

The background of the slide features a dense pattern of vibrant green leaves in various shades and textures, overlaid with a translucent, light blue-green area containing the text. Below this area, the bottom portion of the slide shows a close-up of water ripples in shades of teal and light blue.

# Green PBC Schools

School District of Palm Beach County

LEED Workshop

March 5, 2008



# What is a Green School?

- Environmental benefits:
  - Enhance and protect ecosystems and biodiversity
  - Improve air and water quality
  - Reduce solid waste
  - Conserve natural resources
- Economic benefits:
  - Reduce operating costs
  - Enhance asset value and profits
  - Improve employee productivity and satisfaction
  - Optimize life-cycle economic performance
- Health and community benefits:
  - Improve air, thermal, and acoustic environments
  - Enhance occupant comfort and health
  - Minimize strain on local infrastructure
  - Contribute to overall quality of life

# Non-Economic Benefits

- An analysis of two school districts in Illinois found that **student attendance rose by 5%** after incorporating cost-effective indoor air quality improvements.
- A recent study of the cost and benefits of green schools for Washington State estimated a **15% reduction in absenteeism** and a **5% increase in student test scores**.
- Students moving into the Ash Creek Intermediate School in Oregon experienced a **15% reduction in absenteeism**.
- Students moving from a conventional school to the new green Clearview Elementary School, a 2002 LEED Gold building in Pennsylvania, experienced substantial improvements in health and test scores. A PhD thesis on the school found a **19% increase in average Student Oral Reading Fluency Scores (DIBELS)** when compared to the prior, conventional school.
- The Third Creek Elementary School in Statesville, North Carolina is the country's first LEED gold K-12 school. Completed in 2002, the 800 student school replaced two older schools. Documented student test scores before and after the move provide compelling evidence that **learning and test scores improve in greener, healthier buildings**.

# New Projects

- Design Just Starting or About to Start
  - West Boca Raton Area ES (05-C) - Reuse
  - Royal Palm Beach Area ES (03-W) - Reuse
  - West Central Transportation Compound - Reuse
  - Belle Glade ES Addition
  - Manatee ES Addition
  - Seminole Trails ES Addition
  - Northboro ES Modernization
  - Riviera Beach Area HS (02-MMM)
  - Banyan Creek ES Core Addition

# New Projects

- Architect to be Selected in 3-6 months
  - Grades 6-8 Plumosa @ Seacrest
  - North Palm Beach ES Modernization
- Subsequent Projects 1-2 years
  - Galaxy Elementary
  - Roosevelt Full Service Center
  - Jupiter MS Addition
  - Gove ES Modernization

# Do we want to incorporate LEED requirements in upcoming projects?

- What we know:
  - Initial cost is higher (est. 1-3%)
  - Some things that earn LEED points do not have a payback while other do.
  - There are alternatives to LEED.
  - At a minimum we want to continue doing things we did prior to Pine Jog.
  - Credibility is important; builds community confidence.
  - Green schools have multiple benefits including lower life cycle costs, better health of occupants, improved productivity, good for the environment.
  - Some “new” things at Pine Jog are easy to incorporate in other projects.
  - Other schools want to be “green” too.
  - Early design projects were not planned as LEED-certified projects (A/E and CM selection and fees are approved).

# Do we want to incorporate LEED requirements in upcoming projects?

- What we don't know:
  - Precisely how much more it costs to build LEED-certified schools.
  - Precisely the cost savings we will realize as a result of building LEED-certified schools considering what we already do.
  - If cost will come down as more owners insist on green buildings.
  - Future property tax revenues and impact on budget.
  - What “new” materials and equipment used at Pine Jog we will want to incorporate in future projects.
  - How green do we want to be (Certified, Silver, Gold, Platinum)?




TABLE A

### Financial Benefits of Green Schools (\$/ft<sup>2</sup>)

Energy	\$9
Emissions	\$1
Water and Wastewater	\$1
Increased Earnings	\$49
Asthma Reduction	\$3
Cold and Flu Reduction	\$5
Teacher Retention	\$4
Employment Impact	\$2
<b>Total</b>	<b>\$74</b>
<b>Cost of Greening</b>	<b>(\$3)</b>
<b>Net Financial Benefits</b>	<b>\$71</b>

TABLE B: SCHOOL BUILDINGS ANALYZED IN THIS REPORT\*

Name	State	Year Completed	2005 MA-CHPS	LEED Score	LEED Level or Equivalent	Cost premium	Energy Savings	Water Savings
Ash Creek Intermediate School	OR	2002			CERTIFIED	0.00%	30%	20%
Ashland High School*	MA	2005	19			1.91%	29%	
Berkshire Hills*	MA	2004	27			3.99%	34%	0%
Blackstone Valley Tech*	MA	2005	27			0.91%	32%	12%
Capuano	MA	2003		26	CERTIFIED	3.60%	41%	
Canby Middle School	OR	2006		40	GOLD	0.00%	47%	30%
Clackamas	OR	2002		33	SILVER	0.30%	38%	20%
Clearview Elementary	PA	2002	49	42	GOLD	1.30%	59%	39%
Crocker Farm School	MA	2001	37			1.07%	32%	62%
C-TEC	OH	2006	35	38	SILVER	0.53%	23%	45%
The Dalles Middle School	OR	2002			SILVER	0.50%	50%	20%
Danvers*	MA	2005	25			3.79%	23%	7%
Dedham*	MA	2006	32			2.89%	29%	78%
Lincoln Heights Elementary School	WA	2006			SILVER		30%	20%
Melrose Middle School	MA	2007	36			1.36%	20%	20%
Model Green School	IL	2004		34	SILVER	2.02%	29%	35%
Newton South High School	MA	2006		32	CERTIFIED	0.99%	30%	20%
Prairie Crossing Charter School	IL	2004		34	SILVER	3.00%	48%	16%
Punahou School	HI	2004		43	GOLD	6.27%	43%	50%
Third Creek Elementary	NC	2002		39	GOLD	1.52%	26%	63%
Twin Valley Elementary	PA	2004	41	35	SILVER	1.50%	49%	42%
Summerfield Elementary School	NJ	2006	42	44	GOLD	0.78%	32%	35%
Washington Middle School	WA	2006		40	GOLD	3.03%	25%	40%
Whitman-Hanson*	MA	2005	35			1.50%	35%	38%
Williamstown Elementary School	MA	2002	37			0.00%	31%	
Willow School Phase 1	NJ	2003		39	GOLD		25%	34%
Woburn High School*	MA	2006	32			3.07%	30%	50%
Woodward Academy Classroom	GA	2002		34	SILVER	0.00%	31%	23%
Woodward Academy Dining	GA	2003		27	CERTIFIED	0.10%	23%	25%
Wrightsville Elementary School	PA	2003		38	SILVER	0.40%	30%	23%
<b>AVERAGE</b>						<b>1.65%</b>	<b>33.4%</b>	<b>32.1%</b>



## Construction Cost Analysis 3rd Quarter 2007

### Focus On Green

Construction costs have continued in a similar trend as last quarter, increasing at much lower rates than the double-digit annual percentage increases between 2002 and 2006... and prices for housing materials such as lumber and gypsum products continue to drop. Meanwhile "Green" initiatives have continued to gain momentum and be embraced by owners, designers & contractors in the design and construction field.

These green initiatives include "Green" design, "Leadership in Energy and Environmental Design (LEED)" and "Sustainable" design. These designations are focused on getting projects designed and constructed to improve the long-term environments and energy efficiency of projects, and improving the health and productivity of users. But what do these initiatives require on projects and how do these changes impact initial construction and project life cycle cost?

To meet the LEED rating system, which is a nationally recognized standard for measuring the sustainability of a facility, projects are designed for meeting substantial requirements resulting in various levels of LEED certification: CERTIFIED, SILVER, GOLD AND PLATINUM. The requirements include the following:

- Sustainable Sites – such as building orientation to optimize solar gain
- Materials and Resources – such as high performance windows, insulation and "shell" materials to lower HVAC loads
- Energy and Atmosphere – such as air sealing and efficient HVAC systems
- Water Efficiency – such as low water use plumbing
- Sustainable Energy Use – such as solar energy used where practical
- Indoor Environmental Quality – such as providing interior lighting with natural light (daylighting)
- Innovation in Design, Operations & Management – such as implementing environmentally sensitive practices within a facility

**LEED Impact on Construction Costs:** Meeting LEED requirements does come at a higher initial cost, often estimated at 2% to 8% higher than projects that do not meet sustainability, dependent on the level of LEED certification. See the graph at right for estimated initial cost increase to meet LEED, based on recent studies.

**Life Cycle Costs of Technologies**

The chart compares the life cycle costs of various technologies for LEED and Non-LEED projects. It shows that while LEED projects may have higher initial costs, they often result in lower overall life cycle costs due to operational savings.

**Range of Estimated % Increase of Construction Cost to Meet LEED**

This line graph illustrates the estimated percentage increase in construction cost required to achieve different levels of LEED certification. The x-axis represents the LEED Certification Level (Certified, Silver, Gold, Platinum), and the y-axis represents the % Increase (0 to 8). Two lines are shown: a red line representing the lower end of the range and a green line representing the upper end. Both lines show an upward trend as the certification level increases.

LEED Certification Level	Estimated % Increase (Lower Bound)	Estimated % Increase (Upper Bound)
Certified	~1.5%	~2.5%
Silver	~2.5%	~3.5%
Gold	~4.5%	~5.5%
Platinum	~6.5%	~8.5%

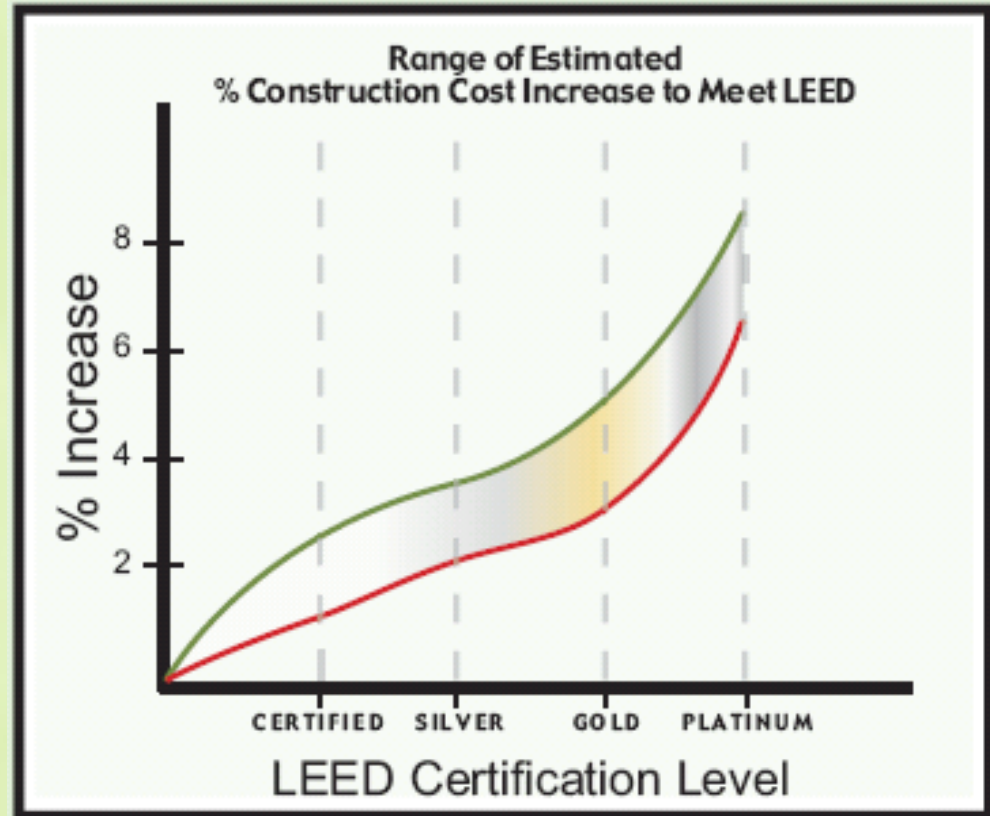
A key to designing for sustainability is maximizing the operating cost savings while minimizing the initial construction cost impact, that is, minimizing the Life Cycle Costs (LCC).

**LEED Impact on Operating Costs:** It has been estimated that an initial investment in LEED can demonstrate a tenfold return on the investment in operational savings over the life of the facility. (Based on a report by California's Sustainable Building Task Force, October 2003). The bottom line is that those meeting LEED requirements and using LCC optimization techniques can show substantial savings in the cost of operations over the life of a facility, as shown in this graph to the left.

**PBSA has a sustainable design program. Led by Chuck Crobin (ccrobin@pbsa.com). In addition to LEED certification for projects, individuals can also achieve LEED AP certification. Further information can be found at the U.S. Green Building Council website at www.usgbc.org.**

**PBSA's National Construction Consulting program can assist you with the latest cost information and accurate cost estimates, as well as services for scheduling, construction claims, value engineering and other project control needs. Please contact David Carter at dcarter@pbsa.com or Phyllis Shook at pshook@pbsa.com for age needs or further information.**

3rd Quarter 2007 Update  
 Cost Consulting | Scheduling | Document Controls | Claims Analysis | Technology





# Discussion

1. Should we be “green aggressive’ with projects starting design; go after projects that were already award?
2. Should we require new solicitations to be designed and built to a minimum of LEED Silver?
3. Should we establish a policy position on all future projects requiring a minimum of LEED Silver?