A Two Step Approach to High Performance Buildings
San Ramon, CA
June 9, 2011

Presented by: Carlos Santamaria, RPA, LEED AP
Vice President – Engineering Services
Glenborough, LLC
Company Overview

Glenborough, LLC has over 30 years of experience in the real estate investment and management industry.

Our focus is on acquiring, managing, leasing and developing high-quality office properties.

Our primary investment markets are in Northern California, Southern California, Denver and Washington, D.C., with over $2.0 billion of assets under management.
Best Practices Used at The Aventine Office & 1525 Wilson Boulevard Buildings

Aventine Office
La Jolla, California

1525 Wilson Boulevard
Arlington, Virginia
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

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 ***
Building Performance Tracking
Tools Used in Achieving
High Performance Buildings

Utility Bill Payment & Data Mining Service

• Primary Data Warehouse for Utility Consumption
• Information Must be Accessible to EVERYONE!
• Provides Important Metrics in Decision Making
## Summary Report

<table>
<thead>
<tr>
<th>Service Type</th>
<th>Restrict Type</th>
<th>Site</th>
<th>Restrict List</th>
<th>All</th>
<th>Start Period</th>
<th>End Period</th>
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</thead>
<tbody>
<tr>
<td>Electricity</td>
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<td>Jan-2010</td>
<td>Dec-2010</td>
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<td>Fire Protection</td>
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<td>Gas</td>
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<tr>
<td>Retail Electricity Vacancy</td>
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<tr>
<td>Retail Gas Vacancy</td>
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</tbody>
</table>

## Search Results

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost</th>
<th>Usage</th>
<th>UOM</th>
<th>Cost/Usage</th>
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<tbody>
<tr>
<td>Electricity</td>
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<td>Gas</td>
<td>$374,242.50</td>
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<td>Water - Sewer</td>
<td>$977,476.93</td>
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<td>GAL</td>
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**TOTALS**

$11,135,495.25

## Usage Trend Monthly Data

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<tbody>
<tr>
<td>Electricity</td>
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<td>6,748,874</td>
<td>7,064,522</td>
<td>6,544,777</td>
<td>5,253,151</td>
<td>5,992,047</td>
<td>7,546,985</td>
<td>6,218,420</td>
<td>6,226,051</td>
<td>5,786,432</td>
<td>5,756,474</td>
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<tr>
<td>Gas</td>
<td>68,926</td>
<td>53,245</td>
<td>39,394</td>
<td>32,802</td>
<td>25,531</td>
<td>21,437</td>
<td>16,042</td>
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<td>18,849</td>
<td>20,920</td>
<td>35,208</td>
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<td>Water - Sewer</td>
<td>7,307,248</td>
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<td>15,792,764</td>
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<td>15,876,220</td>
<td>21,889,780</td>
<td>15,283,184</td>
<td>21,720,856</td>
<td>11,237,396</td>
<td>9,300,214</td>
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</tbody>
</table>
Building Performance Tracking Tools Used in Achieving High Performance Buildings

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

Aventine

Building ID: 1059351
For 12-month Period Ending: February 28, 2011
Date SEP becomes ineligible: N/A
Date SEP Generated: June 06, 2011

Facility
Aventine
8910 University Center Lane
Suite 255
San Diego, CA 92122

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: 1988
Gross Floor Area (R²): 253,117

Energy Performance Rating² (1-100) 100

Site Energy Use Summary³
District Chilled Water - Electric-Driven
Chiller (kBtu) - 2,647,068
Electricity - Gnd Purchase (kBtu) - 6,480,164
Natural Gas - (kBtu) - 0
Total Energy (kBtu) - 5,833,096

Energy Intensity⁴
Site (kBtu/ft²yr) - 23
Source (kBtu/ft²yr) - 101

Emissions (based on site energy use)
Greenhouse Gas Emissions (MCO₂eq/eye) - 770

Electric Distribution Utility
San Diego Gas & Electric Co [Sempra Energy]

National Average Comparison
National Average Site EUI - 63
National Average Source EUI - 275
% Difference from National Average Source EUI - (-63%)
Building Type - Office

Meets Industry Standards⁴ for Indoor Environmental Conditions:
Ventilation for Acceptable Indoor Air Quality - N/A
Acceptable Thermal Environmental Conditions - N/A
Adequate Illumination - N/A

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, as audited to a 12-month period.
4. Values represent energy intensity, as audited to a 12-month period.
5. Based on Weather-Adjusted building energy consumption data. ENERGY STAR Standard 6.0 for first model year, and 2006 Title 24 Standards for building models.
Building Performance Tracking
Tools Used in Achieving High Performance Buildings

Sustainability Gap Analysis

• Identifies High Energy Use
• Can Provide Comprehensive Overview of Options
  • Provides Roadmap to High Performance
### Sustainability Gap Analysis

#### Year Building Investment overview

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<th>Year</th>
<th>Building Investment</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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<td>3</td>
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<td>4</td>
<td>General inflation rate</td>
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<td>3.5%</td>
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<tr>
<td>5</td>
<td>Total inflation rate</td>
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<td>6</td>
<td>Cash flow and ROI statement</td>
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<td>Benefit Drivers</td>
<td>Benefit 1</td>
<td>Benefit 2</td>
<td>Benefit 3</td>
<td>Benefit 4</td>
<td>Benefit 5</td>
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<td>Carbon Credits</td>
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<td>12</td>
<td>Annual discount factor</td>
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<td>Annual benefit savings</td>
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<td>$102,150</td>
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<td>Total annual benefit savings</td>
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<td>Discounted benefit flow</td>
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<td>Other costs</td>
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<td>ROI investment</td>
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<td>23</td>
<td>ROI hurdle rate</td>
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<td>8.4%</td>
<td>8.4%</td>
<td>8.4%</td>
<td>8.4%</td>
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</tbody>
</table>
Building Performance Tracking
Tools Used in Achieving High Performance Buildings

Site Energy Management System

• Baseline Tool in Operating Equipment

• If Open System – Expandability

• Must Monitor & Control “ALL” Equipment
Building Performance Tracking
Tools Used in Achieving High Performance 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
Building Performance Tracking
Tools Used in Achieving High Performance Buildings

Advanced Measurement & Verification Software
Network Based Controls
Building Performance Tracking
Tools Used in Achieving High Performance Buildings

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

Mass Global Digitization

Plug + Load

HVAC

Accounting

Energy Consumption and Prices

Tenant

Property Manager

Building Owner

Building Engineer

SaaS Model Becoming Mainstream

Need and opportunity for a cohesive solution
Building Performance Tracking
Tools Used in Achieving High Performance Buildings

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
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!
1525 Wilson Boulevard Building
High Performance Results

• Reduction of \(2,353,040\) kilowatts > 28%
• HVAC Calls Reduced by over 27% with Occupancy at 100%
• Yearly Cost Reduction of 250k Increasing Asset Value by over $3,000,000

ENERGY STAR Rating Improvement from “63” to “95” in 12 Months
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, **RPA, LEED AP**, Vice President – Engineering Services

[Email Address]

Or call 650-343-9300x522