



Atlanta Better Buildings Challenge

Audit Overview:

1100 Spring Street Atlanta, GA



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Atlanta Better Buildings Challenge Overview

The City of Atlanta has united with Central Atlanta Progress, Atlanta Downtown Improvement District, Midtown Alliance, Metropolitan Businesses, and Nonprofit Communities to implement a comprehensive energy and water efficiency upgrade program for Atlanta buildings.

- 1) This program supports the President's initiative of improving energy and water performance by a minimum of 20% by 2020.
- 2) This helps businesses save nearly \$40 billion annually in utility costs, enabling them to grow, invest in new technology and create American jobs .
- 3) The key mission of the ABBC is to connect, convene and catalyze action in this energy and water efficiency program.
- 4) The Atlanta BBC will educate building owners and connect them with resources to assess current performance and then take action to meet the objectives of the program.



Southface

For over 31 years, Southface has provided expertise in sustainable, energy- and water- efficient buildings that are durable and healthy. Southface offers a breadth of building science-based services to help building owners save money, conserve resources, and enhance the comfort and performance of buildings.



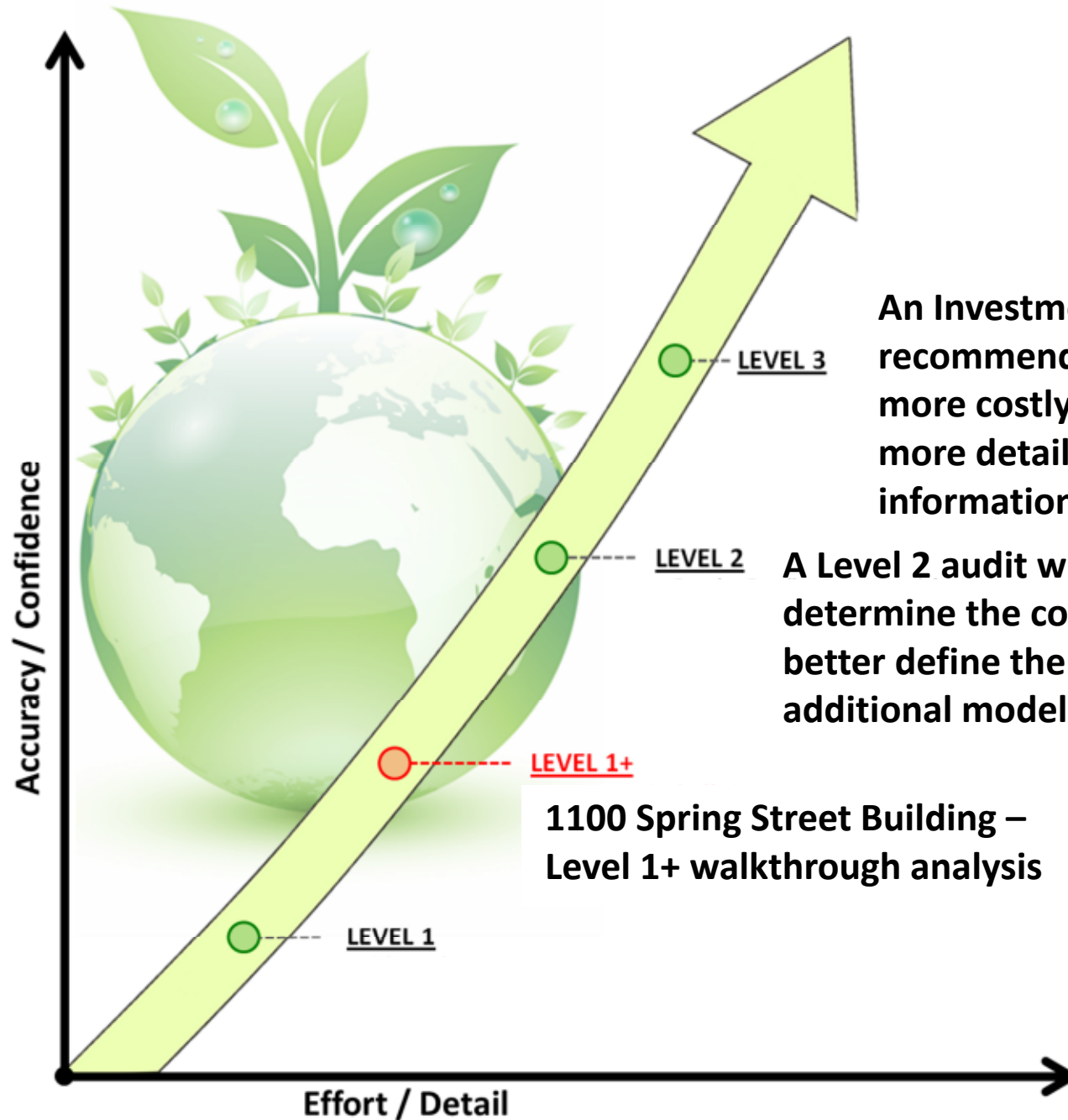
DLB Associates is a dynamic team of consulting engineers, collaborating in a boundary-free culture to produce optimal solutions for clients ranging from global technology leaders to commercial building owners.

DLB sees the bigger picture of each engineering challenge and employs an adaptive approach to problem solving tailoring the firms broad continuum of program and project management, MEP engineering design, construction administration, automation / controls, commissioning and operations support services to meet the needs of the client where they need to be met.



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Audit Scope



An Investment Grade Audit (IGA) is recommended before implementing the more costly upgrades, and includes more detailed energy modeling and cost information.

A Level 2 audit will more accurately determine the cost of implementation and better define the expected savings through additional modeling and contractor pricing

**1100 Spring Street Building –
Level 1+ walkthrough analysis**

This report includes an overview of the ECMs, financial information, and options for moving forward with implementation.

The Level 1+ audit is a walkthrough analysis that will identify and provide:

- **An analysis of low-cost and no cost measures**
- **An initial judgment of potential costs and savings**
- **A breakdown of energy use within the building**
- **A list of potential capital intensive improvements***

*** These items often require a more thorough engineering analysis to realize the potential for energy savings, which is the scope of an Investment Grade Audit (IGA).**

The estimates used in this report should be considered INFORMATIONAL ONLY and should NOT to be used for acquisition or construction.



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Building Summary

1100 Spring Street Information:

- A 149,541 square foot, eight-floor office tower with three floors of underground parking
- The mechanical infrastructure consists of central chilled water-cooling and hot water heating systems, which are fed to a central air handler on each floor.
- The conditioned air is then distributed to the tenant zones from the air handler



EUI and Energy Star

This comparison shows how your building compares to other buildings similar to yours based on EPA commercial buildings database.

1) Energy Use Intensity (EUI)

Selig EUI	Average EUI	Average EUI of ABBC Buildings	ABBC Ranking
130	82	85	31/35

- Building's energy use relative to its size
- Generally, a low EUI signifies good energy performance
- Typically calculated as kBtu / Sq. Ft.

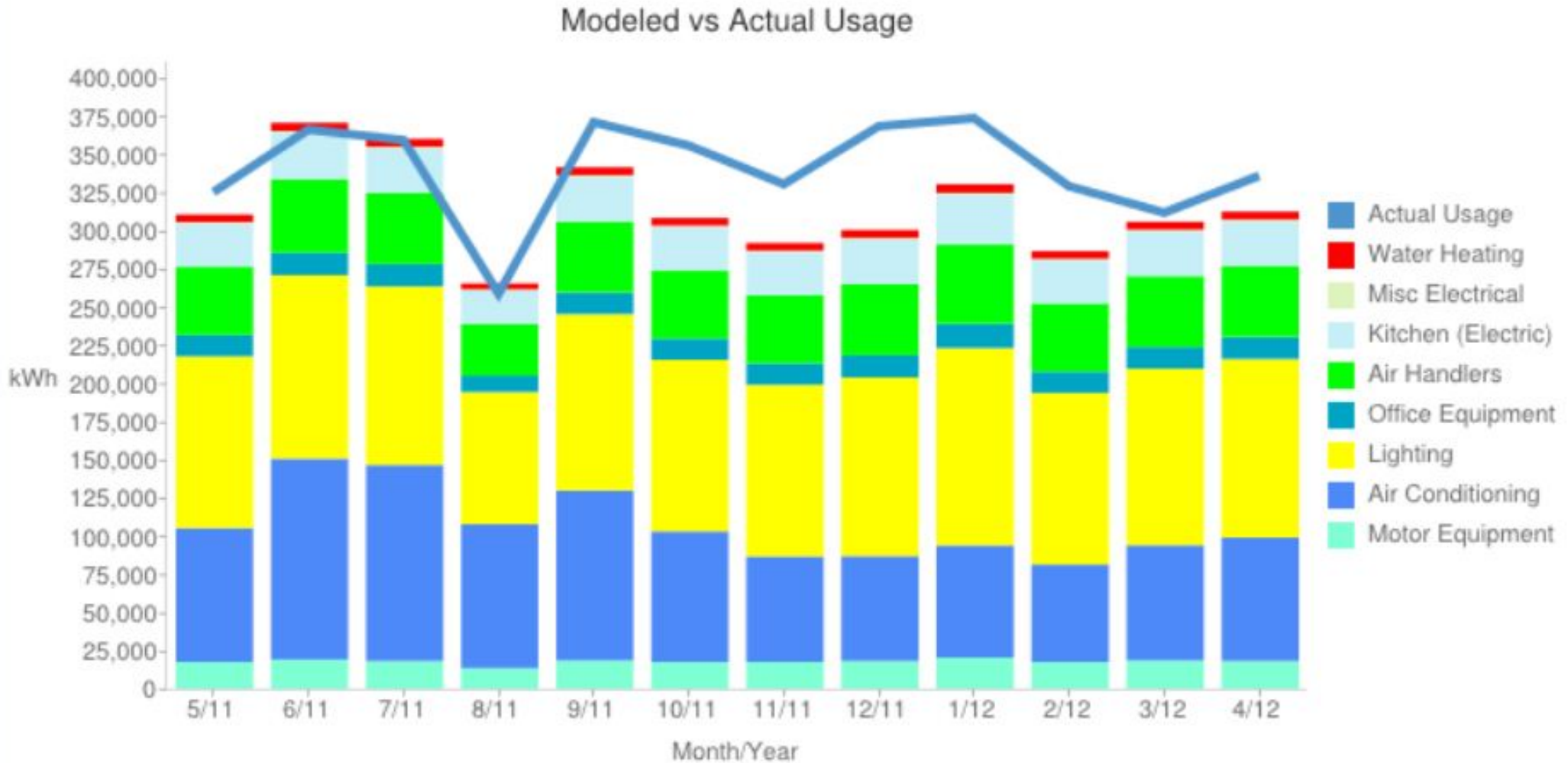
2) Energy Star Rating



- 33% of similar buildings use more energy per square foot of floor area than this building
- An average rating would be 50
- A very efficient building would be in the 90's



The graph below shows the modeled average consumption per monthly billing period for various equipment.



The line graph is the actual total consumption based on billing



Utility Overview

Cost			Consumption		Resources and Emissions	
Utility	Last 12 Mo.	Average Mo.	Last 12 Mo.	Average Mo.	CO2 lbs	Coal lbs
Electric	\$489,878	\$40,823	4,391,760 kWh	365,980 kWh	6,561,289	2,020,210
Natural Gas	\$41,207	\$3,434	44,367 CCF	3,697 CCF	535,035	0
Water	\$134,286	\$11,190	6,908 CCF	576 CCF	0	0
Total	\$665,371	\$55,448	NA	NA	7,096,324	2,020,210

What Would 20% Savings Look Like?

Reduction	Annual \$ Savings	Energy Star
20%	\$133,074	52
41%	\$266,148	75

**Energy Star Certification
Requires a Rating of 75**



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Audit Results



- **The building is generally well maintained as evidenced by the fact that much of the original infrastructure remains.**
 - This also means aging equipment presents opportunities to improve

- **Central Plant Optimization can potentially increase efficiency and reduce maintenance**
 - Chiller and boiler replacements
 - Adopting control schedules for mechanical system optimization
 - Improvements within the condenser water (cooling tower) system

- **There are opportunities to replace all fan and pump motors with a higher efficiency motor and variable speed drive for significant potential savings**

- **The air handler coils in the building have met or exceeded a reasonable expected lifetime**
 - Testing of their integrity, along with an eventual replacement plan, should be included in the facility lifecycle strategy



- **Automation / Control optimization can deliver additional energy savings, lead to better controlled maintenance costs, and better functionality.**

- **Opportunities for savings exist within the lighting systems throughout the facility.**
 - **Types of Lamps**
 - **Motion Sensors and Photocells in appropriate areas**

- **There is opportunity to save over 2.5M gallons of water**

- **Many of the ECMs noted are considered ‘best practice’ or will improve the operability of the building. This has financial impact beyond just energy conservation.**



RECOMMENDED

- Low (or no) cost ECMs
- ECMs that seem to have good value
- These measures have the highest potential of return

REQUIRES ADDITIONAL ANALYSIS

- Includes ECMs with both short and long-term payback periods
- ECMs have a positive impact on energy savings and operability
- To fully understand the potential savings and payback periods more investigation is warranted

NOT PRACTICAL

- These measures do have energy saving potential
- Either the practicality, or cost of implementation, is considered prohibitive.
- These measures can be effective when bundled with more cost effective measures

Note:

- All costs are roughly estimated for material and installation.
- Professional service fees such as engineering, design, project management and testing have not been considered for these purposes

RECOMMENDED CATEGORY

- 1) Many of these measures can be installed with current staff

- 2) These measures range in payback periods from zero to 7.6 years

- 3) The power of piggybacking
 - When all recommended measures are combined the payback period is only 1.1 years

- 4) Implementing these measures will save:
 - 37% of electrical consumption
 - 52% of water consumption
 - 38% of the overall utility bills / generating \$250K in cash flow

- 5) This generates an overall reduction in energy and water consumption of 34%

REQUIRES ADDITIONAL ANALYSIS CATEGORY

- 1) These measures will require some engineering and contractor installation

- 2) These measures range in payback periods from 0.8 to over 30 years

- 3) The power of piggybacking
 - When these measures are combined the payback period is 11.3 years

- 4) Implementing these measures will save:
 - An additional 21% of electrical consumption
 - 42% of natural gas consumption
 - An additional 11% of the overall utility bills / generating \$71K in cash flow

- 5) This generates an overall reduction in energy and water consumption of 19%

NOT PRACTICAL CATEGORY

- 1) The only measure in this category is installing VFDs on the outside air fans and will require more extensive engineering and contractor installation

- 2) This measure has a payback period of 80 years

- 3) The power of piggybacking
 - When this measure is combined with ALL other ECMs the payback period is significantly reduced.
 - This is the only way this measures becomes viable.

The audit identified good opportunity for ECMs with a quick payback and also those that should be considered for further analysis. When combining the two, a reasonable payback period still exists.

- As a result of “piggybacking” related ECMs, the payback period for ALL ECMs is only 3.4 years
- After 3.4 years, there is potential for an estimated ~\$320K per year in ongoing savings
- The recommended measures have a 1 year payback period and can be done immediately
- Substantial reductions in overall energy use reducing the Utility Bill by 48%
- Overall energy and water consumption reduction of 53%

***COST AND PAYBACK CALCULATIONS ARE ALL ESTIMATES THAT REQUIRE FURTHER ANALYSIS AND VALIDATION BEFORE IMPLEMENTATION.**

Improvements in energy and water efficiency can be measured in kWh, gallons, dollars, etc.; however, there are less quantifiable, but equally as important aspects such as:

- 1) Public relations and marketing
- 2) Tenants demanding more energy efficient buildings to work, live, and attend social functions in
 - Demonstrates environmental responsibility
 - Related cost savings
- 3) Energy Star and LEED Certified Buildings becoming the sought after buildings of corporate real estate
- 4) Water efficiency in Atlanta is critical for the sustainability of the region
 - Bathrooms are a very visible means of demonstrating corporate conservation measures, especially to employees and guests.

Ultimately, operating an energy efficient building not only saves dollars, but leads to significant community recognition that can result in broader benefits than simply immediate payback.





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Next Steps

Atlanta BBC welcomes the opportunity to assist the 1100 Spring Street in meeting their energy conservation and sustainability goals along with the Challenge goal of 20% reduction by 2020.

ABBC recommends that the 1100 Spring Street:

- 1) Implement the appropriate ECMs immediately with your existing staff. For example**
 - Night shutoff
 - HVAC control strategies

- 2) Perform an Investment Grade Audit to determine a firm fixed price for the more complex ECMs, and associated savings**
 - Obtain contractor estimates to confirm pricing for ECMs

- 3) Energy Reduction Progress - Meeting the Challenge**
 - Selig has made progress in meeting the goal of the challenge with a 6.3% reduction in energy since 2009
 - Selig should consider opening their information to vendors through Skye Energy for additional targeted information from vendors

Energy Engineering Firms

- Perform technical assessments of buildings and their MEP systems
- Provide cost estimates, payback periods and are uniquely qualified to design the best solutions for specific environments
- Offer commissioning services to ensure proper installation and operation
- As an owner's representative, can use expertise and knowledge to oversee a variety of implementations

Energy Services Company (ESCOs)

- Play a development role, with focus on feasibility studies, financing and implementing ECMs through a sole source agreement
- With the agreement, an ESCO will usually guarantee the energy savings used to pay for implementation

Implementation Specific Contractor

- Individual contractors like lighting and water conservation specialists can provide engineering, design, and construction cost for their specific field
- Oftentimes these are used in conjunction with other approaches to implementation

All incentives should be assessed when preparing the final proposal for a retrofit project.

GA Corporate Tax Credit

- Credit can be used for comprehensive measures (whole building upgrades), up to a maximum of \$100,000
- Program expires December 31, 2014

GA Power EarthCents Program

- Commercial incentives for upgrading inefficient lighting, HVAC, appliances, and controls
- Incentives are capped at \$10,000 for commercial customers
- Rebates may be available for several of the energy-efficiency opportunities discussed in the report
 - Lighting Power Reduction
 - The rebate for lighting power reduction is \$0.20 per watt of reduced lighting power.
 - Lighting Occupancy Controls
 - The rebate for lighting occupancy controls is \$10 per sensor. Wall or ceiling-mounted sensors qualify for the rebate if the combined fixture power per circuit is less than 500 watts.

Additional rebates and eligibility requirements can be found on the EarthCents and DSIRE websites.



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Finance Options

Cash

- **Simply get an Investment Grade Audit of the energy savings potential for your building and fund the project with direct cash.**
- **Once the Return on Investment has been met, energy savings are realized at your bottom line.**

Traditional Bank Loans

- **Working with a traditional lender, a building owner can get a traditional loan and market terms to finance the cost of the building retrofit.**

Energy Service Companies (ESCO)

- **ESCOs are businesses that develop, install, and arrange financing for projects designed to improve the energy efficiency and maintenance costs for facilities over a seven to twenty year time period.**
- **ESCOs generally act as project developers for a wide range of tasks and assume the technical and performance risk associated with the project.**

Shared Savings Agreements

- **The Shared Savings agreements allow building owners to upgrade and retrofit their properties at no up-front cost**
- **This provides building owners and managers the opportunity to start realizing savings immediately**
- **Projects can be entirely funded by realized monthly utility savings, utilizing off-balance-sheet financing**
- **Building owners share the savings for an agreed upon period of time to pay back the equipment and retrofit costs**

Financial Ally

- **The University Financing Foundation (TUFF) is a non-profit 501(c)(3) operating foundation whose mission is to assist Institutions of education and research in the planning, development, and financing of energy efficiency upgrades, at below-market costs.**
- **TUFF has closed in excess of \$900 million in loans and project financings. Unlike a passive foundation or public charity, TUFF actively partners with Institutions.**
- **TUFF will meet with the Institution's management and work with the institution to develop and implement a mutually agreeable financing alternative.**



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Closing Comments

Paybacks / Cost Savings

- The recommended measures collectively have a 1 year payback period
- Piggybacking all ECMs yields a 3.4 year payback period
- There is potential for \$320K per year in ongoing savings
- Reducing the operating schedule one hour could save thousands per year
- There is opportunity to save over 2,500,000 gallons of water annually
- Reduce Utility Bills by 48% and overall consumption by 53%

PR Impact

- Tenants demanding energy efficient buildings to work and live in
- Demonstrates environmental responsibility
- Energy Star and LEED Certified Buildings are becoming sought after

Next Steps

- An independent audit of any datacenter areas has the potential to yield high energy savings
- The recommended ECMs can be implemented first
- In about a Month the ABBC will follow up on progress



END OF SLIDES

1100 Spring Street - ECM by Category / ROI



ECMs by Category / ROI								
Category		Utility Savings			Cost Savings	First Cost	Payback	Comments
		kWh	Therms	Gallons (1000s)				
RECOMMENDED								
1	Computer and Monitor Power Save Mode	72,689	164	0	\$8,000	\$0	0.0	
2	Meter Cooling Tower Make-up / Blowdown	0	0	1,424	\$37,000	\$1,000	0.0	This may already be complete, per meeting 7/23
3	Reduce T8 Wattage	742,693	1,747	0	\$81,000	\$5,000	0.1	
4	Excessive Cooling Tower Water Usage	0	0	704	\$18,300	\$1,200	0.1	
5	Replace Incandescent with Fluorescent	17,501	54	0	\$1,900	\$200	0.1	
6	Urinal Flush Valve Upgrade	0	0	281	\$7,300	\$1,200	0.2	Self installed flush valves
7	Photocells	75,174	8	0	\$8,400	\$2,300	0.3	
8	Retrofit T12 Lighting with T8 Lighting	176,570	0	0	\$19,700	\$6,000	0.3	
9	Install Timer on HW Recirculation Pump	11,099	209	0	\$1,400	\$500	0.4	
10	Add WB Calc to Water-side Economizer	44,941	0	0	\$5,000	\$2,500	0.5	
11	Motion Sensors	31,183	74	0	\$3,400	\$2,100	0.6	
12	Put OA Unit on Building Schedule	26,355	0	0	\$2,900	\$2,000	0.7	
13	AHUs on Building Schedule	187,081	0	0	\$20,900	\$16,000	0.8	This may already be complete, per meeting 7/23
14	Low Flow Faucets (0.5 GPM)	0	0	42	\$1,100	\$1,200	1.1	Self installed flow restrictors
15	Replace Halogen with LED	32,540	100	0	\$3,500	\$4,500	1.3	
16	Insulate HW Piping	3,228	137	0	\$500	\$1,400	2.8	
17	Replace Chiller	216,227	0	215	\$29,700	\$225,000	7.6	Related ECMs = 27
RECOMMENDED TOTAL		1,637,281	2,493	2,666	\$250,000	\$272,100	1.1	
PERCENT REDUCTION		37%	5%	52%	38%			Overall Reduction of 34.1 %

These costs are based on historical data and are not accurate for current pricing.

1100 Spring Street - ECM by Category / ROI



ECMs by Category / ROI								
Category	Utility Savings			Cost Savings	First Cost	Payback	Comments	
	kWh	Therms	Gallons (1000s)					
REQUIRES ADDITIONAL ANALYSIS								
18	VFD on Pumps	338,061	0	0	\$15,100	\$12,000	0.8	Related ECMs = 24
19	VFD on AHUs	413,689	0	0	\$18,500	\$32,000	1.7	Related ECMs = 24
20	Upgrade Insulation Above Roof Deck	230	5,159	0	\$4,800	\$30,000	6.3	
21	Window Tinting (Enerlogic-35)	129,269	5,325	0	\$19,400	\$126,400	6.5	
22	Replace CFL with LED	130	0	0	\$15	\$100	6.7	
23	Window Tinting (\$4.75 sq. ft.)	64,630	2,663	0	\$9,700	\$83,000	8.6	
24	Install Premium Efficiency Motors	5,943	-139	27	\$1,200	\$22,500	18.8	Related ECMs = 18, 19, 28
25	Replace 70% Efficient Boiler	0	6,073	0	\$5,600	\$170,000	30.4	Need additional testing to determine efficiency and actual heat load of building, substantial additional savings possible depending on results
26	Upgrade Control System	0	0	0	\$0	\$200,000	-	Related ECMS - 17, 18, 19, 25, 28. Savings are dependent on sequences implemented for control
27	Add HEX to Water-side Economizer	-30,206	0	0	-\$3,400	\$125,000	-	Related ECMs = 17. Likely only beneficial when new equipment is installed
REQUIRES ADDITIONAL ANALYSIS TOTAL		921,746	19,081	27	\$70,915	\$801,000	11.3	
PERCENT REDUCTION		21%	42%	1%	11%			Overall Reduction of 19.2 %
NOT PRACTICAL								
28	VFD on OA Fan	3,118	0	-2	\$300	\$24,000	80.0	Related ECMs = 24. Needs significant investigation
ALL CATEGORIES TOTAL		2,562,145	21,574	2,691	\$321,215	\$1,097,100	3.4	
PERCENT REDUCTION		58%	47%	52%	48%			Overall Reduction of 53.4 %

These costs are based on historical data and are not accurate for current pricing.