

City of Houston



Team G-22

# Mission

- Increase the energy efficiency of its commercial real estate
- Help create an environment that further supports the business case of energy efficiency



# Overview



	<b>Each Building Owner</b>	<b>Aggregate Buildings</b>
<b>NPV</b>	\$74,293	\$46,329,804
<b>Energy Efficiency</b>	30%	30% for 30%
<b>Costs</b>	No up-front capital costs. Immediate recognition of operational savings.	All programs fund themselves. A key consideration was keeping city costs flat.



# Commercial LEED Certified Projects

(Cumulative)

# Houston

# 518

© U.S. Green Building Council, 2011

Policies



Engagement Communication



\*As of November 2011

Finance

# Behavioral Change





Windows 7™

# Education and Engagement

- Green Office Challenge
- Energy Audit
- Mandate Smart Metering & Display
- Informative Billing
- EEIP Revolving Fund – Luxury Tax



Policies

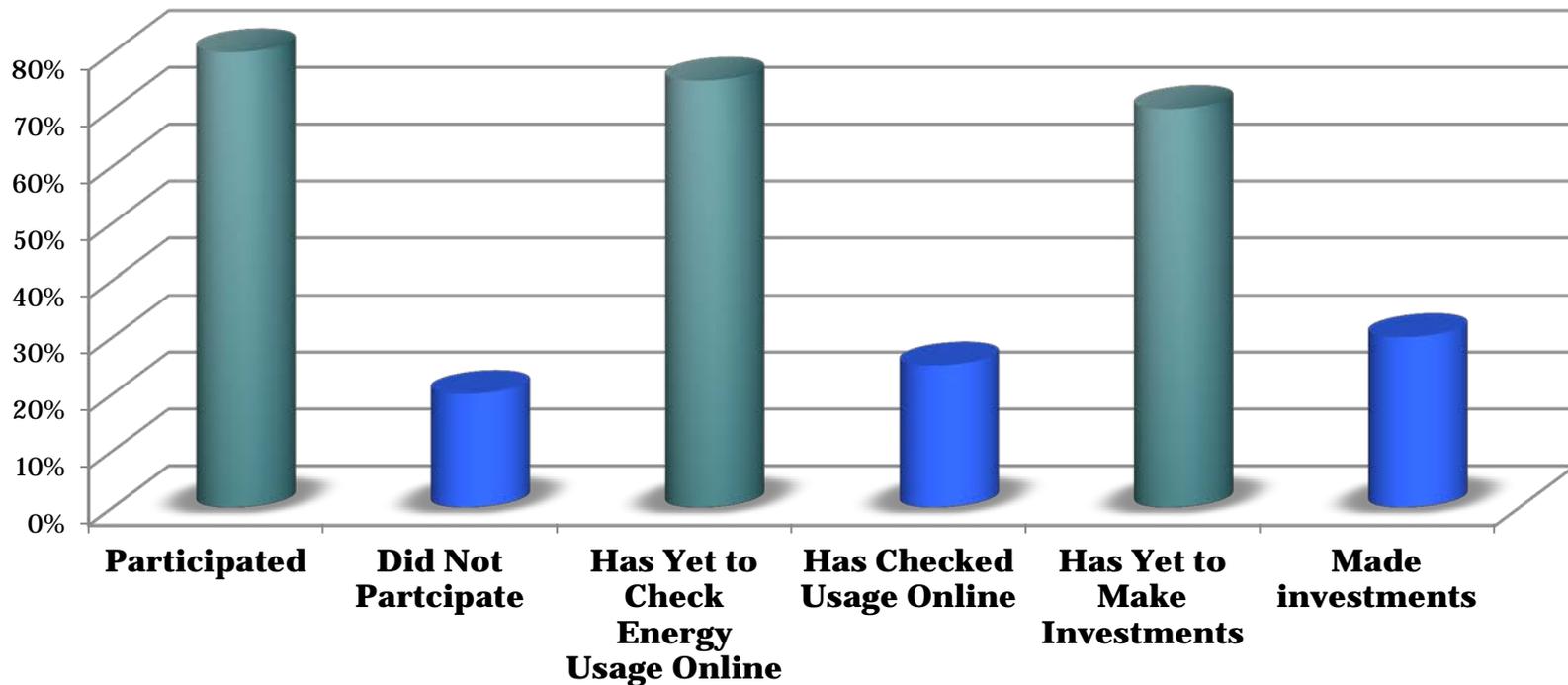


Engagement Communication



Finance

# IBM SMART CITY DUBUQUE: SMART METERING



**“Consumers more engaged, by having them compete against each other ... They are told where they rank compared to their peers... We've found that to be a significant motivating factor,”**

**“The industry-wide average for "energy portal engagement" is 8 percent”  
-IBM Smart City**

Policies

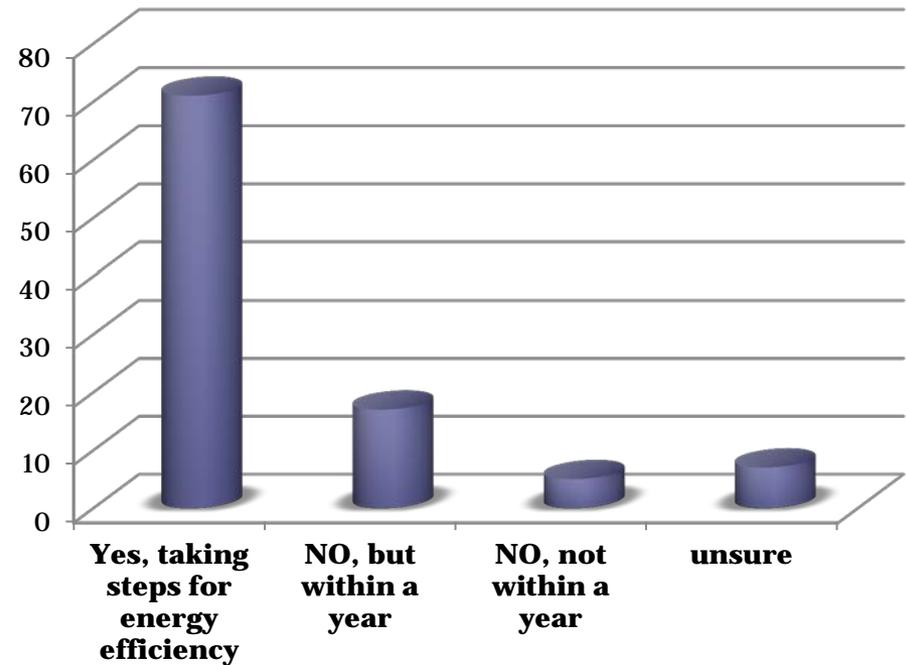
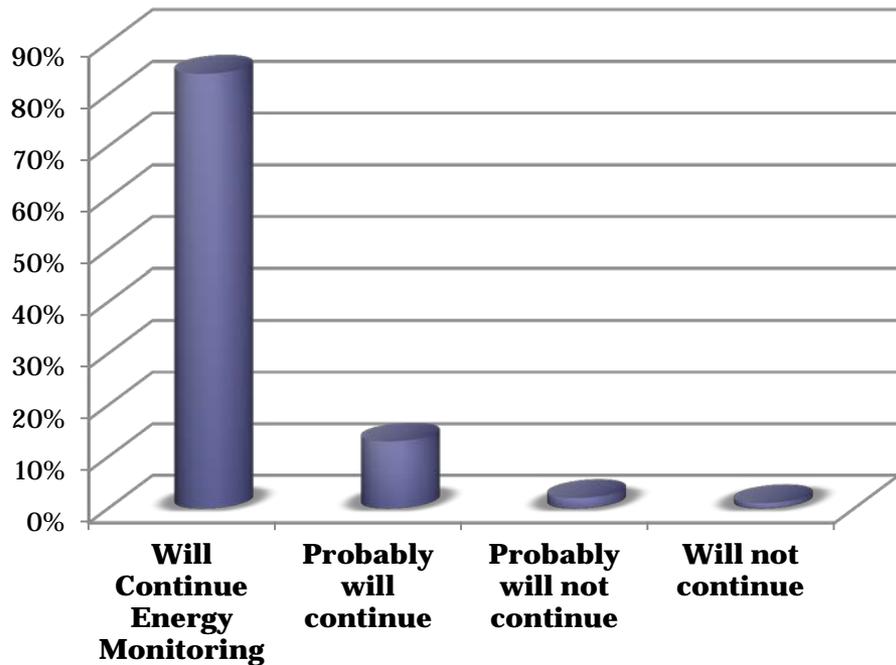


Engagement Communication



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# The Smart Meter Effect: CenterPoint Energy



CenterPoint Energy Houston Electric, LLC and U.S. Deputy Secretary of Energy Daniel B. Poneman released [survey results](#) from a 500 participant smart meter In-Home Display pilot program begun 2010.

Policies



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# Winning the People

- Media Blitz
- Partnering with Universities
- Green Office Challenge Festival



Policies



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# Engagement and Education is Critical

- “Savings came from supplying householders with information on energy use and asking them to read their meters daily. Daily monitoring without information, led to *increased* consumption” - Gaskell et al (1982)
- “Without engaging the end user, we will not see the projected results smart meters will unleash.” – IBM Smarter Cities
- “Immediate direct feedback could be extremely valuable. In the longer term and on a larger scale, informative billing and annual energy reports can promote investment as well as influencing behavior. Savings have been shown in the region of 5-15% and 0-10% for direct and indirect feedback respectively.”

Policies

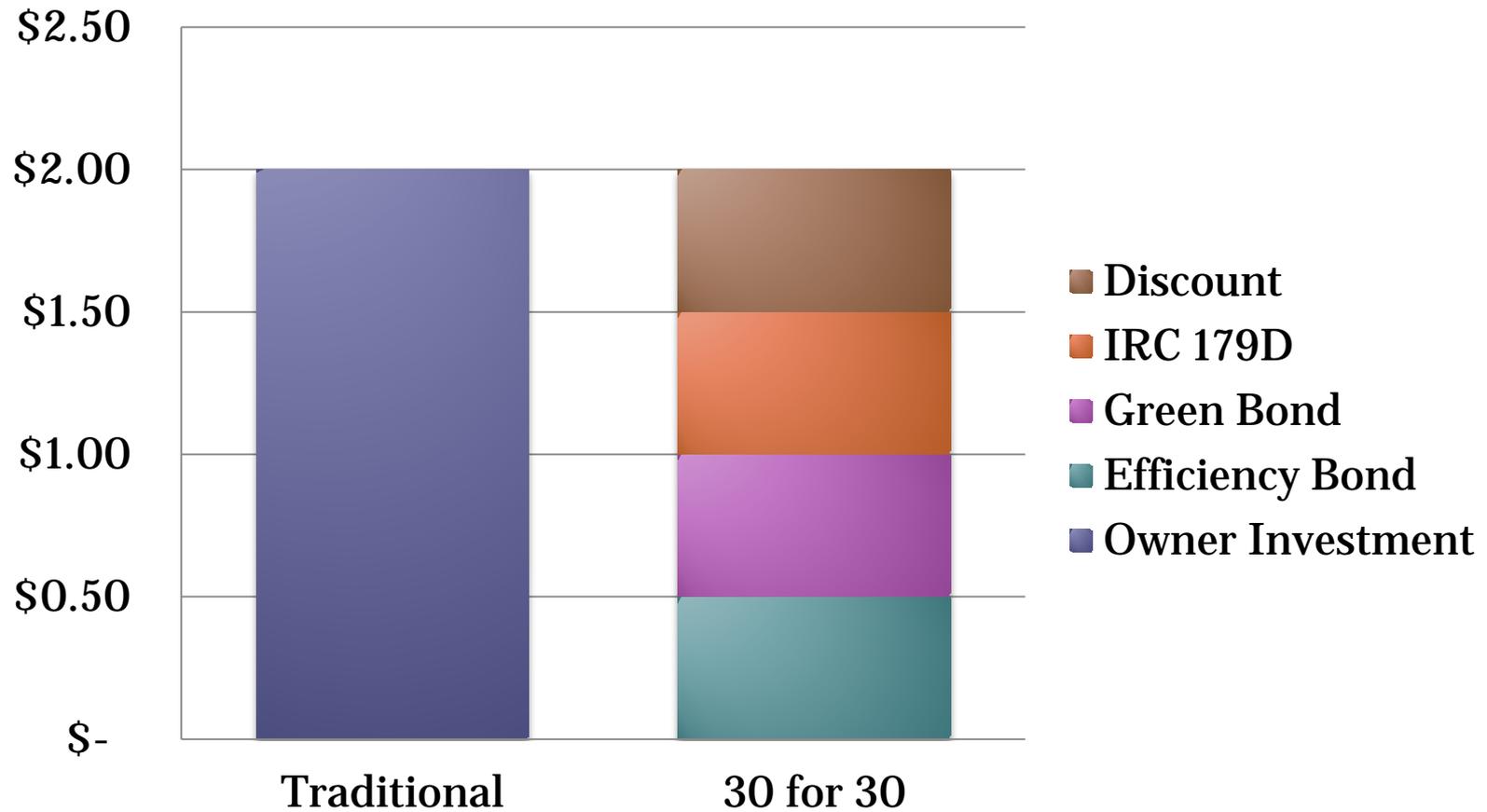


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# 30 for 30 Program



# Groupon-it

## Buying in Bulk

- 266,000,000 Sq Ft
- Avoid advertising, administrative and operation costs
- Alignment with an ambitious environmental initiative

## Potential Partners



Policies



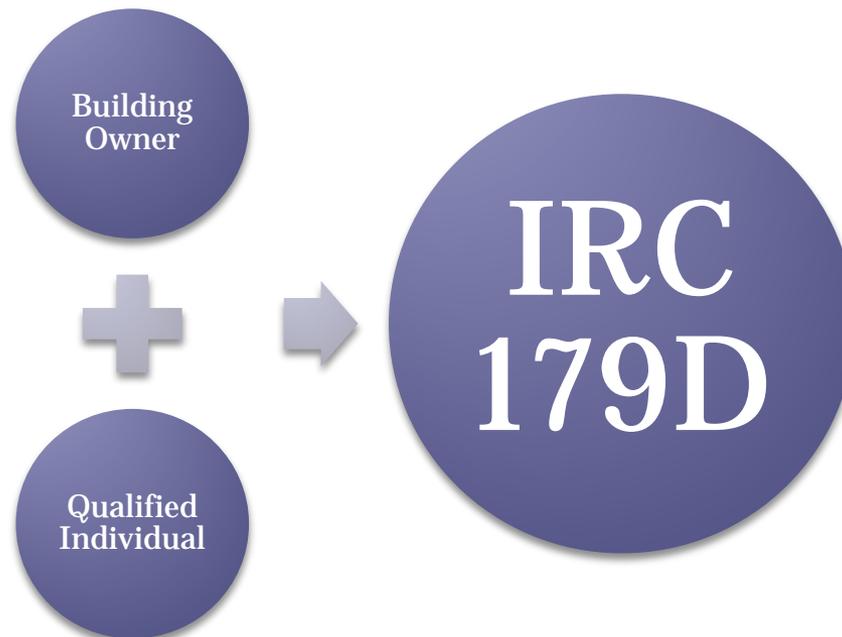
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# IRC 179D

- Federal incentive for energy efficiency
- \$1.80 per Sq Ft for 50% reduction
- \$0.60 per Sq Ft for other qualifying projects



Policies



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# Efficiency Bond

- Tax increase will be determined by the monthly payment necessary to amortize the bond over 20 years
- Backed by future revenues from higher city tobacco and alcohol taxes

	<b>Efficiency Bond</b>
<b>Total Subsidy</b>	\$40,000,000
<b>Interest</b>	6.00%
<b>Maturity</b>	20 years
<b>Monthly Payment</b>	\$286,572.42

Policies

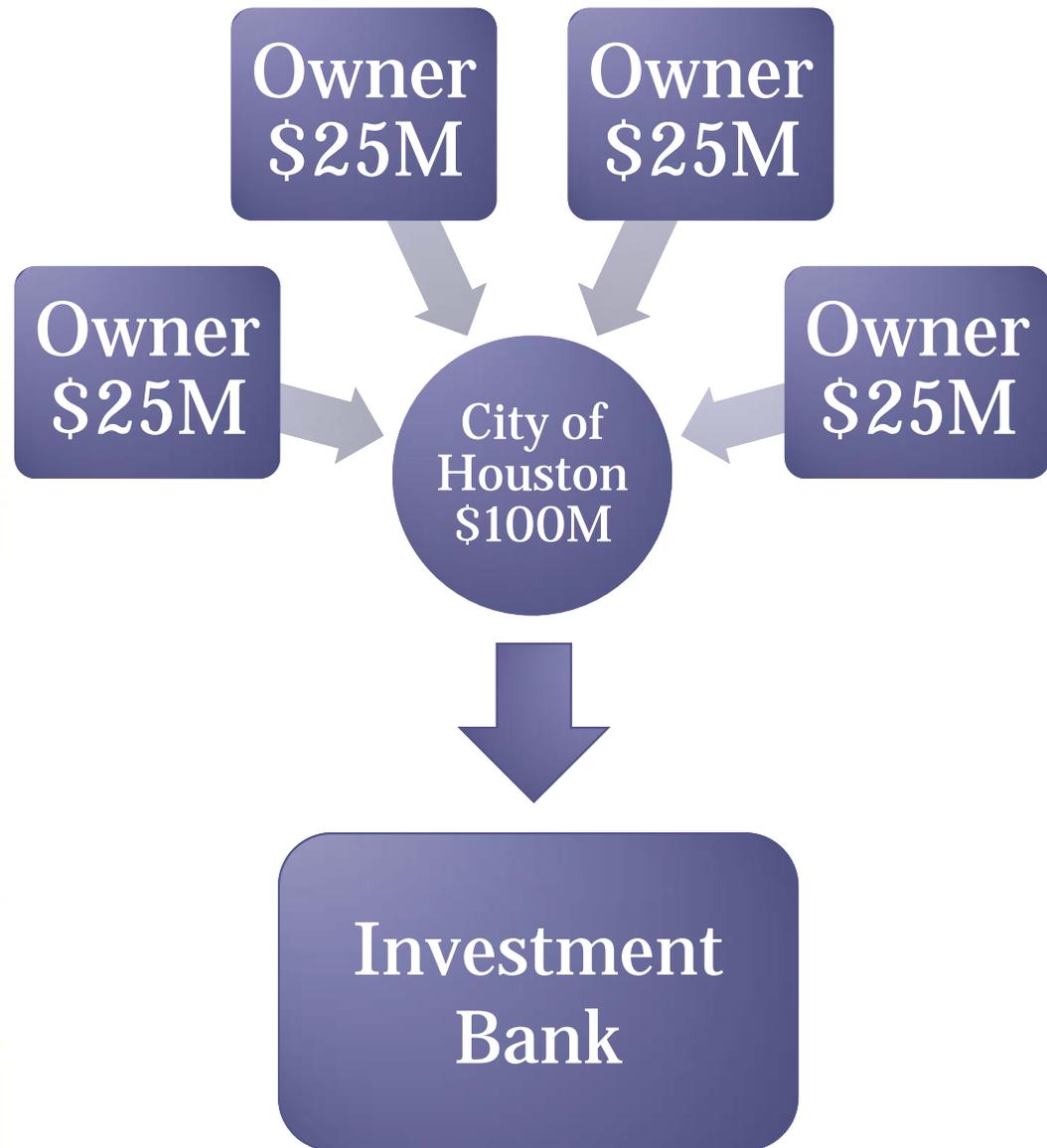


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# Green Bond



# Green Bond



- Access to financial markets

6%



- Detailed record of all projects

9%



- Implement retrofits

Policies

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# Net Present Value

## City of Houston

	<b>Green Bond</b>
<b>Ceiling</b>	\$39,900,000
<b>Interest</b>	6.00%
<b>Maturity</b>	15 years
<b>Net Present Value</b>	\$8,057,467

## Building Owners

	<b>Total NPV</b>
<b>Final Retrofit Cost</b>	\$0.50/sq.ft
<b>Monthly Energy Cost</b>	\$0.20/sq.ft
<b>Building per sq. ft. Cost</b>	79,800,00
<b>Cost</b>	\$39,900,000
<b>Monthly Green Bond Payment</b>	\$404,692.37
<b>Net Present Value</b>	\$46,329,804

Policies



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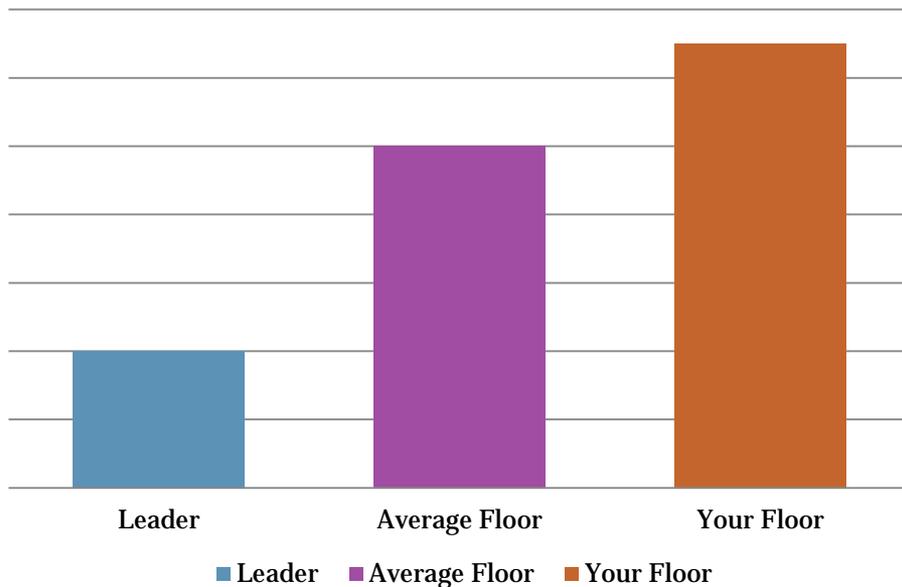


Open Up Your Envelopes!

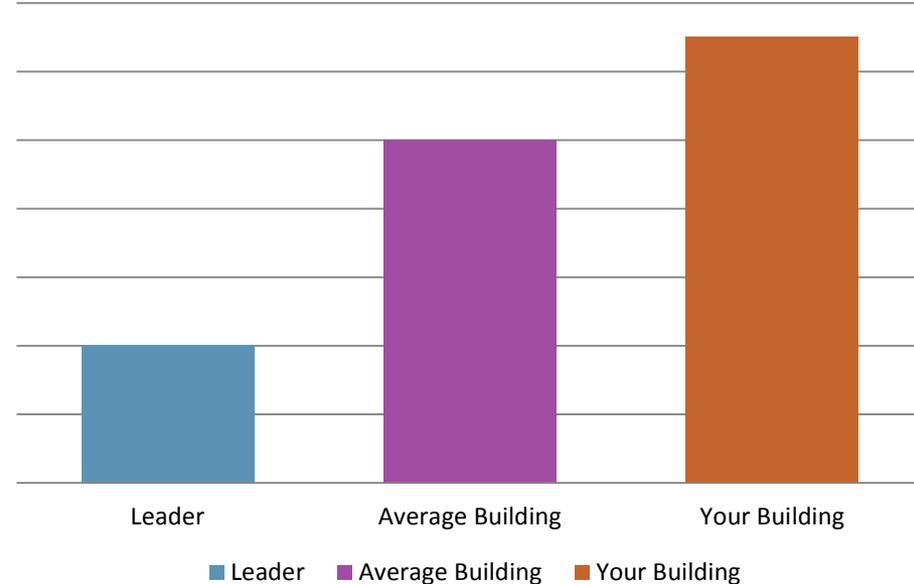
# Exhibit 1

Below is your energy efficiency use progress within the 30 for 30 Program. Here is how your energy use performance compares with your peers.

### Energy Use Against Floors this Month

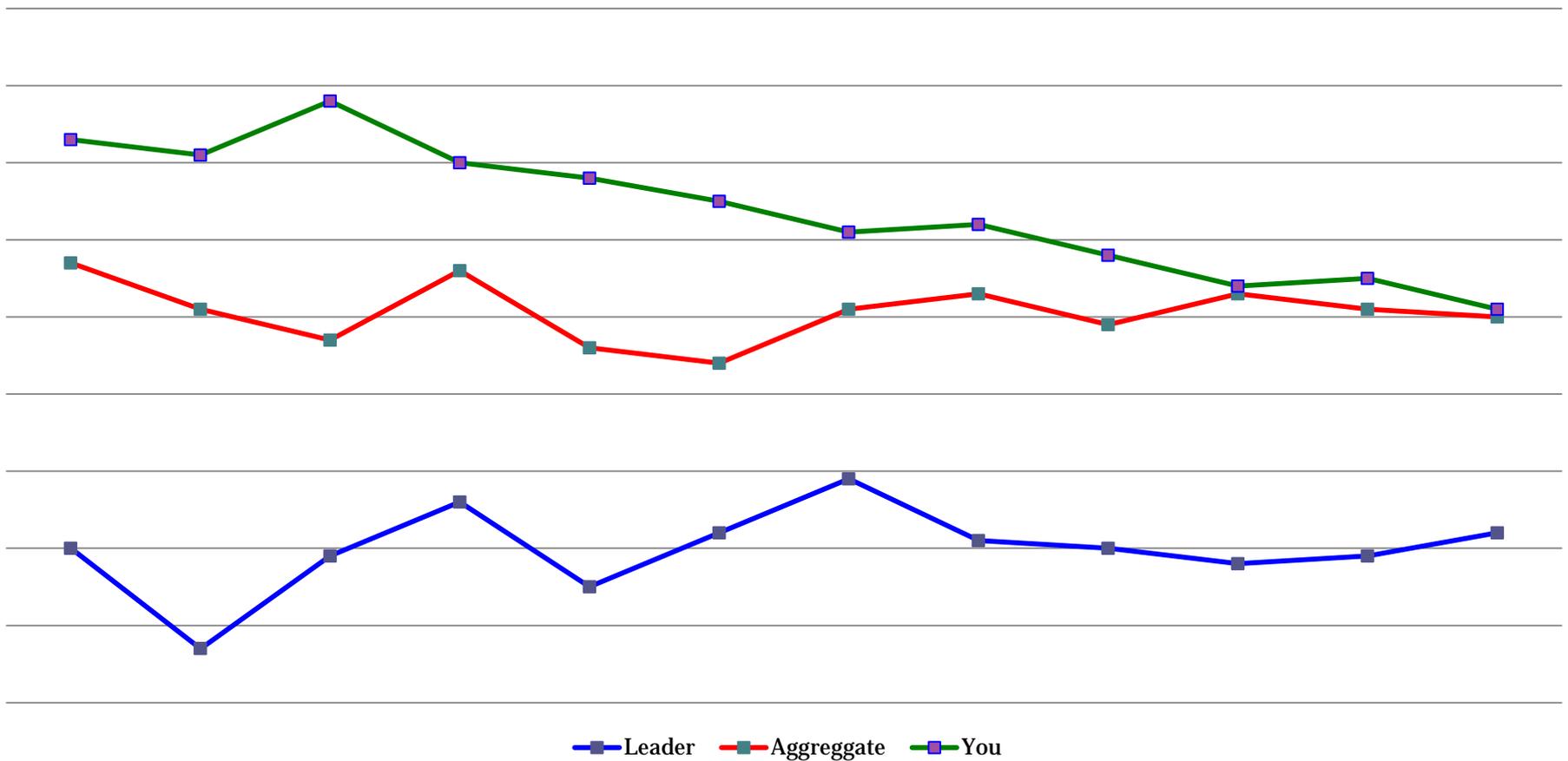


### Energy Use Against Buildings this Month



# Exhibit 2

## Energy Use Against Peers Trend



# Exhibit 3

**Next Steps:** If you would like to improve your energy performance:

Turn you air conditioner down by one degree. For every degree less in air conditioning, **Estimate savings up to \$15,000 annually.**

Engage employees to turn off all computers at the end of the day.

**Estimated savings up to \$3,000 annually.**

Turn off lights after core work hours.

**Estimated savings of \$8,000 annually.**

# Exhibit 4

Year	1	2	3	4	5	6	7
<b>Investment</b>	\$4,856,308	\$30,428	\$30,428	\$30,428	\$30,428	\$30,428	\$30,428
<b>Energy Cost</b>	\$11,172,000	\$11,507,160	\$11,852,375	\$12,207,946	\$12,574,184	\$12,951,410	\$13,339,952
<b>Luxury Tax</b>	-	-	-	-	-	-	-
<b>Total</b>	\$16,028,308	\$11,537,588	\$11,882,803	\$12,238,374	\$12,604,612	\$12,981,838	\$13,370,380
<b>Annual Value</b>	\$(68,308)	\$4,901,212	\$5,625,158	\$5,828,341	\$6,037,620	\$6,253,178	\$6,475,202
<b>Total</b>	\$95,689,686						

8	9	10	11	12	13	14	15
\$30,428	\$30,428	\$30,428	\$30,428	\$30,428	\$30,428	\$30,428	\$30,428
\$13,740,151	\$14,152,355	\$14,576,926	\$15,014,234	\$15,464,661	\$15,928,601	\$16,406,459	\$16,898,652
-	-	-	-	-	-	-	-
\$13,770,579	\$14,182,783	\$14,607,354	\$15,044,662	\$15,495,089	\$15,959,029	\$16,436,887	\$16,929,080
\$6,703,887	\$6,939,432	\$7,182,044	\$7,431,934	\$7,689,321	\$7,954,430	\$8,227,491	\$8,508,745

# Exhibit 5

## 30 for 30 Program

<b>% Reduction</b>	<b>per sq.ft</b>	<b>Savings</b>
> 50%	\$1.80	\$0.63
< 50%	\$0.60	\$0.21
On Average \$0.50 saved in aggregate		

## How Reduce Energy Consumption

	<b>% Reduction</b>
Pay Attention	10
Retrofit	30
Behavior Change	10
Total	50