REQUEST FOR BOARD ACTION

HENDERSON COUNTY
BOARD OF COMMISSIONERS

MEETING DATE: **July 18, 2007**

SUBJECT: **Moseley Architects Presentation**

ATTACHMENTS: **Yes**

SUMMARY OF REQUEST:

Representatives from Moseley Architects will be present at today's meeting to provide additional information on Leadership in Energy and Environmental Design (LEED) certification guidelines and associated costs related to school design and construction.

BOARD ACTION REQUESTED:

The Board is requested to approve the additional funding necessary, but not exceeding $750,000 for both schools, to obtain LEED certification.

Suggested Motion:

I move the Board approve additional funding up to $750,000 for two schools to obtain LEED certification.

Presentation to

HENDERSON COUNTY BOARD OF COUNTY COMMISSIONERS

on behalf of

HENDERSON COUNTY SCHOOLS

LEED Certification for Mills River and Hillandale Elementary Schools

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Topics

- Why are we here?
- What does "green" mean?
- What does it take to make "green" schools?
  - LEED
- What are the benefits of "green" schools?
  - Health
  - Environment
  - Cost Benefits
- Q&A

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Why are we here?

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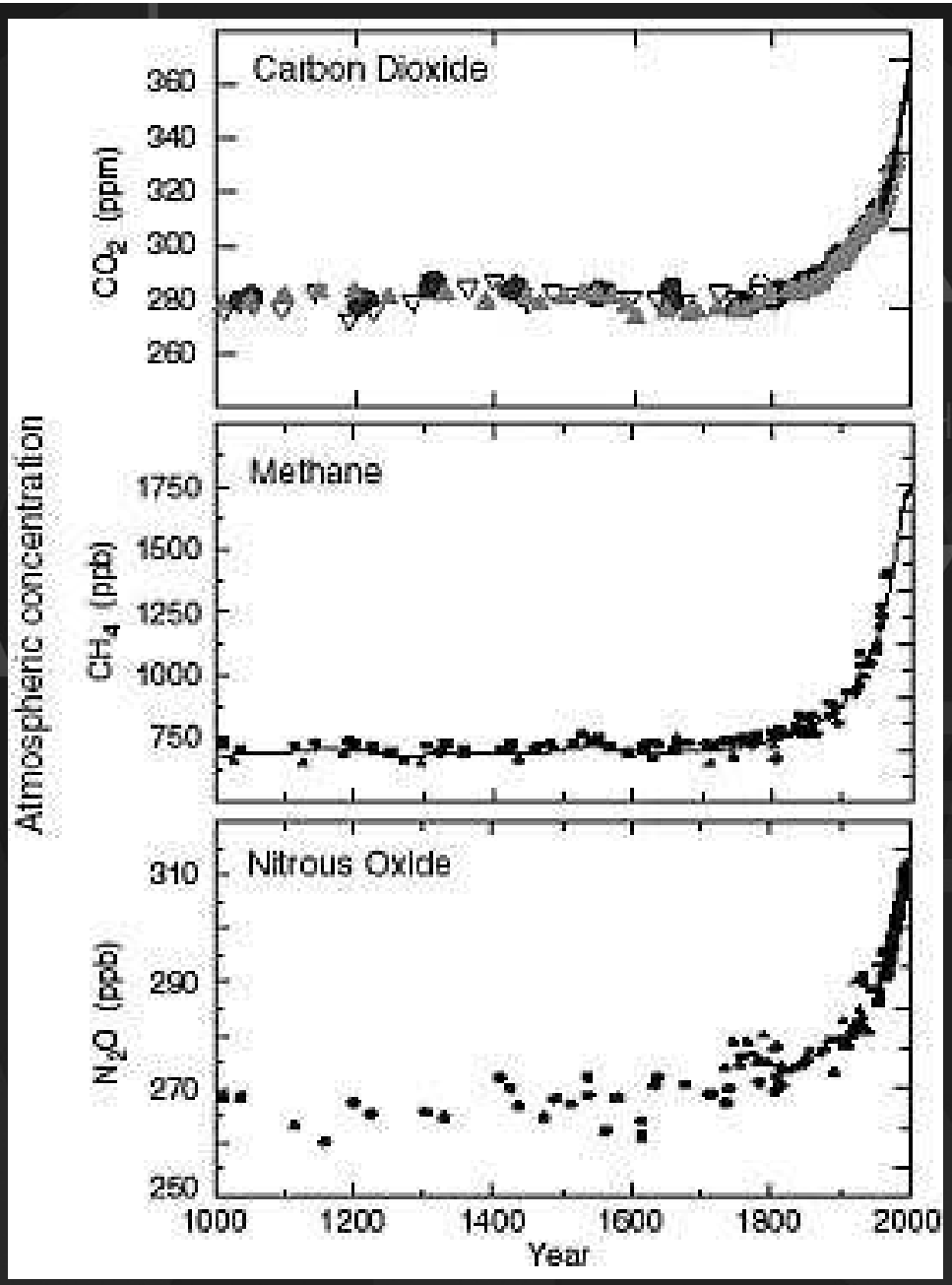
Effects of the Industrial Revolution.

- Since the beginning of the Industrial Revolution, the concentrations of many of the greenhouse gases have increased. The concentration of CO2 has increased by about 100 ppm (i.e., from 280 ppm to 380 ppm). The first 50 ppm increase took place in about 200 years.. to around 1973; the next 50 ppm increase took place in about 33 years, from 1973 to 2006.



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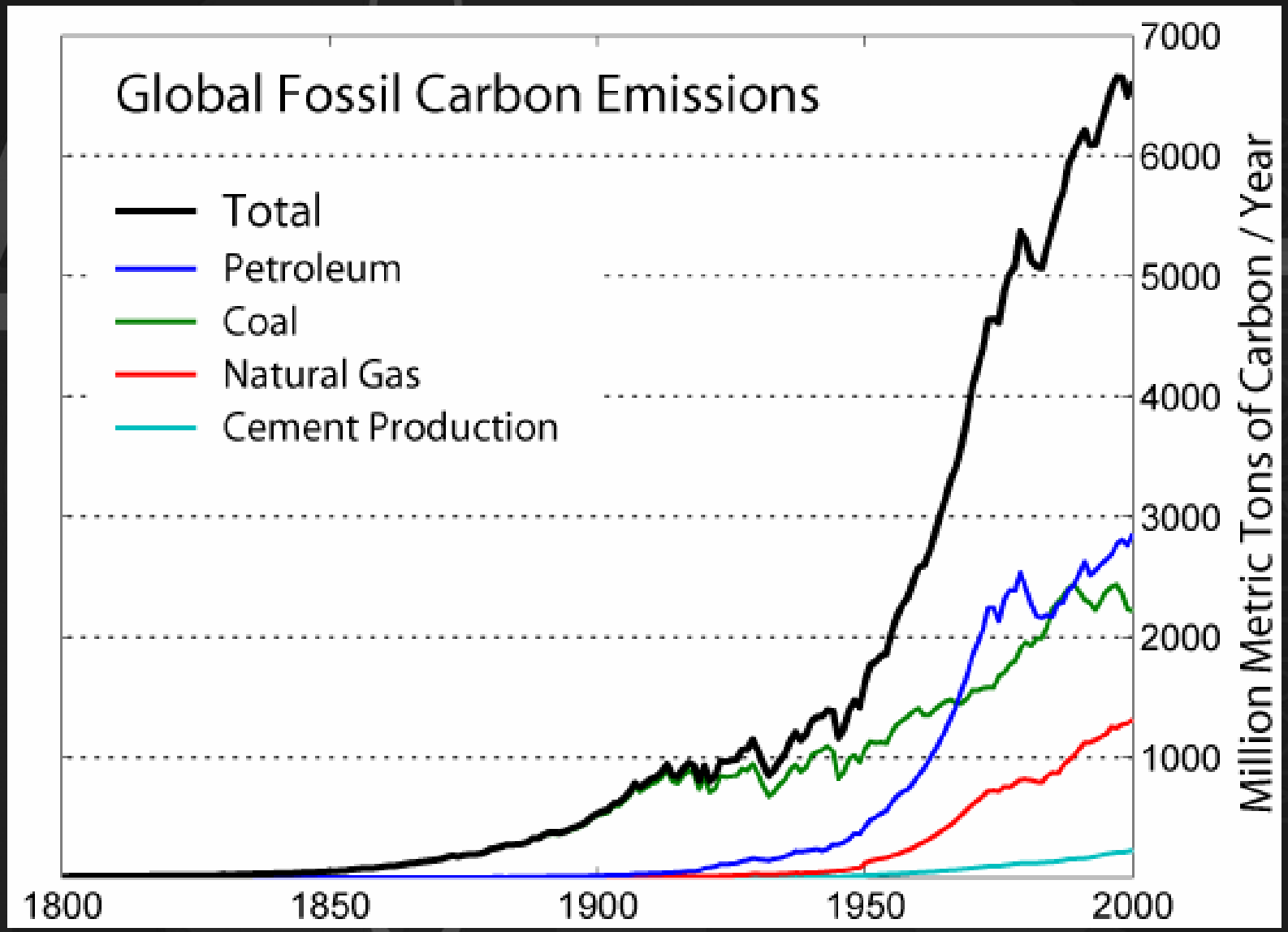

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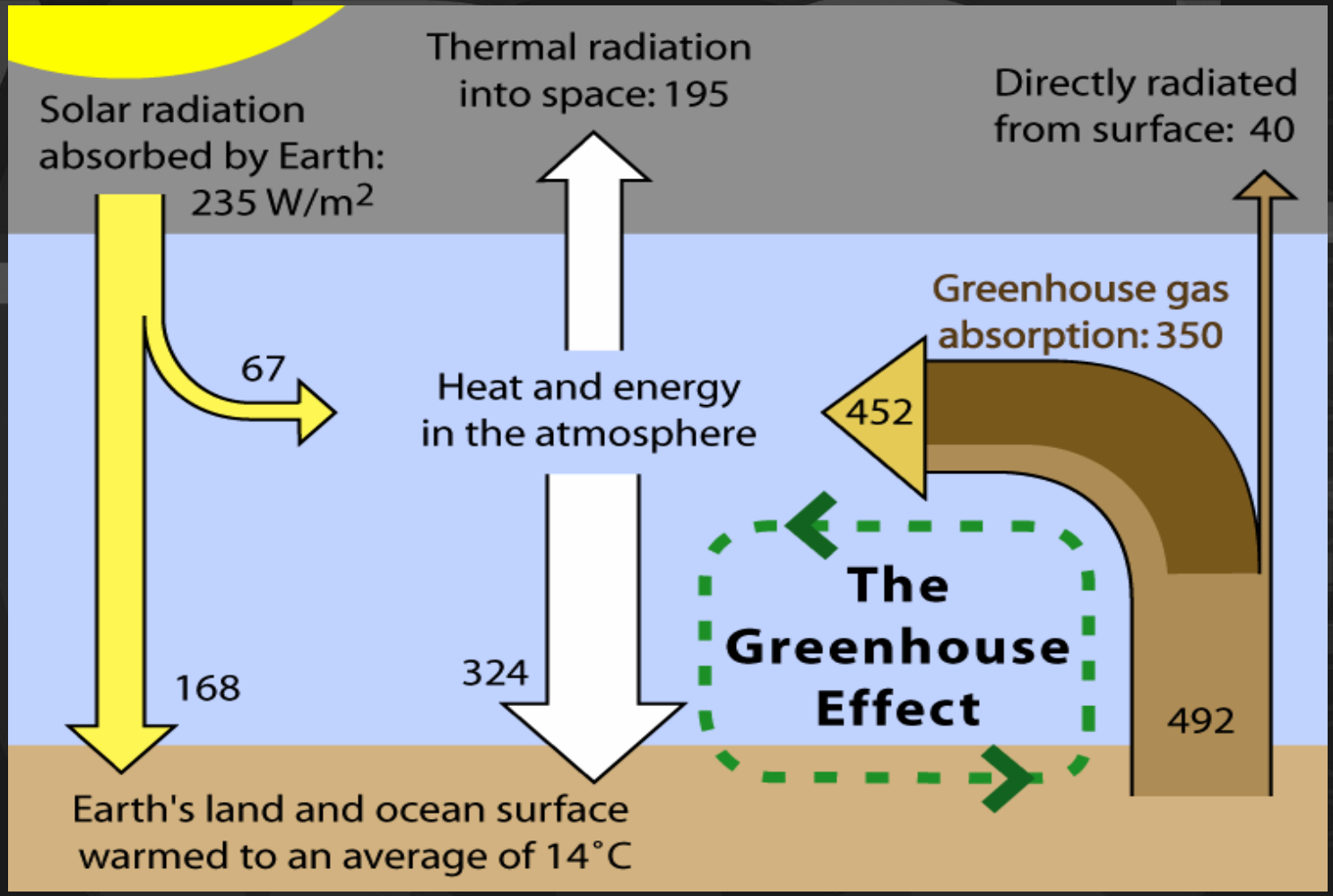
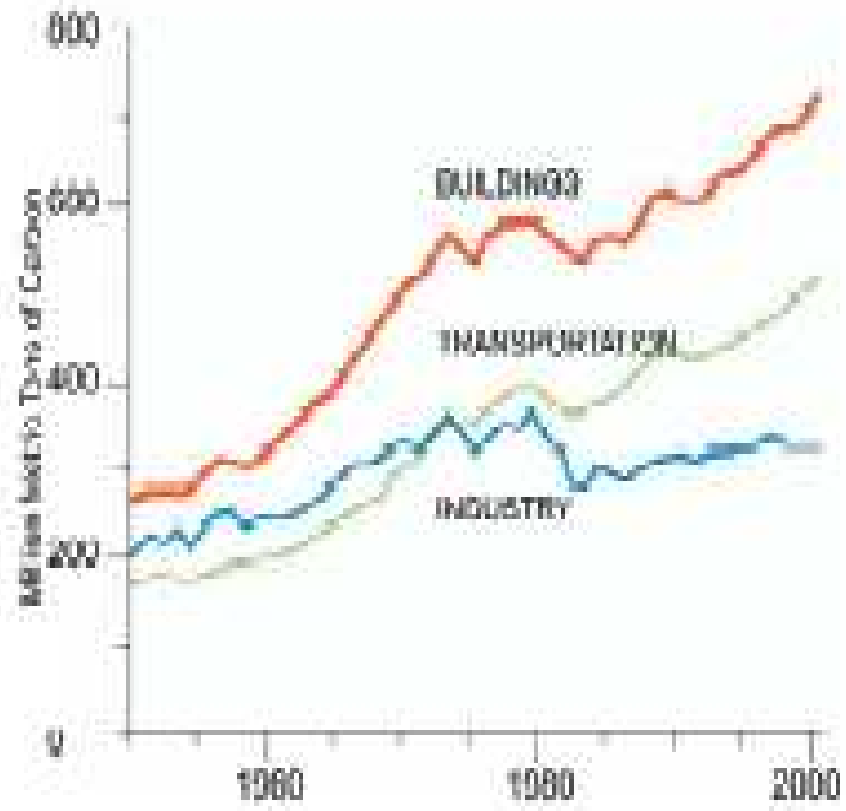
The Greenhouse Effect

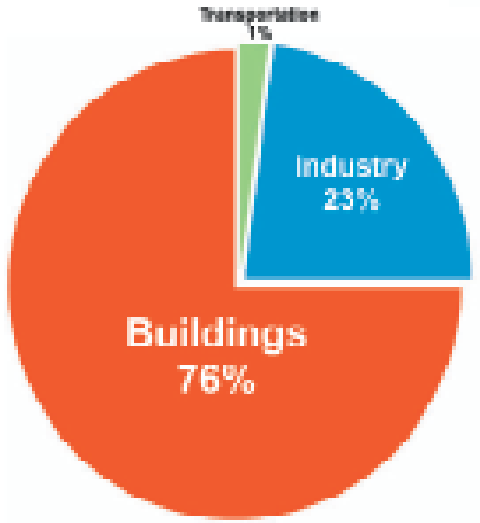


A schematic representation of the exchanges of energy between outer space, the Earth's atmosphere, and the Earth surface. The ability of the atmosphere to capture and recycle energy emitted by the Earth surface is the defining characteristic of the greenhouse effect.

How do buildings effect emissions?

Buildings Account For Half Of All Greenhouse Gas Emissions





GRAPHIC 4: 76% of all power plant generated electricity is used just to operate buildings.

GRAPHIC 2: U.S. CO2 Emissions by Sector.

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Why?

- According to the U.S. Department of Energy's Center for Sustainable Development, buildings consume 40% of the world's total energy, 25% of its wood harvest and 16% of its water.
- Buildings overall are responsible for 48% of Carbon Dioxide emissions in the US, the major contributor to global warming.
- School buildings represent the largest construction sector in the U.S.—$80 billion in 2006-2008

Approximately 91,000 K-12 schools in the US house 47 million students

EPA reports that over 60 million people spend their days in school buildings

What a tremendous opportunity we have to improve these places of learning and to improve the environment, while saving money.

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Why?

- By promoting the design & construction of "green schools", we can make a tremendous impact on student health, test scores, the environment, and *school operational costs* .

What does "green" mean?

- "High Performance" and/or "Sustainable"
- "Green" Building practices promote construction of buildings that are healthier for the occupants and the environment.
- "Green" schools are environmentally sound and provide measurable benefits that impact the occupants of the building and the *financial bottom line.*

What does it take to make "green" schools?

What is **LEED for Schools**?
(**Leadership in Energy and Environmental Design**)

The **LEED for Schools Rating System** recognizes the unique nature of the design and construction of K-12 schools. Based on LEED for New Construction, it addresses issues such as classroom acoustics, master planning, mold prevention, and environmental site assessment. By addressing the uniqueness of school spaces and children's health issues, LEED for Schools provides a unique, comprehensive tool for schools that wish to build green, with measurable results. LEED for Schools is the recognized third-party standard for high-performance schools that are healthy for student, comfortable for teachers, and *cost effective.*

From USGBC

LEED® for Schools

for New Construction and Major Renovations

Categories / Prerequisites / Credits

• Sustainable Sites	8 credits/14 points
• Water Efficiency	3 credits/5 points
• Energy & Atmosphere	6 credits/17 points
• Materials & Resources	7 credits/13 points
• Indoor Environmental Quality	8 credits/15 points
• Innovation & Design Process	2 credits/5 points

Award Levels

• Total Points =	79 (75 Core + 4 Innovation)
• LEED Certified	29-36 points
• LEED Silver	37-43 points
• LEED Gold	44-57 Points
• LEED Platinum	58+ points

From USGBC LEED for Schools

What are the Benefits of "green" schools?

- Health
- Environment
- Cost

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Health Benefits of "Green" Schools?

- Cleaner air, less pollutants, enhanced day-lighting, thermal comfort and acoustics

- Improve Student Performance
  Lighting and indoor air quality – CA., WA., CO., NC, studies show that students progress 20-26% faster on reading and math tests over course of one year

- Increase Average Daily Attendance
  Charles Young ES renovation resulted in an increase in attendance from 89% to 93%

Greening public schools creates an opportunity to improve the health and educational settings for all students.

From Greening America's Schools

Health Benefits

Good lighting "improves test scores, reduces off-task behavior, and plays a significant role in the achievement of students."

17 separate studies all found positive health impacts from improved indoor air-quality, ranging from 13.5% up to 87% improvement.

A recent review of five separate studies found an average asthma reduction of 38.5% in buildings with improved air-quality.

75% of senior executives believe that being green improves a school's ability to attract and retain teachers.

There is a large body of research linking health and productivity with specific building design attributes.

From Greening America's Schools

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Environmental Benefits of "Green" Schools?

- Reduced Environmental Impact
- Reduces Carbon Dioxide emissions
- Energy and water efficiency
- Nontoxic materials that are high in recycled content that can be recycled again.
- Protection of wetlands
- Minimizes impact on our landfills

LEED certified green buildings use an average of 33% less energy and 30-50% less water, and reduce harmful Carbon Dioxide emissions by 40%.

From Greening America's Schools

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Financial Benefits of "Green" Schools?

- Reduced insurance and risk related costs
  - Continued Increase in health related lawsuits
- Reduced Teacher / Student Sick Days
- Increased Staff Retention
- Reduced Operating Cost
  - $6 billion dollars per year spent on energy for K-12 schools (more than computers and textbooks); ¼ of that is on wasted energy!

Green schools use an average of 33% less energy than conventionally designed schools.

From Greening America's Schools

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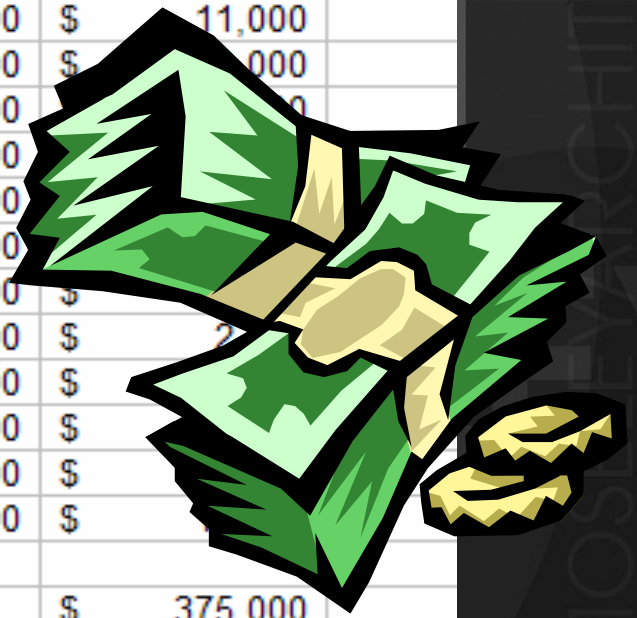
Henderson County Schools

LEED for Schools	HENDERSON two schools	per school
Registration/Certification	$ 10,000	$ 5,000
Commissioning	$ 150,000	$ 75,000
98% efficient boilers	$ 90,000	$ 45,000
Solar hot water preheat system	$ 40,000	$ 20,000
T5 fixtures	$ 30,000	$ 15,000
Waterless urinals/flow control devices	$ 22,000	$ 11,000
Domestic Hot Water recirculation/ondeman	$ 28,000	$ 000
Occupancy sensors/additional switching	50,000	
Alternative transportation bicycle/shower	$ 20,000	
Construction Waste Management	$ 40,000	
Recycle/Regional Materials	$ 10,000	
Daylighting/light shelves/solar shading	30,000	
Teaching tools	$ 5,000	$
Venitlation/Humidity controls (ERV)	180,000	$
Acoustical performance	$ 20,000	$
Refrigerant management	$ 5,000	$
Energy modeling	$ 20,000	$
		$ 375,000



Energy-efficient design is a primary component of LEED Certification…reduces the contribution to fuel consumption and saves money.

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THIRD CREEK ELEMENTARY SCHOOL				92,500 SF			adjusted
Energy Savings		2001		2005			2006
ASHRAE 90.1 ECB cost	=	$112,109	$/yr	$128,925.35			$149,104.97
Proposed (Energy Cost Budget)	=	$86,446	$/yr				33% from 2001
Proposed Savings	=	**22.89%**					
Actual Bills		*8/02-7/03*		*8/03-7/04*	*8/04-7/05*	*8/05-7/06*	*8/05-7/06*
Electric	=	$65,560		$65,981	$ 58,392	$ 68,858	$ 68,858
Gas	=	$17,663		$16,637	$ 16,222	$ 26,643	$ 26,643
Total	=	$83,223		$82,618	$ 74,614	$ 95,501	$ 95,501
Actual Savings	=	**25.76%**		**26.30%**	**33.50%**	**14.81%**	**36%**
$/PER SF/YR		*$ 0.90*		*$ 0.89*	*$ 0.81*	*$ 1.03*	
Actual Dollars save/yr over 90.1					$37,495	$16,608	$53,604
Payback (yrs)	$375,000 cost	**4.5 yrs**			10.00		7.00

As energy costs rise, energy-efficient design becomes more and more economical and necessary. The above data has been collected from Third Creek Elementary School in Iredell-Statesville Schools.

Third Creek is a LEED Gold Certified Elementary School

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Financial Benefits: Case Study 1

THIRD CREEK ELEMENTARY SCHOOL		adjusted
Energy Savings		2006
ASHRAE 90.1 ECB cost	=	$149,104.97
Proposed (Energy Cost Budget)	=	33% from 2001
Proposed Savings	=	$49,204.00
Actual Bills		*8/05-7/06*
Electric	=	$ 68,858
Gas	=	$ 26,643
Total	=	$ 95,501
Actual Savings	=	**36%**
$/PER SF/YR		
Actual Dollars save/yr over 90.1		$53,604
Payback (yrs)		7.00

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Financial Benefits: Study #2

Table A: Financial Benefits of Green Schools ($/ft²)	
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
TOTAL	$74
COST OF GREENING	($3)
NET FINANCIAL BENEFITS	$71

From Greening America's Schools

Financial Benefits: Summation

- Case Study #1 / Third Creek
  - Projected energy savings for Mills River and Hillandale Elementary Schools could realize a payback on the initial investment in as little as seven years over the baseline facility.

Financial Benefits: Summation

- Study #2 / *Greening America's Schools*
  - $74 x 80,000 SF = $5,920,000 / 20 years = $296,000 per year / school

    $357,000 / 296,000 = 1.2 years payback

  - $10 x 80,000SF = $800,000 / 20 years = $40,000 per year / school

    $357,000 / 40,000 = 8.9 years payback

William McDonough, AIA:

- "We need a new design assignment and we need a new design. In order to do this we need to ask new questions. … The first is: "How do we love all the children, of all species, for all time?" Please notice that I am not just saying our children; I am saying all of the children. And notice I am not just saying our species, I am saying all species. And notice I am not just saying now, I am saying for all time. When we integrate this question into our designs, wonderful and beautiful things begin to happen.."

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QUESTIONS?

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