HOK’s Effect...

+/- 275 MILLION SF Annually
PRE AIR-CONDITIONING
MARKET-RATE NET ZERO PROTOTYPE
MARKET-RATE NET ZERO PROTOTYPE
### MARKET-RATE NET ZERO PROTOTYPE

#### ZERO EMISSIONS BUILDING VS. LEED CERTIFIED BUILDING

Updated for 170,735 gsf energy use 6-2-2010

<table>
<thead>
<tr>
<th></th>
<th>ZERO EMISSIONS BUILDING (ZEB): Concrete Frame Structure</th>
<th>LEED CERTIFIED BUILDING: Steel Frame Structure</th>
<th>LEED CERTIFIED BUILDING: Concrete Frame Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Costs</strong></td>
<td>Cost ($M)</td>
<td>$36M</td>
<td>$30M</td>
</tr>
<tr>
<td><strong>Cost per sf</strong></td>
<td>$211/sf</td>
<td>$178/sf</td>
<td>$183/sf</td>
</tr>
</tbody>
</table>

**12-14 year payback in St. Louis market**

14 year = 2% fuel escalation rate
12 year = 4% fuel escalation rate
A REPLICABLE PROCESS…

1 Discovery + Definition
Climate in place Analysis, Life’s Principles
Goals
Benchmarking Analysis, Identify target metrics

2 Macro-Scale Strategies
Massing
Orientation
Site and Planning Concepts
Renewable Energy Opportunities

3 Passive Strategies
Finalize plan and section
Openings
Shading

4 Integrated Solutions
Primary systems – MEP, structural
Site and Landscape Design
Building Envelope – walls, roof windows
Secondary Systems – controls, lighting,
MEP, plug/occupancy loads, metering

5 Renewable Systems

6 Occupancy
Ongoing O+M
Tenants play an essential part
Executive Order 13423, 01/24/07

Reduce energy intensity by 3% each year, leading to 30% by the end of fiscal year (FY) 2015 compared to an FY 2003 baseline.

Ensure that one half of all renewable energy required under EPAct 2005 comes from new renewable sources.

To the maximum extent possible, renewable energy generation projects should be implemented on agency property for agency use.

Reduce water intensity (gallons per sf) by 2% each year through FY 2015 for a total of 16% based on water consumption in FY 2007.

Executive Order 13514, 10/5/09

30% reduction in Vehicle Fleet Petroleum Use by 2020.

26% improvement in Water Efficiency by 2020.

50% Waste Diversion by 2015.

95% of all applicable Contracts will meet Sustainability Requirements.

2030 CHALLENGE

U.S. Building Sector CO2 Emissions

Source: Mazria Inc. 2005 (Assumes a 15% embodied energy reduction in the construction of new buildings)
BYRON ROGERS FEDERAL OFFICE BUILDING

Life Cycle Continuum

PATH TO NET ZERO
GSA TARGET 39.1 EUI
HOK TEAM 24.7 EUI
HOK Carbon Footprint by Category

Carbon Footprint by Category

- Air Travel: 53%
- Energy: 33%
- Commuting: 14%

SELF ASSESSMENT
BIOMIMICRY
ATLANTA – CITY OF THE FUTURE

2010

2110
ATLANTA – CITY OF THE FUTURE

New Growth Node | Old Growth Neighborhood | Cultural Core | Renewal Catalyst

nodes and neighborhoods
BLACK-TAILED PRAIRIE DOGS

- Round crater: wind goes in
- Steep crater: wind goes out and creates negative pressure pulling air through tunnel coupler
- Wind velocity in tunnel is proportional to outside wind