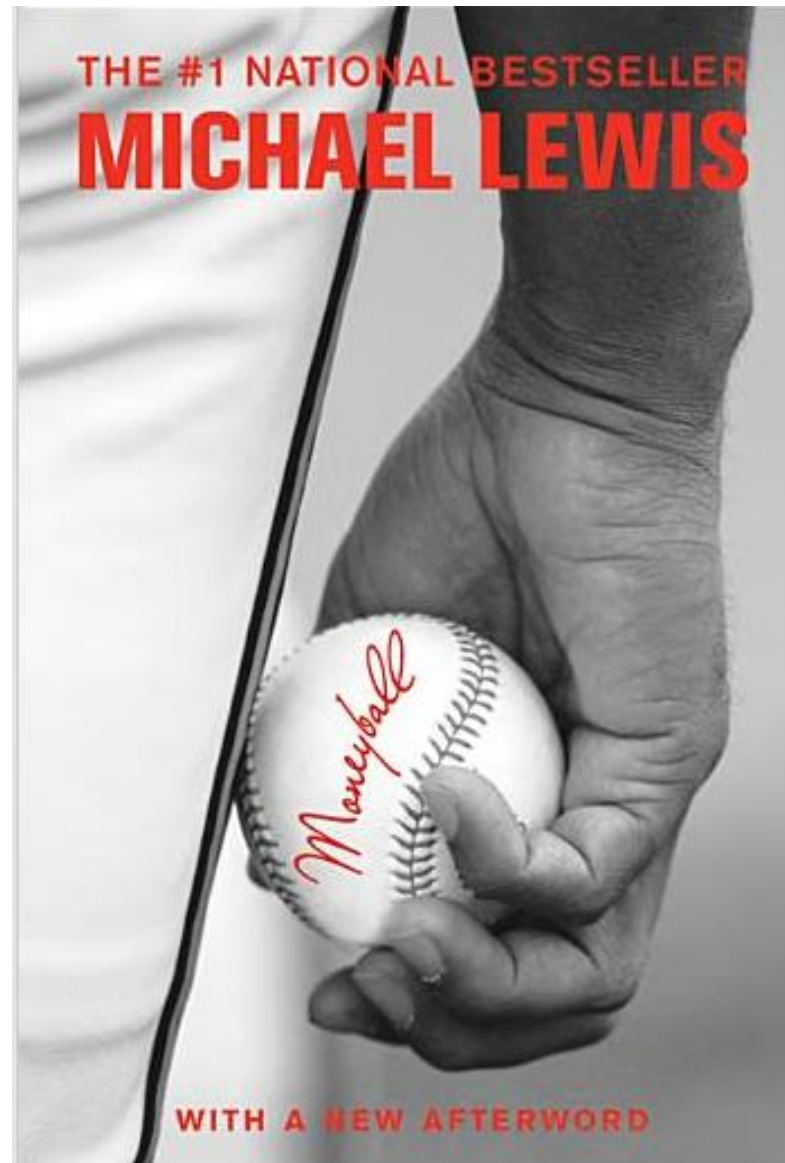
- Need whole building data for score
  - *Easier said than done!*
- Energy costs don't impact score
  - Procurement/rate reductions have no impact
- Water costs and usage don't impact score
  - They have a huge impact on your bottom line



## Why would I want an ENERGY STAR Score?

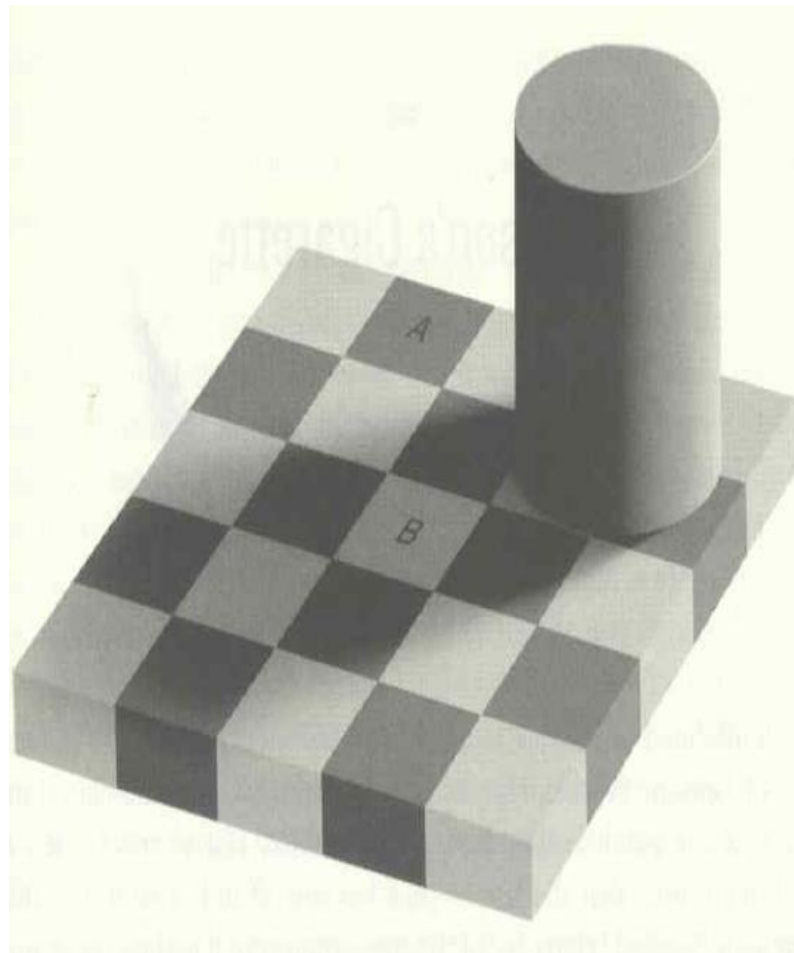
- ES Portfolio Manager may be required by local government
- Marketing symbol of good management
  - May impact rental rates / occupancy *in time*
- May be important to senior management or required by real estate investors (especially European)
- Could be part of corporate culture or “Green” program

# Moneyball: The Art of Winning an Unfair Game

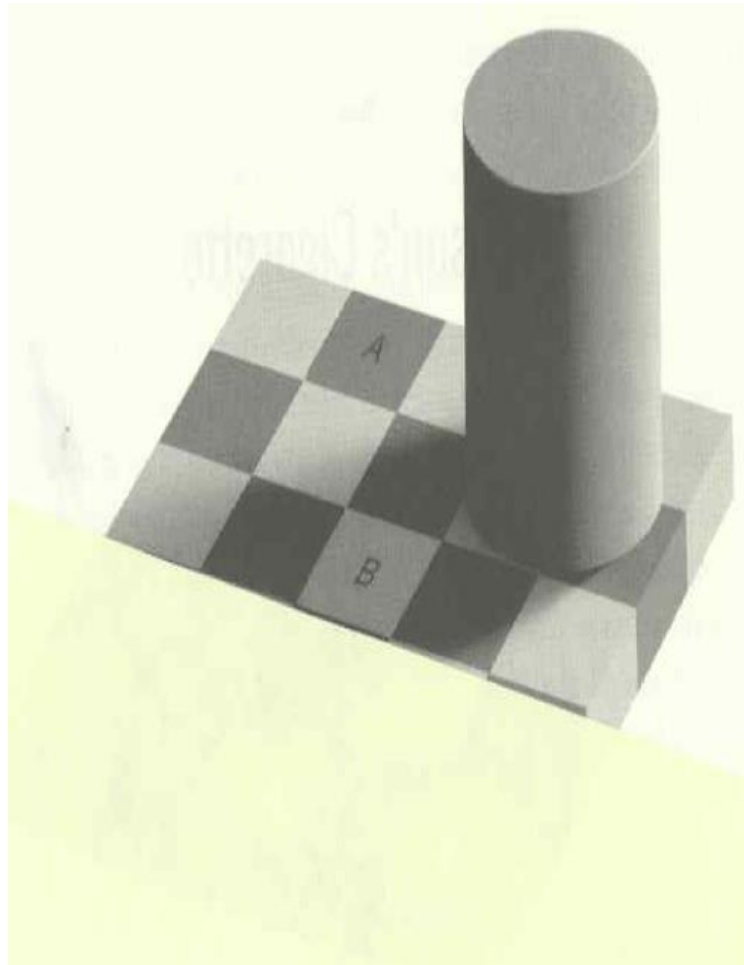


2014 **NMHC**  
**OpTech**  
CONFERENCE & EXPOSITION  
(Multifamily Operations & Technology)

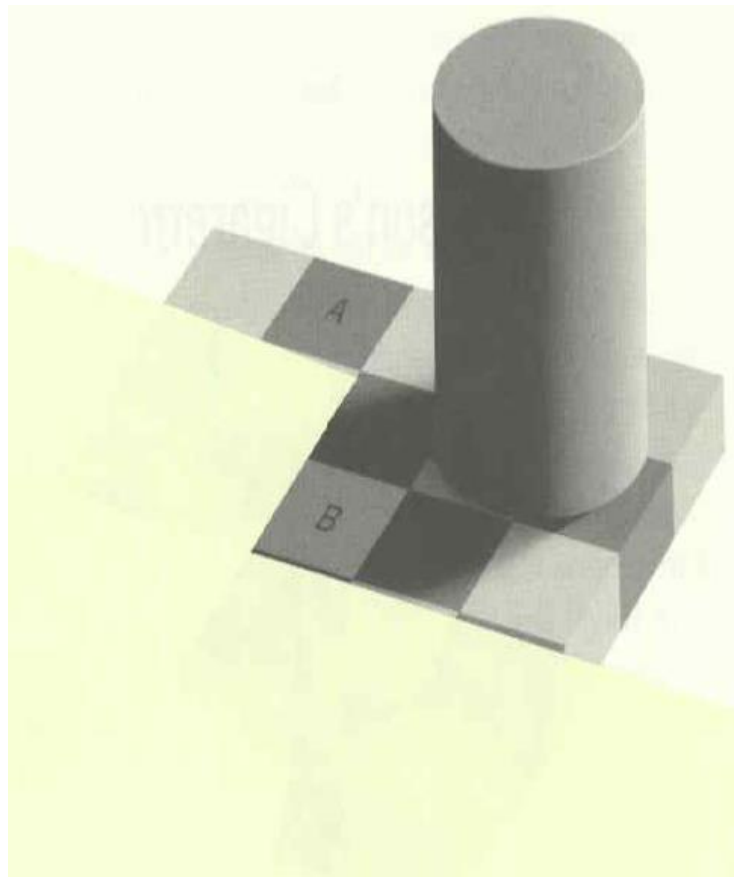
**Which is darker – A or B?**



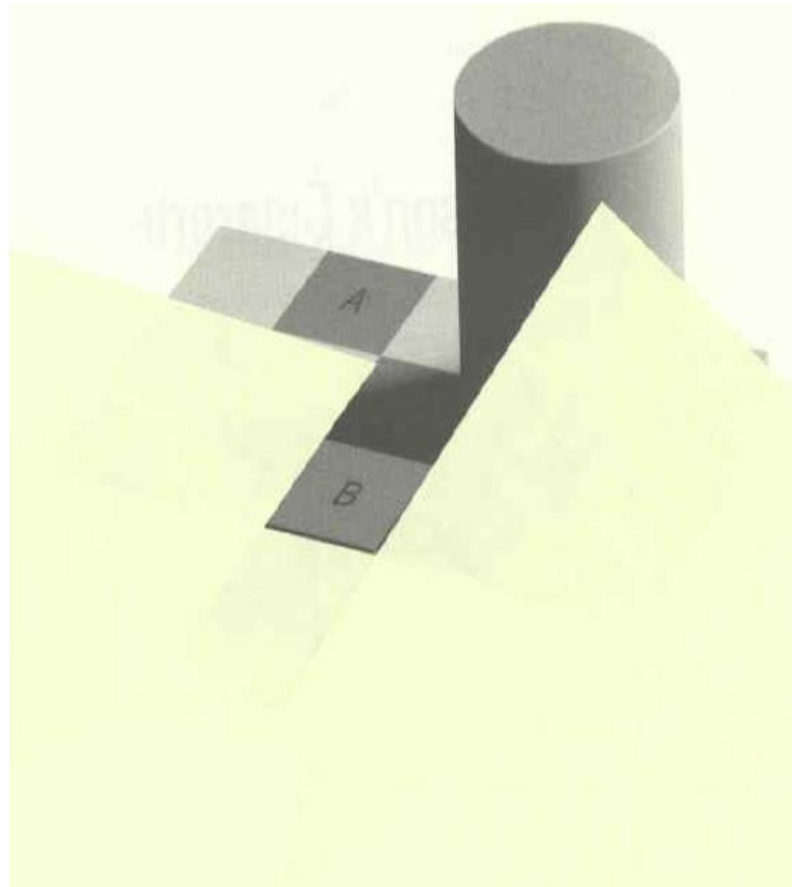
**Which is darker – A or B?**



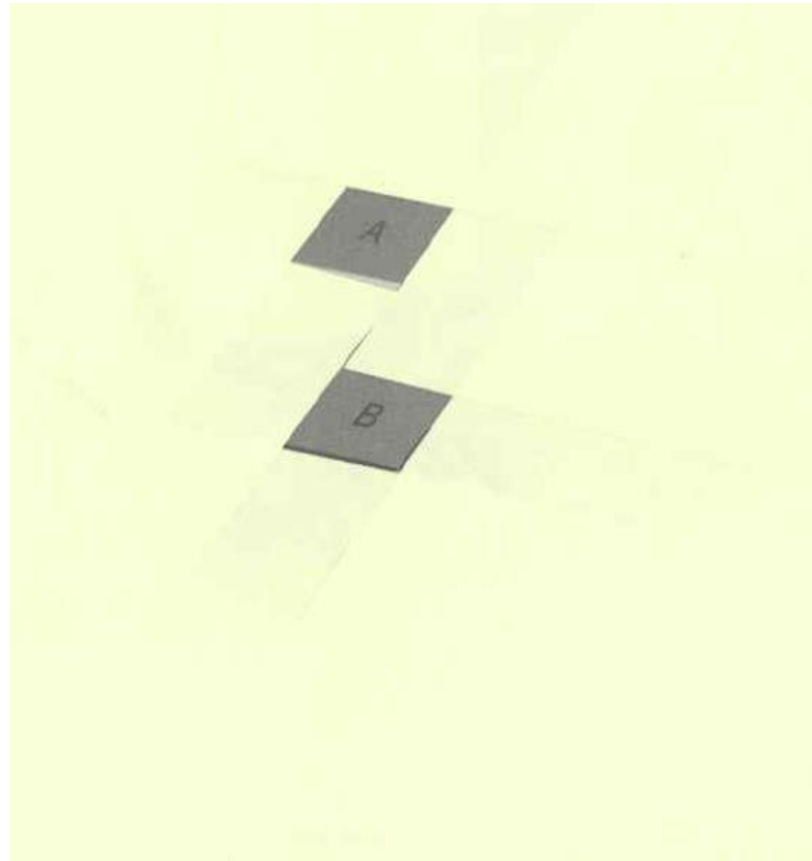
**Which is darker – A or B?**



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**Which is darker – A or B?**





## Comments About Investing in Conservation

- We won't own the property long enough to recoup our investment.
- Our residents will get all the savings so why would we make the investment?
- We only undertake upgrades that have a payback of three years or less

# Payback or Hurdle (Cap) Rate Investing

<u>Payback Period</u>	<u>Hurdle (Cap) Rate</u>
3 Years	33.3%
5 Years	20.0%
10 Years	10.0%
15 years	6.7%
20 Years	5.0%
30 Years	3.3%

Typical Rate for Valuation of Apartment Property  
6.0%?

## Focus on Value Creation

- Invest \$10,000 at 10% (10 year payback)
- Value at 6.0% Cap Rate is \$16,667
- Annual Return on Investment is \$1,000 (10%)
- Net Increase in Value is \$6,667 (67%)
- With leverage, ROI is dramatically higher



## The Value of \$1

Increase in NOI per day, per Unit                      \$1.00

Annual total for a 250 Unit property                      \$91,250

Value at Cap Rate of 6.0%                      \$1,520,000



## Real Life Example

- Problem: Water use was very high at acquisition due to inefficient fixtures, leaks and poor maintenance practices. Water and Sewer included in rent.
- Three Corrective measures proposed:
  - Preventive maintenance
  - Submeter water and sewer
  - Replace 5 gallon flush toilets

# Real Life Example

- Corrective measures:
  - Phase 1. Preventive maintenance to replace toilet flappers, fill and flush valves, leaking valve stems, new shower heads, aerators. Cost of parts was \$7,000 plus in house labor. Immediate savings of \$6,000 per MONTH!

Phase 1 Value at 6.0% cap: **\$1,200,000**

# Real Life Example

- Corrective measures:
  - Phase 2. Submeter all apartments and have residents start paying for their actual water and sewer consumption. Total cost of about \$60,000 to add system and fix related plumbing code issues. Result was further reduction in owner costs or recovery from residents of \$8,500 per month.

Phase 2 Value at 6.0% cap: **\$1,700,000**

# Real Life Example

- Corrective measures:
  - Proposed Phase 3. Replace existing 5 gallon per flush toilets with Watersense 1.28 gallon flush toilets. Estimated cost of \$30,000. Residents expected to save a total of \$37,000 per year at current water and sewer rates. Owner decided not to proceed.
  - Assuming owner would recover 50% of savings, value would have been:

**Phase 3 Value at 6.0% cap: \$300,000**

# HOW FOREST CITY TOOK CONTROL OF THEIR UTILITY BILLS

Forest City Enterprises, Inc., a national real estate owner and developer, desired to enhance its operational efficiencies and sustainability program through energy management software.



FOREST CITY HANDLES OVER **5,000** MONTHLY BILLS FOR



**200**  
buildings



**340**  
cost centers



**10,000**  
utility meters



**3,000**  
submeters

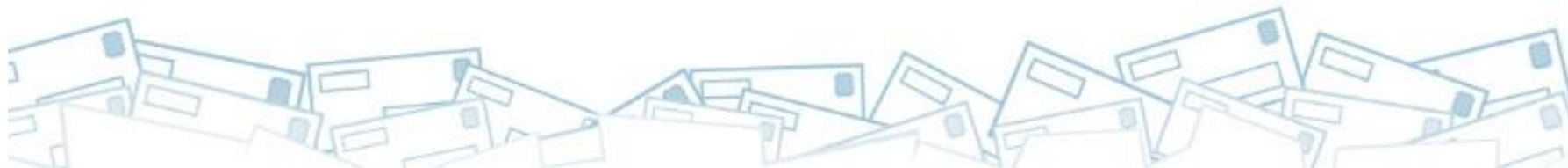
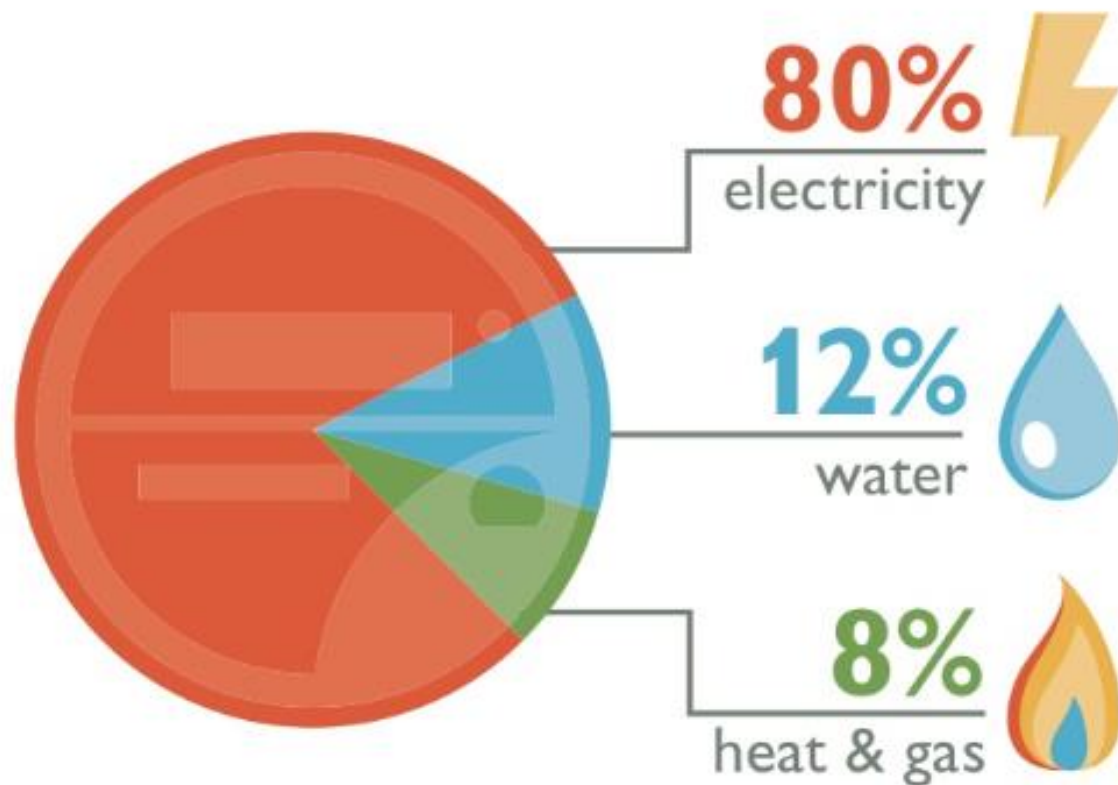
2014 **NMHC**  
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CONFERENCE & EXPOSITION  
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# UTILITY COSTS

REPRESENT  
BETWEEN

**10–20%**

of total  
OPERATING  
EXPENSES





## **EIGHT** SIGNIFICANT BENEFITS OF ENERGYCAP

leading to **full payback** over a three-year period



CENTRALIZED BILL  
PROCESSING AND  
AUDITING



COST AVOIDANCE  
CALCULATION (M&V)



ISSUE TRACKING



SUSTAINABILITY  
REPORTING



ENERGY STAR  
BUILDING RATINGS



RATE SCHEDULE  
MANAGEMENT



LOAD ANALYSIS



DATA REPORTING  
AND SECURITY

Controlling bills  
**IN-HOUSE**

helped increase efficiency  
and enhanced awareness  
of energy costs

**SHARED  
KNOWLEDGE  
PLATFORM**

allows everyone to  
access data and  
quickly resolve issues

FORESTCITY



**ENERGY  
INFORMATION**

can be obtained by  
building managers and  
administrators to make  
profitable decisions

**5% REDUCTION**

of energy consumption  
was achieved by  
using EnergyCAP and  
energy savings initiatives

Watch the video at [www.EnergyCAP.com/forestcity](http://www.EnergyCAP.com/forestcity)

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## Our LEED and ENERGY STAR® projects include:

- 18 LEED certified properties, including three mixed-use Neighborhood Developments
- 13 projects in development actively targeting LEED certification
- Six properties ENERGY STAR® certified or targeting ENERGY STAR®

## Our LEED certified\* projects have:



Saved  
more than

\$3.7M in  
energy costs

Retained



3.7M CUBIC FEET  
of storm water onsite

Avoided  
generation of

1M  
metric tonnes of

Used more than

\$25 MILLION worth of reused /  
recycled materials



CO<sub>2</sub>



Diverted 47,576 metric tonnes of  
construction waste FROM LANDFILLS

Reduced indoor water  
consumption by



40.2M KGALS



Includes 14 LEED certified  
projects for which  
complete data exists.

## FOREST CITY

### Energy Performance

#### GOAL

20% Reduction in Energy Intensity by 2020 from a 2010 Baseline

#### CHALLENGE COMMITMENT

14 Million Square Feet

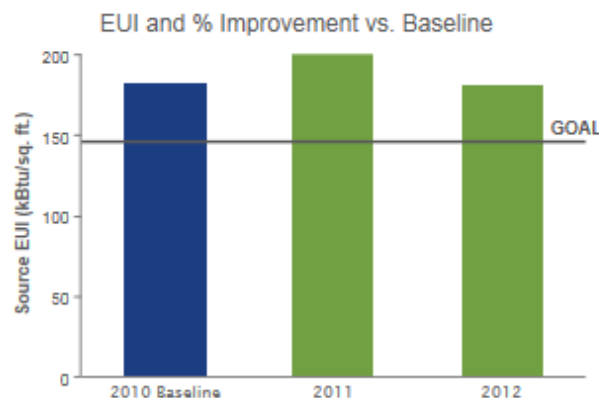
#### PROGRESS TO DATE

Cumulative (vs. Baseline)	<b>1%</b>
Annual (2012)	<b>10%</b>

# FORESTCITY

## PORTFOLIO ENERGY PERFORMANCE

Better Buildings Challenge Partners strive to decrease portfolio-wide source energy use intensity (EUI) and to increase the percent improvement compared to a set baseline. Forest City's portfolio consists of more than 70 buildings and 14 million square feet. Since 2010, Forest City has improved energy performance by 1 percent. The program jump started in June of 2011 and many improvements were budgeted for implementation in 2012. FCE continues to implement better tracking methods in order to distinguish changes in energy use as a result of efficiency improvements or changes in occupancy and heightened tenant services.



## EAP – Create a Corporate Energy Management Function

**Action Plan Lead:** A C-Level Officer

**Implementation Timing:**

**Next 90 days**

**Stakeholders:** Business Centers & Operations

**Organizational Driver:**

**Structure & Talent**

Overview			
Description	Design and implement an energy management organization focused on strategically managing energy through energy consumption and spend reduction, allocation of energy-related capital, and oversight of energy measurement and verification. Lay out specific roles and responsibilities at different levels of the organization (i.e., corporate, BU, property), and define and enforce decision-making hierarchy.		
Where to Apply	Enterprise	Key Steps	<ul style="list-style-type: none"><li>Develop detailed org structure aligned with responsibilities matrix</li><li>Create job descriptions for Energy Management function</li><li>Communicate changes to key executive leadership and establish clear and responsibilities</li><li>Reallocate staff and leadership as necessary</li></ul>
Lead Function	C-Level Officer		
Supporting Functions	<ul style="list-style-type: none"><li>Energy</li><li>Engineering &amp; Design</li><li>All Business Units</li></ul>		
Benefits		Costs & Complexity	
<b>Quantitative:</b> <ul style="list-style-type: none"><li>Determine Budget according to scope and size of company &amp; mission</li></ul>		<b>Costs: MEDIUM</b> <ul style="list-style-type: none"><li>Retraining and repurposing of employees that currently perform certain functions within SBUs: determine if additional FTEs are needed</li></ul>	
<b>Qualitative:</b> <ul style="list-style-type: none"><li>Supports virtually all other Action Plans</li><li>Oversight supports consistency and coordination across the organization; a single mission, vision, objective, and strategy as it relates to energy management allows Company to capitalize on energy management investments</li><li>Ensures that initiatives are evaluated against standard investment thresholds across the organization and only the prioritized initiatives are funded and implemented</li></ul>		<b>Complexity: HIGH</b> <ul style="list-style-type: none"><li>Energy is currently managed at the business unit level with minimal overall coordination ; moving to a consolidated model for certain activities can be perceived as a major change culturally</li><li>Roles and responsibilities may change, requiring significant change management and training</li></ul>	
Implementation & Change Considerations			
<ul style="list-style-type: none"><li>Reporting lines and structure will be a significant change, some dotted line reporting may be required.</li><li>Energy management organization must be given adequate authority (potentially through standing of its Executive Sponsor) without adding complexity or bureaucracy, with over sight provided by other company leaders to ensure that their mission is aligned with the overall company plan.</li><li>Based on approval requirements, funding and implementation of energy projects could be perceived as taking additional time, but could result in better allocation of time and capital</li></ul>			

Property Name	Property Type	Recommendation Type	System Affected	Recom	Recommendations	Project Cost	Annual Savings
<a href="#">Hummingbird Pointe</a>	CONV	Energy Savings	Computers	Yes	Hibernate business center computers when not in use	\$0	\$40
<a href="#">Hummingbird Pointe</a>	CONV	Energy Savings	DHW	Yes	Insulate piping and storage tanks	\$1,500	\$934
<a href="#">Hummingbird Pointe</a>	CONV	Energy Savings	Vending	Yes	Utilize vending misers	\$1,018	\$584
<a href="#">Hummingbird Pointe</a>	CONV	Life Cycle Replacement	Windows	Yes	Replace Windows	\$250,000	\$21,530
<a href="#">Hummingbird Pointe</a>	CONV	Life Cycle Replacement	Sliding Doors	Yes	Replace Doors	\$140,000	\$9,928
<a href="#">Hummingbird Pointe</a>	CONV	Life Cycle Replacement	Common Area HVAC	Yes	Replace MUAU	\$36,000	\$2,248
<a href="#">Midtown Towers</a>	CONV	Energy Savings	HHW	Yes	Insulate and label piping	\$1,500	\$949
<a href="#">Midtown Towers</a>	CONV	Energy Savings	Vending	Yes	Utilize vending misers	\$1,527	\$875
<a href="#">North Church Towers</a>	CONV	Energy Savings	HHW	Yes	Insulate HHW pipes	\$1,500	\$843
<a href="#">North Church Towers</a>	CONV	Energy Savings	Apartment HVAC	Yes	Utilize indoor AC covers in the heating season	\$3,990	\$1,778
<a href="#">North Church Towers</a>	CONV	Life Cycle Replacement	Windows	Yes	Replace Windows	\$423,000	\$22,275
<a href="#">North Church Towers</a>	CONV	Life Cycle Replacement	Sliding Doors	Yes	Replace Doors	\$120,000	\$4,289
<a href="#">Independence Place I</a>	CONV	Energy Savings	Vending	Yes	Utilize vending misers	\$509	\$296
<a href="#">Independence Place I</a>	CONV	Energy Savings	DHW	Yes	Insulate piping and storage tank	\$1,000	\$355
<a href="#">Independence Place I</a>	CONV	Life Cycle Replacement	Sliding Doors	Yes	Replace Doors	\$220,000	\$15,830
<a href="#">Independence Place I</a>	CONV	Life Cycle Replacement	Windows	Yes	Replace Windows	\$110,000	\$7,647
<a href="#">Independence Place II</a>	CONV	Energy Savings	Vending	Yes	Utilize vending misers	\$509	\$300
<a href="#">Independence Place II</a>	CONV	Energy Savings	DHW	Yes	Insulate Piping and Storage Tank	\$1,000	\$451
<a href="#">Lenox Park</a>	CONV	Energy Savings	Apartment HVAC	Yes	Install programmable thermostats	\$81,200	\$29,435
<a href="#">Lenox Park</a>	CONV	Energy Savings	Building Automation	Yes	Placeholder for BAS Upgrade	\$30,000	\$10,000
<a href="#">Lenox Park</a>	CONV	Life Cycle Replacement	HHW	Yes	Replace Boilers	\$350,000	\$11,882
<a href="#">Lenox Club</a>	CONV	Energy Savings	Lighting	Yes	Garage Lighting Convert to Super T8	\$6,625	\$2,804
<a href="#">Lenox Club</a>	CONV	Energy Savings	Building Automation	Yes	Placeholder for BAS Upgrade	\$30,000	\$10,000
					Programmable TSTATS - FCE Pays		

Energy Recommendations

BTS Recommendations

Include	Recommendations	Project Cost	Annual Savings	Simple Payback	Electricity Savings (kWh)	Gas Savings (ccf)	Water Savings (ccf)	Project Tra
Yes	Install programmable thermostats	\$81,200	\$29,435	2.76	107,620	13,539	0	0
Yes	Placeholder for BAS Upgrade	\$30,000	\$10,000	3.00	79,178	0	0	0
Yes	Replace Boilers	\$350,000	\$11,882	29.46	0	10,155	0	15-M09_CO
No	Utilize Pool and Spa Covers	\$0	\$0	0.00	0	0	0	0
No	No Recommendation	\$0	\$0	0.00	0	0	0	0
No	No Recommendation	\$0	\$0	0.00	0	0	0	0
No	No Recommendation	\$0	\$0	0.00	0	0	0	0
No	No Recommendation	\$0	\$0	0.00	0	0	0	0
No	No Recommendation	\$0	\$0	0.00	0	0	0	0
No	No Recommendation	\$0	\$0	0.00	0	0	0	0
No	No Recommendation	\$0	\$0	0.00	0	0	0	0
No	No Recommendation	\$0	\$0	0.00	0	0	0	0
No	No Recommendation	\$0	\$0	0.00	0	0	0	0
No	No Recommendation	\$0	\$0	0.00	0	0	0	0
Total		\$461,200	\$51,317	9.0	186,798	23,694	0	
Percent Savings			8%		5%	26%	0%	



SBU: **Res-CON**Site: **All**

Utility

**All Energy**

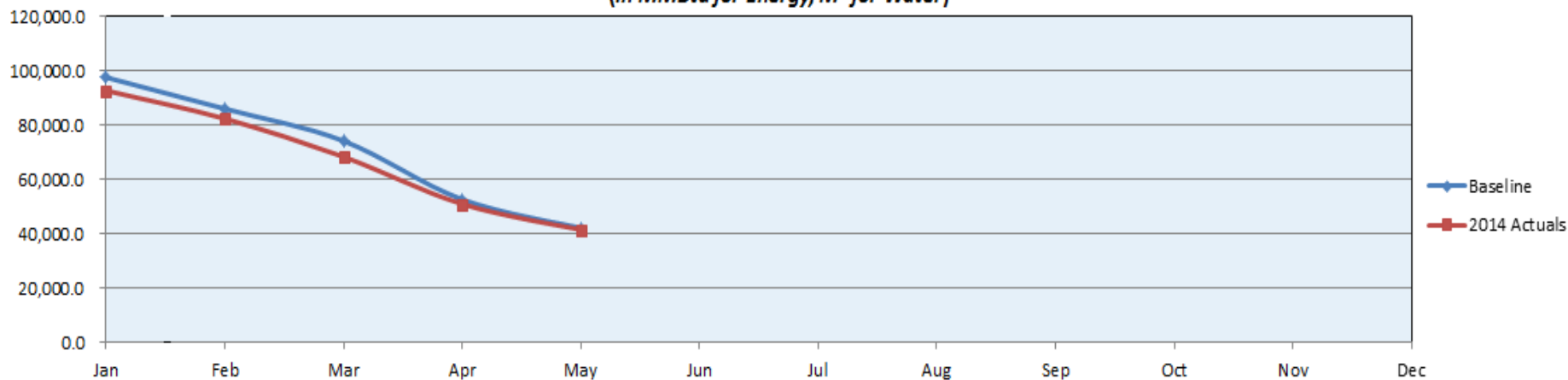
Site Code:

Location:

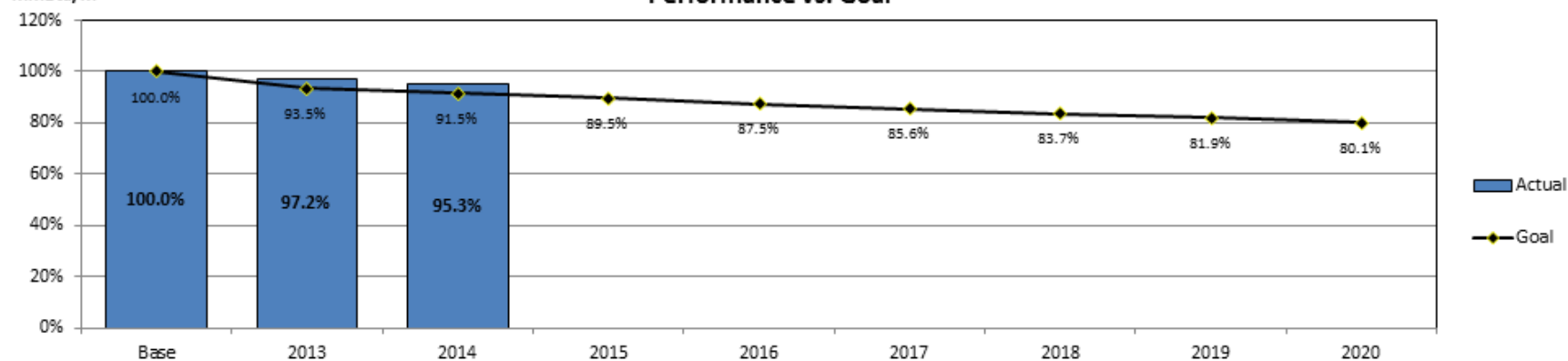
2010	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2014 YTD
Baseline	97,371	85,851	74,006	52,469	41,956								351,654
2014 Actuals	92,522	82,186	68,157	50,796	41,331								334,991

MMBtu/M<sup>3</sup>

### Performance Since Baseline (in MMBtu for Energy, M<sup>3</sup> for Water)

MMBtu/M<sup>3</sup>

### Performance vs. Goal



Energy Summary	2013	2014	2015	2016	2017	2018	2019	2020
Baseline Total	659,526	351,654						

# Benchmarking for Dummies

## How To Benchmark w/ Financials Step One—Run P&L and Sort by Likeness

Property	City	State	Total Units	Total Utility Cost (A=B+C+D)	Total Utility Cost w/o VR & VM (B=A-C-D)	Total Vacant Cost Recovery (C)	Total Vacant Management Cost (D)	Total Electric Cost	Monthly Cost Per Apt.	Property Effective Rate / kWh	Total Water Cost	Monthly Cost Per Apt.	Property Effective Rate / Gal
Happy Site 1	Gig Harbor	WA	279	\$170,116	\$159,198	\$2,943	\$7,975	\$26,802	\$0.18	\$0.13	\$79,091	\$0.81	\$0.04
Happy Site 2	Beaverton	OR	350	\$277,721	\$269,695	\$572	\$7,454	\$33,193	\$0.24	\$0.16	\$63,550	\$1.16	\$0.00
Happiest Site Ever	Portland	OR	185	\$165,103	\$154,085	\$6,437	\$4,581	\$49,291	\$3.23	\$0.17	\$15,874	\$5.75	\$0.00
<b>Northwest Same Store Total</b>			<b>992</b>	<b>\$788,532</b>	<b>\$751,379</b>	<b>\$12,136</b>	<b>\$25,017</b>	<b>\$170,414</b>	<b>\$2.93</b>	<b>\$0.15</b>	<b>\$175,846</b>	<b>\$4.96</b>	<b>\$0.01</b>
Sunny So Cal Site	Thousand Oaks	CA	248	\$181,627	\$176,604	\$1,142	\$3,881	\$22,013	\$0.47	\$0.13	\$67,158	\$10.17	\$0.00
Great Skiing Site	South Jordan	UT	300	\$153,118	\$141,451	\$2,372	\$9,295	\$40,926	\$0.61	\$0.11	\$28,795	\$2.25	\$0.00
<b>Other Same Store Total</b>			<b>548</b>	<b>\$334,745</b>	<b>\$318,055</b>	<b>\$3,514</b>	<b>\$13,176</b>	<b>\$62,939</b>	<b>\$0.54</b>	<b>\$0.12</b>	<b>\$95,953</b>	<b>\$6.21</b>	<b>\$0.00</b>
Sacramento Homes	Sacramento	CA	384	\$208,135	\$198,431	\$2,397	\$7,306	\$39,916	\$0.10	\$0.23	\$95,821	\$13.93	\$0.94
El Rancho Homes	Rancho Cordov	CA	304	\$145,108	\$137,628	\$1,195	\$6,285	\$43,009	\$0.39	\$0.17	\$29,574	\$9.06	\$0.00
<b>Sacramento Same Store Total</b>			<b>688</b>	<b>\$353,243</b>	<b>\$336,059</b>	<b>\$3,592</b>	<b>\$13,592</b>	<b>\$82,925</b>	<b>\$0.25</b>	<b>\$0.20</b>	<b>\$125,394</b>	<b>\$11.50</b>	<b>\$0.47</b>
<b>Same Store Total</b>			<b>6,035</b>	<b>\$5,303,572</b>	<b>\$5,168,360</b>	<b>\$39,390</b>	<b>\$95,822</b>	<b>\$1,051,053</b>	<b>\$2.15</b>	<b>\$0.17</b>	<b>\$154,968</b>	<b>\$8.47</b>	<b>\$0.05</b>
Fancy Pants Site	Santa Clara	CA	430	\$413,917	\$396,154	\$2,121	\$15,641	\$143,913	\$1.82	\$0.15	\$72,300	\$2.85	\$0.00
Icon at Doyle	Emeryville	CA	27	\$54,989	\$54,800	\$48	\$142	\$12,242	\$28.08	\$0.16	\$19,908	\$61.45	\$0.01
Super Cool Site	Emeryville	CA	54	\$125,012	\$125,012			\$59,669	\$61.25	\$0.13	\$11,783	\$18.19	\$0.00
Mega Awesome site	Santa Clara	CA	1000	\$863,110	\$846,936	\$919	\$15,255	\$181,056	\$0.25	\$0.23	\$169,139	\$7.84	\$0.00
Home for Everyone	Santa Clara	CA	114	\$80,267	\$78,688	\$287	\$1,292	\$4,919	\$0.47	\$0.34	\$20,266	\$4.57	\$0.00
Northern Mega Site	Mountain View	CA	188	\$182,098	\$180,256	\$940	\$902	\$20,364	\$0.80	\$0.14	\$35,493	\$18.88	\$0.00
Silly Site	Palo Alto	CA	244	\$218,838	\$212,433	\$1,816	\$4,589	\$14,736	\$0.24	\$0.11	\$62,630	\$2.05	\$0.01
Super Silly Site	Palo Alto	CA	92	\$82,889	\$82,889			\$6,239	\$0.99	\$0.13	\$35,471	\$15.49	\$0.00
Lots of Landscaping	Walnut Creek	CA	164	\$125,087	\$122,035	\$214	\$2,838	\$22,732	\$1.30	\$0.15	\$44,505	\$15.08	\$0.00
Podium Style fancy	Walnut Creek	CA	47	\$4,039	\$3,939		\$100	\$139	\$0.81	\$0.13	\$2,233	\$11.88	\$0.00
Warm and cozy site	Quinton	CA	100	\$200,000	\$200,000	\$2,000	\$2,000	\$10,000	\$0.10	\$0.10	\$20,000	\$20.00	\$0.00

# How To Benchmark w/ Financials

## Step Two—Take Annual Expense and divide by # Units

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Super Silly Site	Palo Alto	CA	92	\$35,471	\$15.49	\$0.00
Lots of Landscaping	Walnut Creek	CA	164	\$44,505	\$15.08	\$0.00
Podium Style fancy	Walnut Creek	CA	47	\$2,233	\$11.88	\$0.00
Wow yet another site	Cupertino	CA	429	\$75,438	\$13.22	\$0.01

# How To Benchmark w/ Financials

## Step Three-- Pick your Pig and dig in!

Property	City	State	Total Units	Total Water Cost	Monthly Cost Per Apt.	Property Effective Rate / Gal
Happy Site 1	Gig Harbor	WA	279	\$79,091	\$0.81	\$0.04
Happy Site 2	Beaverton	OR	350	\$63,550	\$1.16	\$0.00
Happiest Site Ever	Portland	OR	185	\$15,874	\$5.75	\$0.00
<b>Northwest Same Store Total</b>			<b>992</b>	<b>\$175,846</b>	<b>\$4.96</b>	<b>\$0.01</b>
Sunny So Cal Site	Thousand Oaks	CA	248	\$67,158	\$10.17	\$0.00
Great Skiing Site	South Jordan	UT	300	\$28,795	\$2.25	\$0.00
<b>Other Same Store Total</b>			<b>548</b>	<b>\$95,953</b>	<b>\$6.21</b>	<b>\$0.00</b>
Sacramento Homes	Sacramento	CA	384	\$95,821	\$13.93	\$0.94
El Rancho Homes	Rancho Cordov	CA	304	\$29,574	\$9.06	\$0.00
<b>Sacramento Same Store Total</b>			<b>688</b>	<b>\$125,394</b>	<b>\$11.50</b>	<b>\$0.47</b>
<b>Same Store Total</b>			<b>6,035</b>	<b>\$154,968</b>	<b>\$8.47</b>	<b>\$0.05</b>
Fancy Pants Site	Santa Clara	CA	430	\$72,300	\$2.85	\$0.00
<b>Icon at Doyle</b>	<b>Emeryville</b>	<b>CA</b>	<b>27</b>	<b>\$19,908</b>	<b>\$61.45</b>	<b>\$0.01</b>
Super Cool Site	Emeryville	CA	54	\$11,783	\$18.19	\$0.00
Mega Awesome site	Santa Clara	CA	1000	\$169,139	\$7.84	\$0.00
Home for Everyone	Santa Clara	CA	114	\$20,266	\$4.57	\$0.00
Northern Mega Site	Mountain View	CA	188	\$35,493	\$18.88	\$0.00
Silly Site	Palo Alto	CA	244	\$62,630	\$2.05	\$0.01
Super Silly Site	Palo Alto	CA	92	\$35,471	\$15.49	\$0.00
Lots of Landscaping	Walnut Creek	CA	164	\$44,505	\$15.08	\$0.00
Podium Style fancy	Walnut Creek	CA	47	\$2,233	\$11.88	\$0.00
Wow, yet another site	Cupertino	CA	429	\$75,438	\$13.22	\$0.01

# What I found—Meet Icon at Doyle

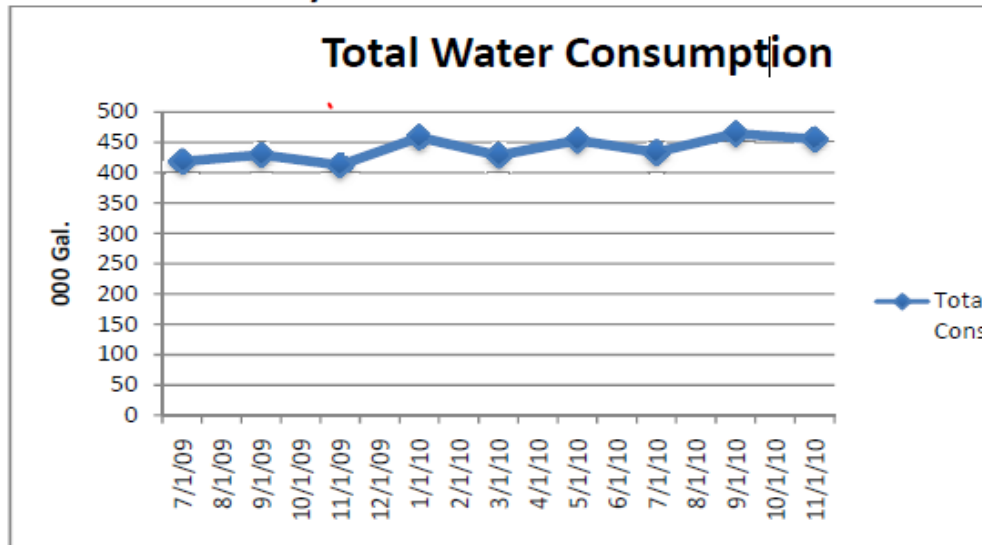
- 27 Unit Site in Emeryville, California
- Built in 2008
- Resident Demographic: Pixar Employees



# What Happened To Our Water?

- Irrigation Programming was not Seasonal
- 66% of Toilets Leaked

## Water Bill History



# Units	27
Average Toilets per Unit	2
Total # Toilets	54
Per EBMUD 66% of Toilets leak@ these properties	
# of Leaky Toilets	36
Water Loss per day leaky toilet in gallons	50
Gallons lost per day per leaky toilet	1,782
Cost per gallon	\$ 0.01
Loss per day	\$ 17.82
Monthly loss per day	\$ 534.60
Loss Annually	\$6,504.30
Toilet Flapper Cost	\$2.00
Cost to replace All leaky flappers	\$71.28
Monthly Savings 1st month less flapper cost	\$ 463.32
Yearly Savings less cost of flappers	\$6,433.02

# How much does it cost to change a light bulb in your resident's bathroom?

	Incandescent	CFL	LED
Cost of bulb	0.41	1.24	9.97
Life	1000	10,000	25,000
Hours used per year	182	182	182
Cost of bulb per year	\$ 0.07	\$ 0.02	\$ 0.07
Cost of service per hour	\$ 18.65	\$ 18.65	\$ 18.65
Time to change bulb	0.25	0.25	0.25
Cost per bulb change	\$ 4.66	\$ 4.66	\$ 4.66
Number of bulb changes per year	0.182	0.018	0.007
Sources:			
Light bulb prices online Homedepot.com			
Hours in Bathroom: wiki answers			

Here's what we know.....

# Show Me The Money

				Incandescent	CFL	LED
Cost of bulb				0.41	1.24	9.97
Life				1,000	10,000	25,000
Hours used per year				182	182	182
Cost of bulb per year				\$ 0.07	\$ 0.02	\$ 0.07
Cost per bulb change				\$ 4.66	\$ 4.66	\$ 4.66
Number of bulb changes per year				0.18	0.02	0.01
Annual cost of bulb change				\$ 0.85	\$ 0.08	\$ 0.03
Total Owner cost per year				\$ 0.92	\$ 0.11	\$ 0.11
Power consumption per hour in watts				60	14	9
Total power per year				10,920	2,548	1,638
Resident's cost of power	\$ 0.10	per KWH		\$ 1.09	\$ 0.25	\$ 0.16
Total cost of bulb per year				\$ 2.02	\$ 0.36	\$ 0.27
Annual Cost for 250 units with 10 bulbs each				\$ 5,038	\$ 906	\$ 676



# Thank You!

## Questions?