



# Cool Energy Savings

ENERGY STAR Monthly Partner Meeting

Call in number: 866 299 3188

Conference Code: 202 343 9965#



Learn more at [energystar.gov](https://energystar.gov)

# About The Web Conferences



- Monthly
- Topics are structured on a strategic approach to energy management
- Help you continually improve energy performance
- Opportunity to share ideas with others
- Slides are a starting point for discussion
- Open & interactive



# Web Conference Tips



- Mute – To improve sound quality, all phones will be muted.
  - Use # 6 to un-mute
  - \* 6 to mute
- Presentation slides will be sent by email to all participants following the web conference.

# Cooling Loads



2003 Commercial Buildings Delivered Energy End-Use Intensities, by Building Activity (Thousand Btu per SF)

	Education	Food Sales	Food Service	Hospitals	Lodging	Warehouse	Office	Retail
Space Heating	39.4	28.9	43.1	91.8	22.2	19.3	32.8	24.8
Cooling	8.0	9.8	17.4	18.6	4.9	1.3	8.9	5.9
Ventilation	8.4	5.9	14.8	20.0	2.7	2.0	5.2	3.7
Water Heating	5.8	2.9	40.4	48.4	31.4	0.6	2.0	1.1
Lighting	11.5	36.7	25.4	40.1	24.3	13.1	23.1	25.7
Cooking	0.8	8.6	63.5	5.6	3.2	N.A.	0.3	0.6
Refrigeration	1.6	94.8	42.1	2.0	2.3	3.5	2.9	5.0
Office Equipment	0.4	1.6	1.0	1.1	N.A.	0.2	2.6	0.6
Computers	3.4	1.9	1.4	3.9	1.3	0.6	6.1	1.0
Other	4.0	9.1	9.5	18.1	7.0	4.8	9.0	5.6
Total (kBtu/sq ft)	83.1	199.7	258.3	249.2	100.0	45.2	92.9	73.9

Source(s): EIA, 2003 Commercial Building Energy Consumption Survey, Energy End-Uses, Oct 2008, Table E.2A. C

# Opportunities



- Cooling technologies & practices have significantly improved over the last 20 years.
- But there are still many opportunities to improve cooling efficiencies
- As ACEEE points out, “The well has not been drawn down.”

## ACEEE’s Emerging Energy-Saving HVAC Technologies and Practices for the Buildings Sector (2009)

- Advanced Rooftop Packaged Air Conditioners
  - Advanced "Gas Pack" Rooftop Packaged Air Conditioner
  - Commercial Energy Recovery Ventilation Systems
  - Residential Hot-Dry Air Conditioners
  - Smart Premium (Robust) Residential Air Conditioners
  - Advanced Northern Heat Pumps
  - Commercial Ground-Source Heat Pumps
  - Residential Ductwork Optimization
  - Active Chilled Beam Cooling
  - Advanced Modulating HVAC Compressor
  - Automated Fault Detection and Diagnostics for Rooftop Units
  - Liquid Desiccant Air Conditioner
  - Residential Boiler Controls
  - Dehumidification Enhancements for Air Conditioners in Hot-Humid Climates
  - Air-Side Economizer Control Strategies
- <http://www.aceee.org/research-report/a092>

# Today's Web Conference

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## Cool Energy Savings:

- **Carlos Santamaria**, Vice President - Engineering Services **Glenborough, LLC**

# Energy Efficient Strategies Transforming The 1525 Wilson Boulevard Building Into a High Performance Building

June 15, 2011

**Presented by:**

**Carlos Santamaria, LEED AP**

Vice President – Engineering Services

Glenborough, LLC



**1525 Wilson Boulevard  
Arlington, Virginia**

# **Strategies & Best Practices Used at The 1525 Wilson Boulevard Building**

- 1. Vision and Desire Towards Change**
- 2. Know That Road Blocks Will Occur**
- 3. Must Have Trust in Technology**
- 4. Must Be Flexible to Change Parameters if Necessary**
- 5. Key – Team Must Be on Board**

**1525 Wilson Boulevard  
Arlington, Virginia**



# Objectives & Obstacles – 1525 Wilson Boulevard Building



**Project Start Date** - June 2009

**Project Completion Date** - January 2010

**Project Objectives**

- (1) Replace HVAC System
- (2) Improve Energy Efficiency
- (2) Improve Tenant IAQ
- (3) Improve Tenant Retention

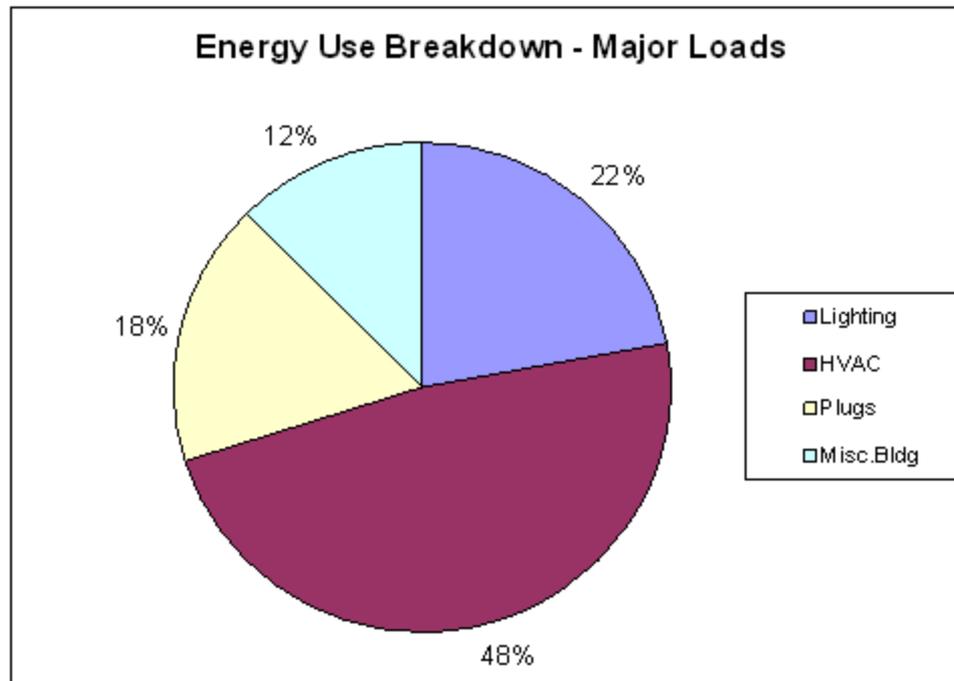
**Major Obstacles**

- (1) COST – 1.1M
- (2) Field Cooperation
- (3) New Technology Adoption
- (4) Logistics' Vendor & Site

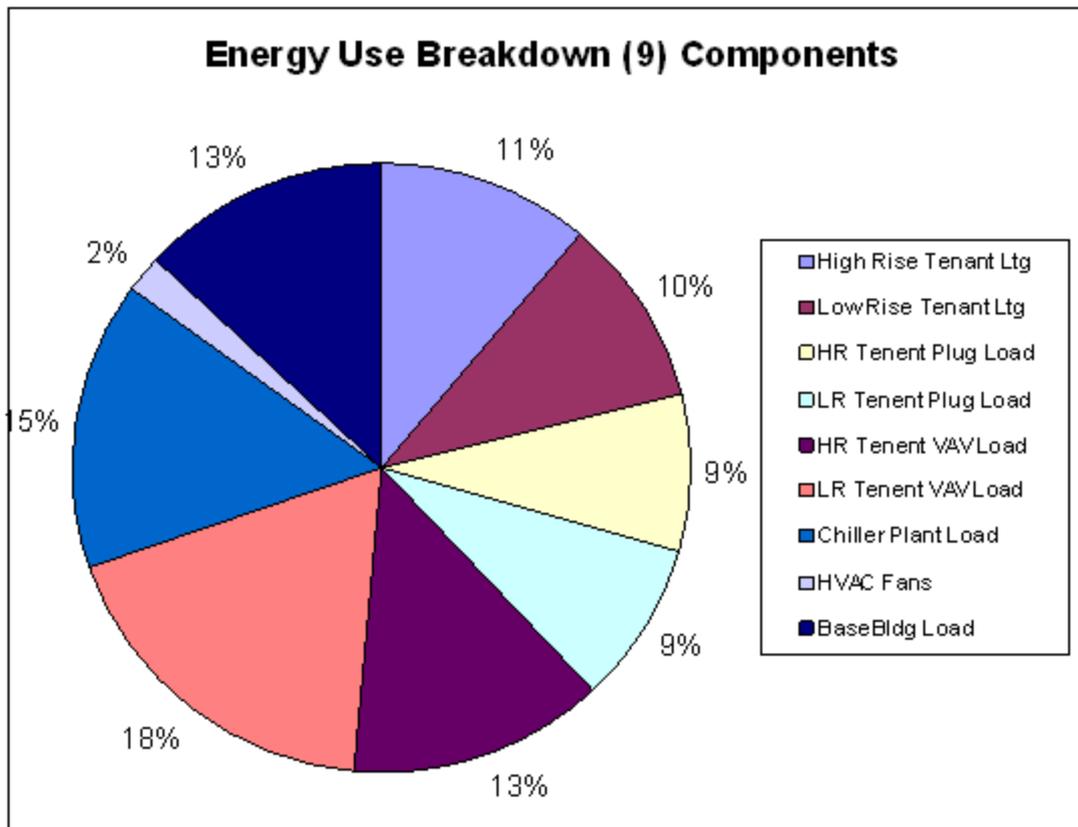


# High Performance Buildings Energy Management Strategies

## Step-1 / Must be able to Identify High Energy Use Loads



# High Performance Buildings Energy Management Strategies



## Various Methods in Determining Breakdown at this Level

- Review As Built Prints
- Review Metering in Bldg
- Add Metering on Loads
- Have Calculated
- Track Through EIS

## **Step 2 – “Multi Faceted Approach” Tools Used in Achieving High Performance Buildings**

- **Utility Bill Payment & Data Mining Service**
- **Energy Star – Portfolio Manager**
- **Gap Analysis**
- **Site Energy Management System**
- **Advanced Measurement & Verification Software**
- **Advanced Energy Management Technology**
- **Energy Information Systems \*\*\***

# **Strategies & Best Practices Used at The 1525 Wilson Boulevard Building**

## **Utility Bill Payment & Data Mining Service**

- **Primary Data Warehouse for Utility Consumption**
- **Information Must be Accessible to EVERYONE!**
- **Provides Important Metrics in Decision Making**

Glenborough LLC

Search My View Logout



Dashboard Site View Analytics Financial TrakPak Advanced Search

Dashboard

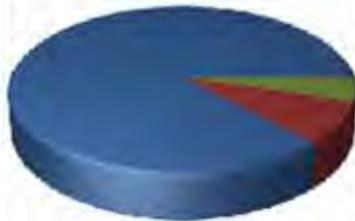


Edit Widgets Add Widget

Summary Report

Total Utilities

# Months: YTD Service(s): <All>



- Electricity: \$2,077,029.93
- Water - Sewer: \$2,271,417.27
- Gas: \$1,052,271
- Trash: \$12,452.19
- Freight: \$1,020,246.27
- Post - Bob City: Accounts: 1712 Co.
- Recycling - Denver: Vacancies: \$29,400

Trend Report

# Months: YTD Service(s): <All>

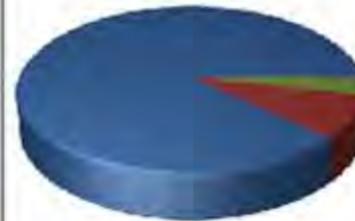


- Electricity
- Water - Sewer
- Gas
- Trash
- Freight
- Post - Bob City: Accounts
- Total Water - Sewer: Vacancies

Summary Report

Last 12 Months

# Months: 12 Service(s): <All>



- Electricity: \$2,767,293.40
- Water - Sewer: \$2,989,566.17
- Gas: \$1,076,226.51
- Trash: \$12,329.40
- Freight: \$1,014,646.77
- Total Electric: Vacancies: \$3,802.86
- Total Water - Sewer - Vacancies: \$231,600

Glenborough LLC

 Search  My View  Logout


ExpenseSmart

[Dashboard](#) [Site View](#) [Analytics](#) [Financial](#) [TrakPak](#) [Advanced Search](#)
Summary Report ?

Service Type	<input type="text" value="Electricity"/>	Restrict Type	<input type="text" value="Site"/>	Start Period	<input type="text" value="Jan-2010"/>
	<input type="text" value="Fire Protection"/>	Restrict List	<input type="text" value="All"/>	End Period	<input type="text" value="Dec-2010"/>
	<input type="text" value="Gas"/>				
	<input type="text" value="Retail Electricity Vacancy"/>				
	<input type="text" value="Retail Gas Vacancy"/>				
					<input type="button" value="Submit"/>

Search Results  [Select Service UOM](#)

Service	Cost	Usage	UOM	Cost/Usage
Electricity	\$9,783,781.82	76,209,243.00	KWH	0.1284
Gas	\$374,242.50	398,265.73	THMS	0.9397
Water - Sewer	\$977,470.93	164,961,022.00	GAL	0.0059
<b>TOTALS</b>	<b>\$11,135,495.25</b>			

## Usage Trend Monthly Data

	Service	Jan 2010	Feb 2010	Mar 2010	Apr 2010	May 2010	Jun 2010	Jul 2010	Aug 2010	Sep 2010	Oct 2010	Nov 2010	Dec 2010
<a href="#">Graph</a>	Electricity	7,136,143	6,748,874	7,064,522	6,544,777	5,253,151	5,992,047	7,546,985	6,218,420	6,226,051	5,786,432	5,756,474	5,935,367
<a href="#">Graph</a>	Gas	68,926	53,245	39,394	32,802	25,531	21,437	16,042	17,002	18,849	20,920	35,208	48,910
<a href="#">Graph</a>	Water - Sewer	7,307,248	6,480,372	11,918,808	12,073,994	15,792,764	16,080,186	15,876,220	21,889,780	15,283,184	21,720,856	11,237,396	9,300,214

# Strategies & Best Practices Used at The 1525 Wilson Boulevard Building

## Energy Star – Portfolio Manager

- Easy to Use Building Comparison Tool
- Can be Used on Property or Portfolio Level
- Being Used as Primary Building Rating System
  - It Free 😊



# STATEMENT OF ENERGY PERFORMANCE

## 1525 Wilson Blvd

Building ID: 1035933  
 For 12-month Period Ending: January 31, 2011<sup>1</sup>  
 Date SEP becomes ineligible: N/A

Date SEP Generated: June 13, 2011

### Facility

1525 Wilson Blvd  
 1525 Wilson Blvd  
 Arlington, VA 22209

### Facility Owner

Glenborough, LLC  
 400 So. El Camino Real  
 San Mateo, CA 94402

### Primary Contact for this Facility

Carlos Santamaria  
 400 So. El Camino Real  
 San Mateo, CA 94402

Year Built: 1987

Gross Floor Area (ft<sup>2</sup>): 321,959

Energy Performance Rating<sup>2</sup> (1-100) 97

### Site Energy Use Summary<sup>3</sup>

Electricity - Grid Purchase(kBtu)	20,476,094
Natural Gas - (kBtu) <sup>4</sup>	0
Total Energy (kBtu)	20,476,094

### Energy Intensity<sup>5</sup>

Site (kBtu/ft <sup>2</sup> /yr)	64
Source (kBtu/ft <sup>2</sup> /yr)	212

### Emissions (based on site energy use)

Greenhouse Gas Emissions (MTCO <sub>2</sub> e/year)	3,062
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### Electric Distribution Utility

Virginia Electric & Power Co [Dominion Resources Inc]

### National Average Comparison

National Average Site EUI	114
National Average Source EUI	381
% Difference from National Average Source EUI	-44%
Building Type	Office

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

# **Strategies & Best Practices Used at The 1525 Wilson Boulevard Building**

## **Sustainability Gap Analysis**

- **Identifies High Energy Use**
- **Can Provide Comprehensive Overview of Options**
  - **Provides Roadmap to High Performance**



# **Strategies & Best Practices Used at The 1525 Wilson Boulevard Building**

## **Site Energy Management System**

- **Baseline Tool in Operating Equipment**
  - **If Open System – Expandability**
- **Must Monitor & Control “ALL” Equipment**

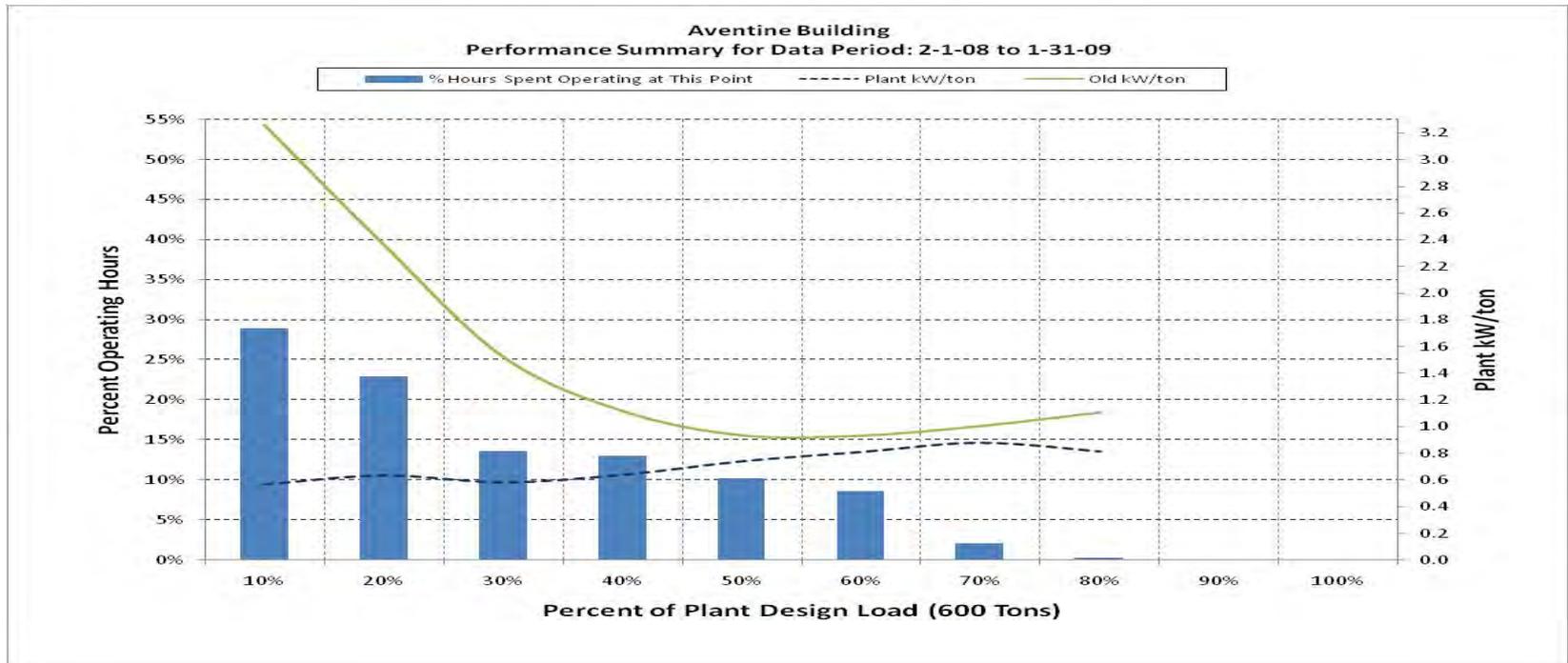
# **Strategies & Best Practices Used at Other Buildings**

## **Advanced Measurement & Verification Software Network Based Controls**

- **Less Energy Consumption During Peak Demand**
- **All Equipment Runs More Efficiently by as Much as 40% or More, More Often**
- **Equipment Life Cycle Increased**

# Strategies & Best Practices Used at Other Buildings

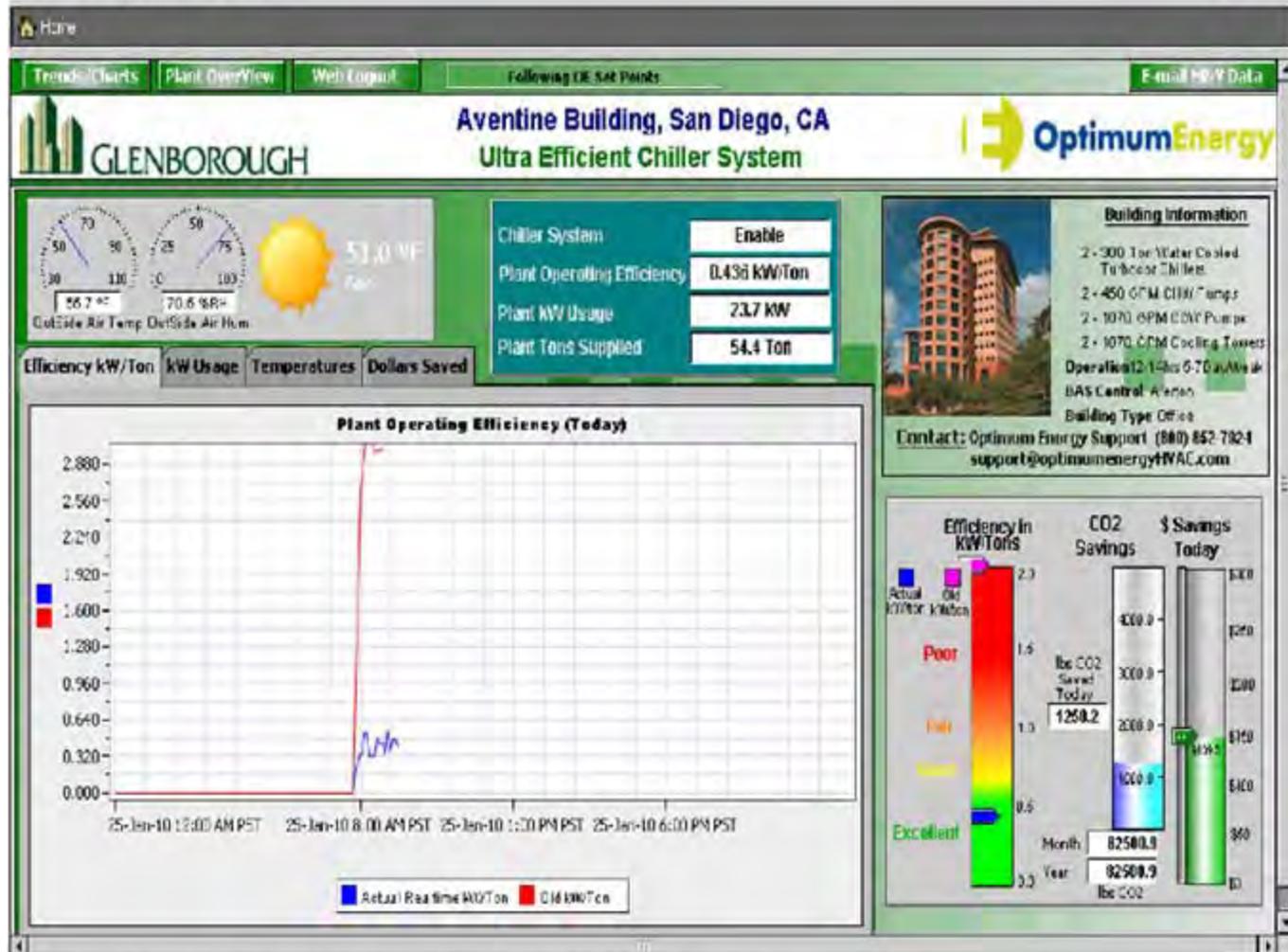
## Advanced Measurement & Verification Software Network Based Controls



# Advanced Measurement & Verification Software Network Based Controls

OptimumEnergyWeb - Web Px View

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# **Strategies & Best Practices Being Tested at The 1525 Wilson Boulevard Building**

## **Advanced Energy Management & Technology**

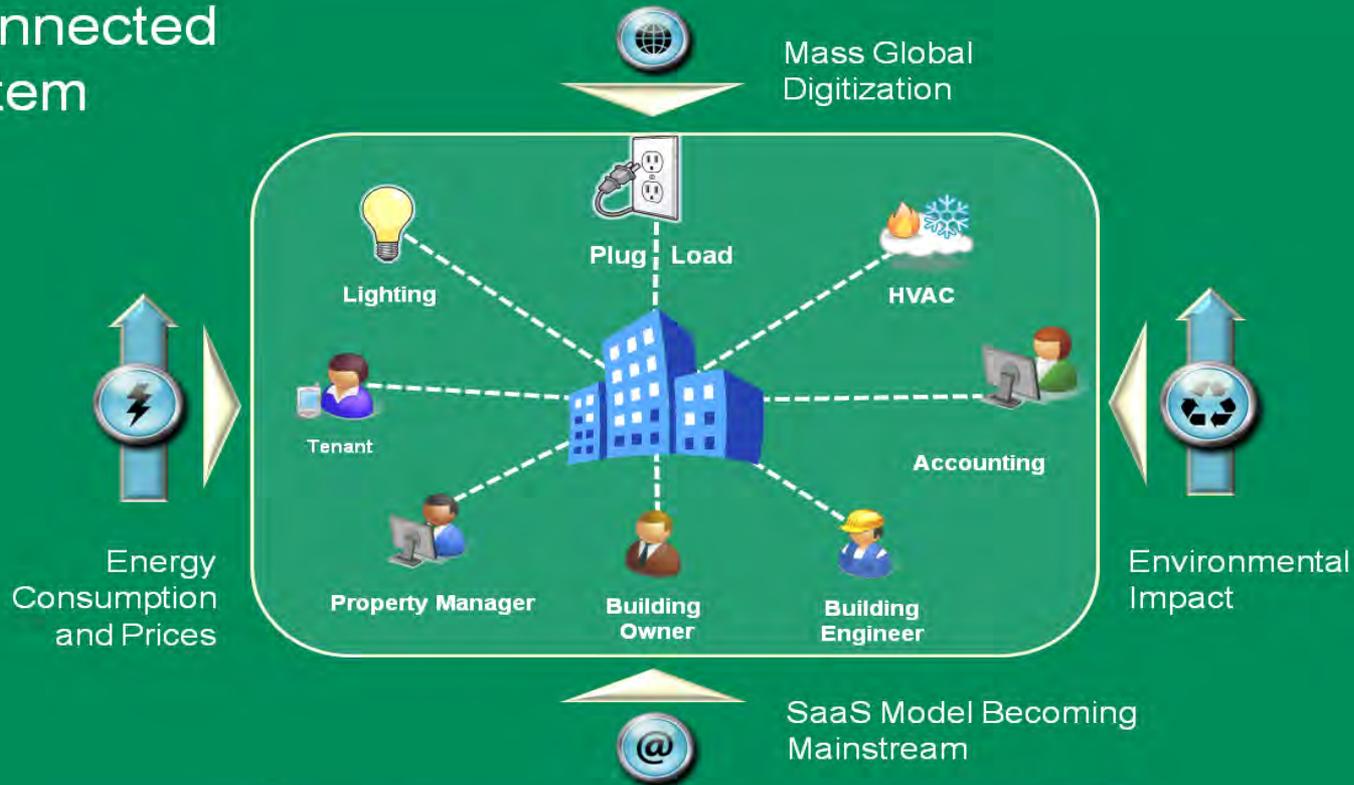
### **“Building Optimization Program”**

- **Squeezing out Last 7-12% Energy Savings**
  - **Developing Tenant User Profiles**
  - **Using Sophisticated Algorithms**

# Advanced Energy Management Technology

## Squeezing Out That Last 7-12% Energy Savings

A Disconnected Ecosystem



Need *and* opportunity for a cohesive solution

# Strategies & Best Practices Used at The 1525 Wilson Boulevard Building

## Energy Information Systems \*\*\*

- Pilot Solutions
- Make Sure Information is “Actionable”  
*“Not Static bits of information”*
- Must be Linked to Major Energy Use Loads

## SaaS Data Collection



- **Meters** record real time consumption data
- **Data Logger** receives meter data and pushes it to data center
- **Data Center** stores, manages & reports data in real time
- **Energy software** analyzes, formats & reports the data
- **User** logs into website and accesses data & reports

# Results – 1525 Wilson Boulevard Building



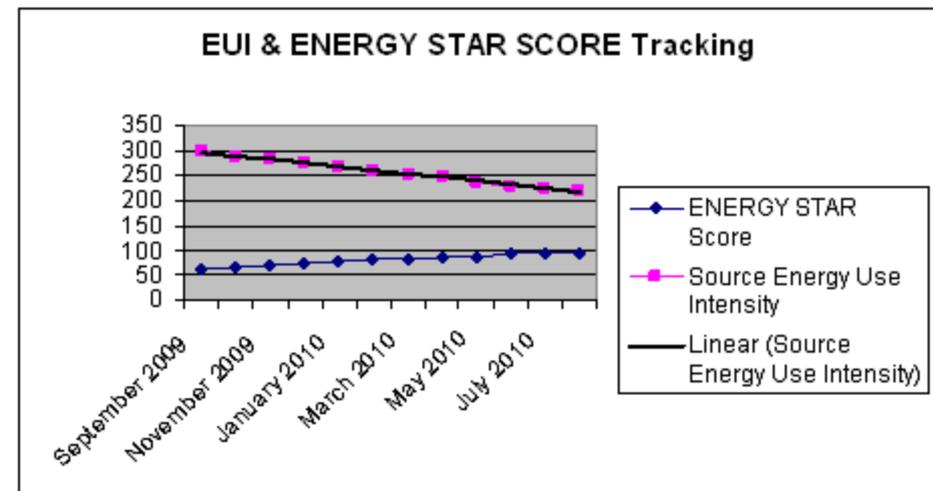
## 5 Major Outcomes

1. Energy Reduction of **2,353,040 kwh** or **28%**
2. Reduction of **1,218 MtCO<sub>2</sub>e**
3. **ENERGY STAR Score Increased from “63” to “97” – 54% Improvement**
4. HVAC Calls Reduced by over **27%** with Occupancy **100%**
5. Yearly Cost Reduction **250k - 280k**  
Increase in Asset Value of **>\$3,000,000**

# Results – 1525 Wilson Boulevard Building



- National Recognition for Sustainability & Energy Efficiency – Best in Class
- Reduced Most CO2 Emissions
- Office Building Sector Responsible for 42% of Total Energy Reduced by ALL 14-Contestants!

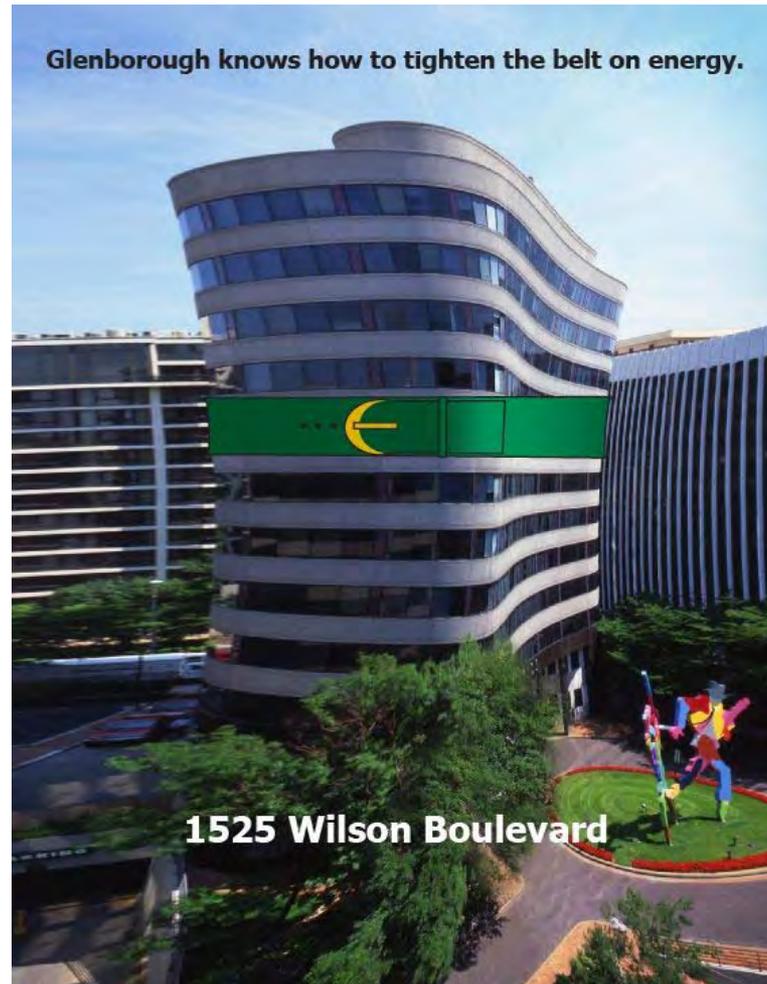


# Ongoing Projects & Strategies Being Used at The 1525 Wilson Boulevard Building

1. Piloting a Whole Building Energy Information System
2. Starting Major Elevator Modernization Seeking to Integrate Energy Research and Sustainability Attributes
3. Whole Building Tenant Integration of Glenborough Sustainability Programs



# 1525 Wilson Boulevard Knows How to Save Energy!



# **Broader Corporate Strategies Used Throughout Glenborough Buildings**

1. Waste Management Program – Min. 50% Waste Diversion
2. Development of Comprehensive Sustainability Dashboard
3. Research and Implementation of Broader Energy Information System of Connected Loads
4. Demand Response Programs

# The Aventine Office Building High Performance Results



LEED Platinum Certification – Just “**One of Five**” 20 Plus - Year Old Multi -Tenant Office Buildings in the **World!** - 2010

ENERGY STAR Rating  
of “100” for last 2 - ½  
Years

**Sustained Performance!**



## Glenborough's Energy Efficiency & Sustainability Accomplishments

- NAREIT Leader in the Light “**Gold**” Award for Energy Efficiency - 2005
- EPA **Top Leaders Award** for Achieving a Portfolio Wide Average ENERGY STAR Score above 75 - 2008
- Flex Your Power **Energy Efficiency Award** - 2008
- EPA **Top Leaders Award** for Reducing Energy Across the Portfolio by over 10% - 2009
- EPA – **ENERGY STAR National Building Competition Finalist** and 4th Place Award Winner – Highest Percentage Reduction - **2010**
- EPA **Top Leaders Award** for Achieving a Portfolio Wide Average ENERGY STAR Score **above 85** - **2011**

# Questions



If you would like to contact us, please feel free to send an email to Carlos Santamaria, **LEED AP**, Vice President – Engineering Services

[carlos.santamaria@glenborough.com](mailto:carlos.santamaria@glenborough.com)

Or call 650-343-9300x522

- Questions & Comments
  - # 6 to un-mute phone
  - \* 6 to mute

# Upcoming Web Conferences

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July – Best Practice & Project Replication Strategies

August – Our Top 3 Energy Projects

Register online at:  
[energystar.webex.com/meetings](http://energystar.webex.com/meetings)

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**Thank you!**