



# See How We Grow:

## GREENING MARYLAND SCHOOLS

January 4, 2013

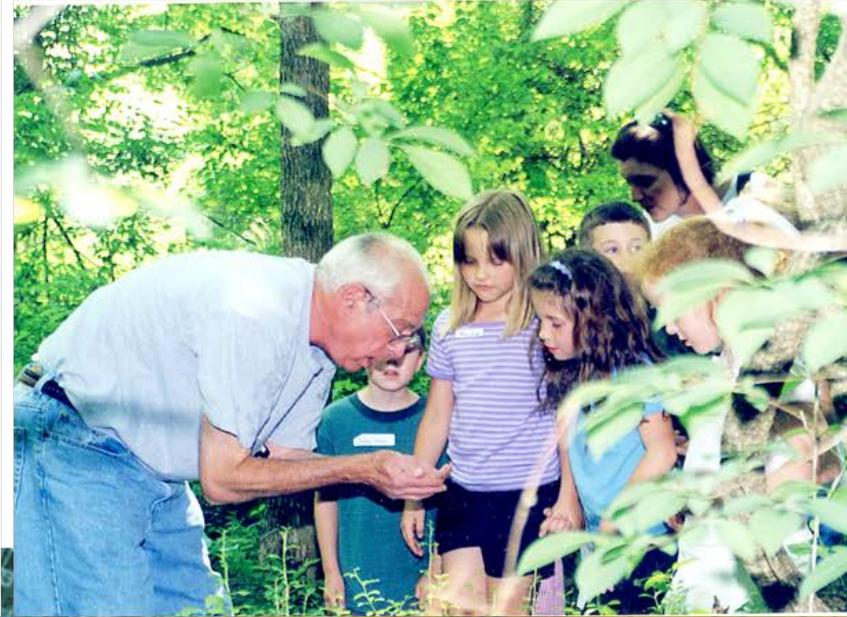


*USGBC Maryland*

*Chris Parts, AIA, LEED AP*

# Educational Mission

- CREATING SUSTAINABILITY NATIVES
- UNDERSTANDING OUR PLACE IN THE WORLD





## Transportation...getting to school

How far can I go on a gallon of gas

Bus 120 miles

Carpool 68 miles

Drive alone 17 miles

Bike and walk, indefinite



# Statewide Student bus transportation costs \$225.1 million in 2010

Per pupil costs rose 26% from 2005 levels from \$751 to \$949 in 2010

New school funding policies similar to road and infrastructure

- Locate schools in designated growth areas
- Make areas pedestrian friendly

Re-use existing buildings

Build taller structures

Enable joint use of public facilities





SECONDARY SCHOOL ENTRY

COURTYARD-PLAYGROUNDS

GREEN ROOFS

CAFETERIA

TEACHING GREEN ROOF

MULTI PURPOSE FIELDS

ELEMENTARY SCHOOL (2ND AND 3RD FLOOR)

MAIN SCHOOL ENTRY

PUBLIC LIBRARY

LIBRARY/RECREATION CENTER ENTRY

MIDDLE SCHOOL (4TH FLOOR)



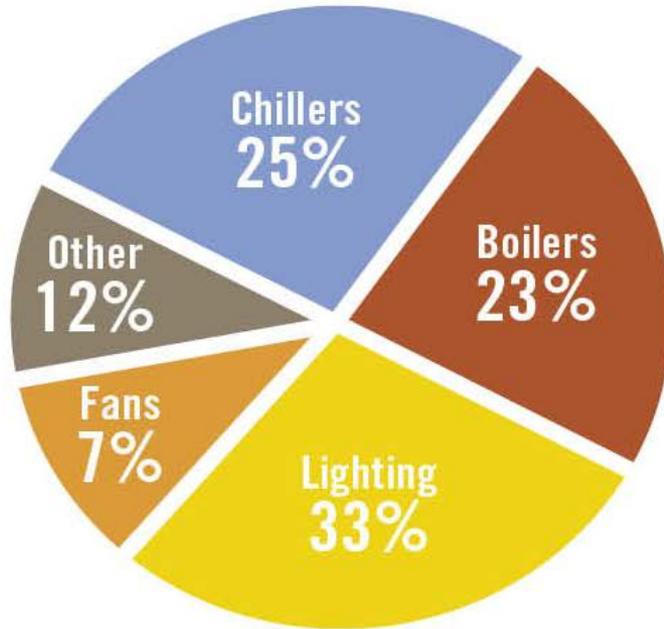
# Walker Jones Pre K – 8 School Washington DC



## Schoolyard projects..... Green Apple Day of Service

- Connects School, Community and Businesses
- Learn about plants are used to our climate and thrive





This will vary depending on your climate region.

## How much does your school spend each year on energy?

**Elementary School:**  
**\$70,000 to \$150,000**

**Middle School:**  
**\$100,000 to 200,000**

**High School:**  
**\$200,000 to \$650,000**

## How much does it cost to run your school?

Half of energy use is heating and cooling

One third of energy use is lighting most of our time in school is during daylight hours

Up to 20% can be incidental plug loads





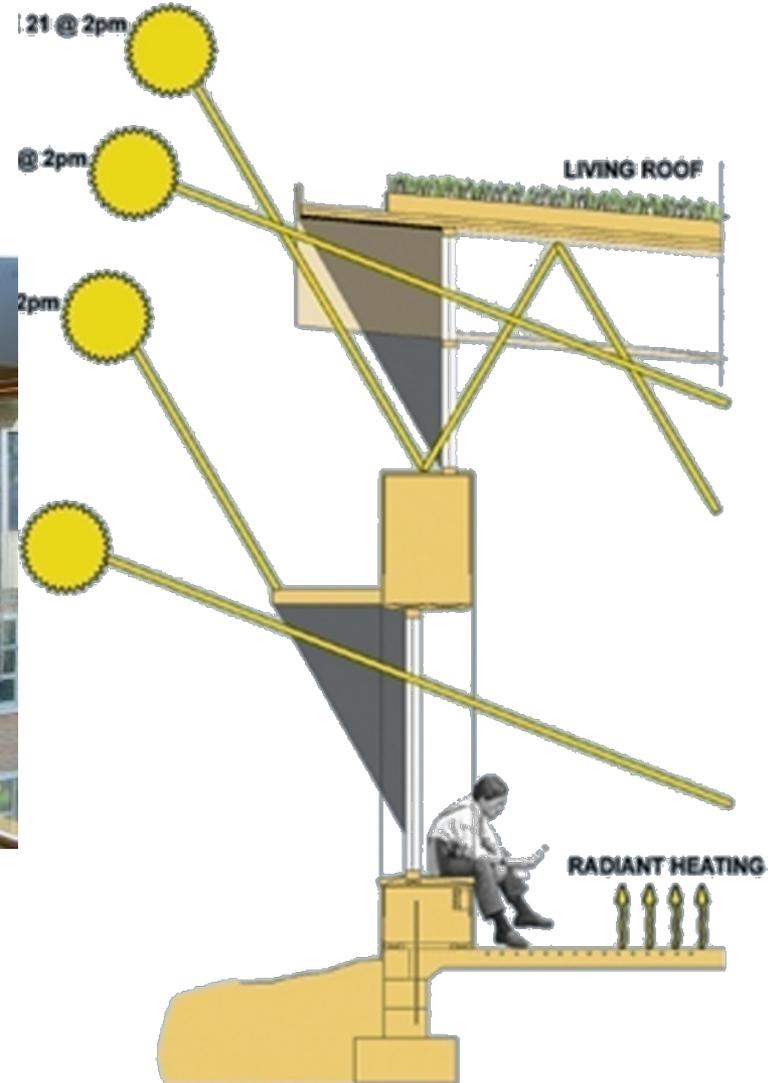
## The best way to conserve energy is not to use it. What can I do?

*Alliance to Save energy program ....no cost energy savings campaign.  
Grant funded by Baltimore Office of Sustainability*

3 Baltimore City Schools

- Reduced energy by 2.7 % in a 2 month study in February and March, if implemented across all City schools it could save up to \$260,000 per year.





## Improve your use of daylight

One third of energy use is lighting and schools predominant use is daytime.  
Light Shelves at Sidwell Friends School

- Shade from hot summer suns
- Bounce daylight further into interior classrooms





## Renewable Energy: Wind Turbines

Generates power at the blade tips with wind speed as low as 2mph  
Web based monitoring to learn about net metering, utility rates & energy output

## Harford County Solar Arrays on 6 school sites

Systems expected to reduce operational costs by \$2,000,000 over the 20 year contract with the solar provider. Solar hot water is also being used at 2 schools.





## **Renewable Energy: Ground Source Heat Pumps Hyattsville Elementary School Prince Georges County**

Ground source heat pump system heats and cools school by using constant temperature of ground to disperse or recover heat. 154 wells drilled on site in conjunction with a Chilled Beam system are expected to reduce energy use to be 30% lower than a baseline building





## **Net zero Schools: Models for the Future**

### **Richardsonville Elementary School, Warren County Kentucky**

First net zero school in the US. Average energy use is approx 1/3 of conventional school and systems, technologies and integrated planning meet the needs of the occupants

### **PSC agreement with Constellation/Excelon**

Funds dedicated for 5 net zero schools in Maryland within the Constellation Energy service area.





## **Why does this matter?**

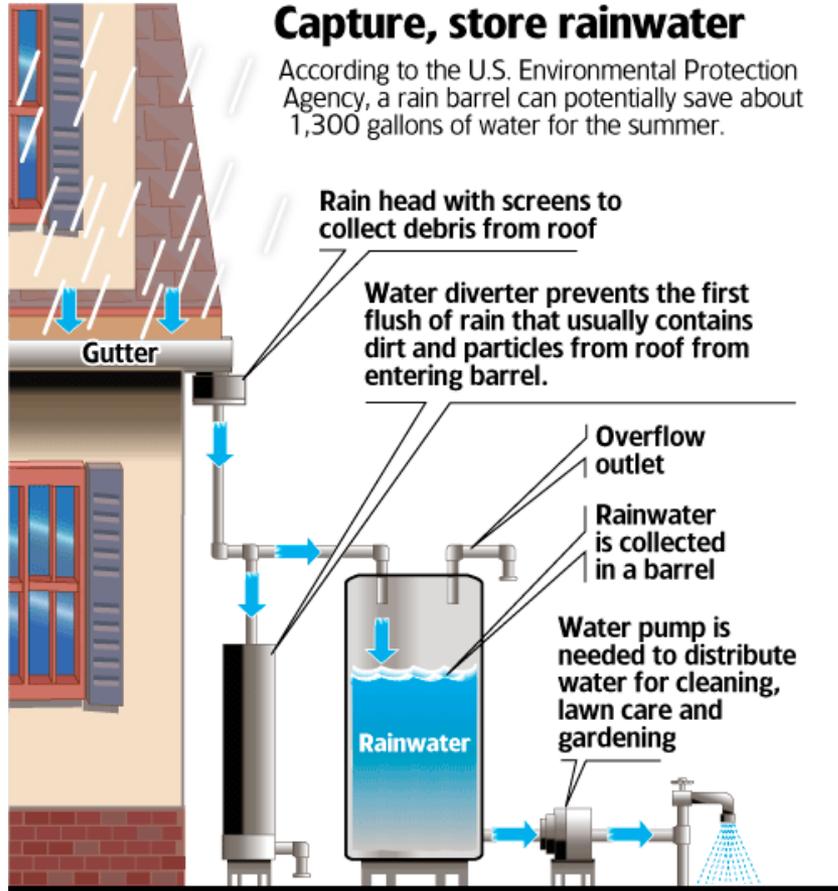
If all of the kids under 18 years old and their families in Baltimore reduced their energy use by 20 % over the next 30 years, you could save 11,998,445,760 KWH of energy

.....that's enough energy to power 30,860 houses a year for the next 30 years



## Capture, store rainwater

According to the U.S. Environmental Protection Agency, a rain barrel can potentially save about 1,300 gallons of water for the summer.



## Water use: Evergreen Elementary School in St Mary's County

Designed to save 90% of the water typically used in an elementary school.

Graywater captured often be re-used for irrigation, water from sinks and showers can often be re-used for toilets or plants





## Why does this matter?

If all of the kids under 18 years old and their families in Baltimore reduced their water use by 20 % over the next 30 years, you could save 72, 990,545, 040 gallons of water

.....that's enough water for an additional 31,735 Baltimore Aquariums



# *A resource in the wrong place.*



## **Waste**

The average American household generates 77 lbs of waste in one week.

How much of trash is?

- Paper 33%
- Plastics 26%
- Yard 13%
- Food 13%
- Misc 15%





## How can this make a difference at school?

**Harford County** schools implemented single stream recycling.

- In their first year of recycling reduced 735 yards of trash taken from their schools per year (4 classrooms entirely full of trash).
- The recycling program cut operational costs by \$114,000 and reversed an annual cost escalation of \$45,000 to a 4 year low.





## How can this make a difference at home?

If all the kids (under 18 years old) and their families in Baltimore reduced their waste generation by 20% over the next 30 years, you could divert 3,568,426,646 pounds of waste from landfills

....that's enough to fill 2 ½ Ravens Stadiums....and it's really easy to recycle ½ of our waste or more.





## Green Building Careers

- Harford Technical High School Construction Technology students built a LEED Gold home in conjunction with Habitat for Humanity
- Students learned green building practices addressing lot and site development, energy, water and resource efficiency, indoor environmental quality, homeowner education, operation and maintenance.



# What do we think about when planning a new school?

*“When I took the tour of Richlandville, the students explained everything that had been done in the school. Everything they’ve done is used as a teaching tool. Our children are a whole new generation that is changing. If they do it at school, they do it at home. It’s about personal responsibility.”*

Jane Beshear, First Lady of Kentucky

