

## Once Upon a Time...

A Sustainability Story

Pierce  
Energy  
Planning



## Case Studies...About Buildings The Impact of Behavior on a Newly Constructed School

### Sunnyslope School Energy Tips:

- Turn off lights & equipment when not in use.
- A **30.6%** electric reduction in a new school.
- Educate and involve facility manager and staff.
- Use daylighting whenever possible.
- Adjust temperature set points to 74-78 when cooling and 68-72 when heating.
- Keep doors closed
- Involve energy in curriculum & students as energy police.



Sunnyslope School Built in 2007

Baseline Rating April 2008	July 2011 Rating	Increase in Rating	Baseline \$/Square Foot	July 2011 \$/Square Foot	% Reduction in Usage	Behavior and/or Bldg Improvements?
55	87	32 Points	\$1.59	\$1.41	30.6%	100% Behavior

## Case Studies...About Buildings

### The Impact of Behavior on Newly Built Offices

#### Administrative Building Energy Tips:

- Create an energy team and have them meet monthly.
- Built in 2006.
- A **25.4%** electric reduction in a new school.
- Educate and involve facility manager and staff.
- Eliminate unnecessary appliances.
- Use daylighting whenever possible.
- Adjust temperature set points to 74-78 when cooling and 68-72 when heating.

Baseline Rating April 2008	July 2011 Rating	Increase in Rating	Baseline \$/Square Foot	July 2011 \$/Square Foot	% Reduction in Usage	Behavior and/or Bldg Improvements?
67	85	18 Points	\$1.94	\$1.69	25.4%	100% Behavior

## Case Studies... The Impact of Behavior and Building Improvements

#### Richard E. Miller Elementary School Energy Tips:

- Start with behavior change.
- Achieved a **41.4%** reduction in electric usage on campus!
- Go after the 20% plug load.
- Get computers and equipment turned off when not in use.
- Adjust temperature set points 74-78 cooling & 68-72 heating.
- Involve energy in curriculum & students as energy police.



RE Miller Elementary Built in  
1967

Baseline Rating April 2008	May 2010 Rating	July 2011 Rating	Increase in Rating	Baseline \$/Square Foot	May 2010 \$/Square Foot	July 2011 \$/Square Foot	% Reduction in Usage	Behavior and/or Bldg Improvements?
26	67	NA	41 Points	\$1.89	\$1.49	NA	31.8%	Behavior
26	NA	80	13 Points	\$1.89	NA	\$1.30	9.6%	Lighting Retrofit

## A Case Study... The Impact of Behavior and Building Improvements

### Sweetwater Elementary School Energy Tips:

- Start with behavior change.
- Built in 1980.
- 39.9%** reduction in electric use to date.
- There is no substitute for a committed facility manager.
- There is no substitute for a committed principal.
- Go after the 20% plug load.
- Adjust temperature set points 74-78 cooling & 68-72 heating (at Sweetwater the facility manager must adjust thermostats in each classroom manually!)



Baseline Rating February 2008	November 2009 Rating	July 2011 Rating	Increase in Rating	Baseline \$/Square Foot	November 2009 \$/Square Foot	July 2011 \$/Square Foot	% Reduction in Usage	Behavior and/or Bldg Improvements?
50	82	NA	32 Points	\$1.61	\$1.40	NA	29.1%	Behavior
50	NA	91	9 Points	\$1.61	NA	\$1.30	10.8%	Lighting Retrofit

## A Case Study... The Impact of Behavior on a Campus with Portables

### Shaw Butte Elementary School Energy Tips:

- Start with behavior change.
- Built in 1964.
- 50% portables and 50% permanent buildings.
- 33.2%** reduction in electric use to date.
- Get HVAC in portables and all buildings off when unoccupied.
- Go after the 20% plug load.
- We shut our portables off in the summer when not in use.

Baseline Rating February 2008	November 2009 Rating	July 2011 Rating	Increase in Rating	Baseline \$/Square Foot	November 2009 \$/Square Foot	July 2011 \$/Square Foot	% Reduction in Usage	Behavior and/or Bldg Improvements?
25	53	NA	28 Points	\$2.17	\$1.97	NA	22.5%	Behavior
25	NA	69	16 Points	\$2.17	NA	\$1.89	10.7%	Lighting Retrofit

## A Case Study... The Impact of Behavior on a School with T12 Lighting

### Sunburst Elementary School Energy Tips:

- Start with behavior change.
- Built in 1974.
- This building has T12's (soon to be removed).
- 29.3%** reduction in electric use to date.
- Go after the 20% plug load.
- Get your facility manager very involved!

Baseline Rating April 2008	July 2011 Rating	Increase in Rating	Baseline \$/Square Foot	July 2011 \$/Square Foot	% Reduction in Usage	Behavior and/or Bldg Improvements?
52	84	32 Points	\$1.71	\$1.49	29.3%	100% Behavior



## Case Studies...People Power The Impact of Leadership

**Story #1 – A Superintendent Makes a Difference**

**Story #2 – A Principal Saves the Day**

**Story #3 – The Over-Zealous Facility Manager**

**Story #4 – It Takes One Committed Teacher**



## ENERGY STAR – A Great Tool for Schools



Originally no WESD Campus  
Scored 75 or Higher

Now 20 of 34 Campuses  
Rate 75 or Higher



## Grant Awards and Recognitions



- 2010 BOMA Killowatt Crackdown Award
- 2011 BOMA Killowatt Crackdown Award
- Greenest School In the Valley Recognition from Phoenix Magazine
- Two Green Schoolhouse Projects Worth \$3,000,000
- Energy Star Leader Awards



## Geothermal Pilot Project



Desert View Elementary School  
Phoenix, Arizona



- Five Classrooms with Geothermal
- Five Control Classrooms
- HVAC Roof- top Units in Control Group
- Sub-metering to Monitor and Track Data

## APS Solar for Schools Program



Washington Elementary School  
District wins December, 2011 APS  
Solar for Schools Auction

Impacted Campuses - Mountain View  
and Sunnyslope Schools

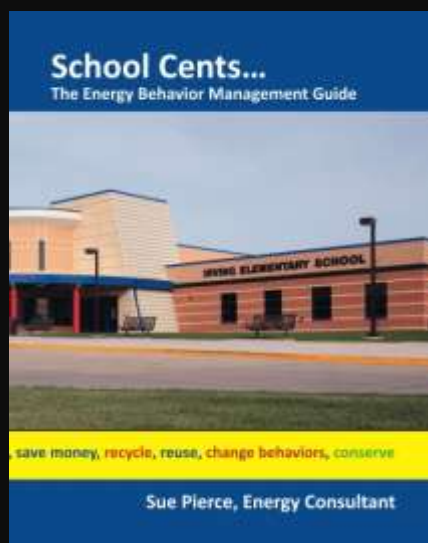


## New Sustainable School

Lookout Mountain  
Phoenix, Arizona

- New Construction with Bond Money
- Goal - Use Less Energy than Is Generated
- Geo Thermal
- Solar
- Water Reclamation
- Educational Wind Power Installation
- 90,000 Square Feet and 1,000 Students

## School Cents...The Energy Behavior Management Guide



# Pierce Energy Planning



Sue Pierce  
Pierce Energy Planning  
PO Box 26357  
Scottsdale, Arizona 85255  
(480) 773-0035  
[sue@energyplanning.org](mailto:sue@energyplanning.org)  
[www.energyplanning.org](http://www.energyplanning.org)



## ILEARN

A Sustainable School of the Future



## School Overview

- Sustainably powered by Arizona's brilliant sun
- Smart windows will reduce electricity usage
- Recycling to reduce landfill waste
- Multi-purpose and media center buildings
- Greenhouse & Outdoor classrooms
- Natural desert learning environment
- Classrooms of the future

## Solar Power

- Use of traditional solar panels
- All windows will be covered in 3M solar window film



## SMART WINDOWS



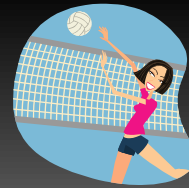
- Smart windows automatically become darker in the summer (respond to higher temperatures).
- Results in less electricity usage for heating & cooling

## Recycling

- Our school will feature paper, plastic, glass, and aluminum recycling
- Reduces our impact on the environment
- Decreases landfill garbage

## Multi Purpose Building

- Combines the gymnasium, auditorium, and cafeteria in one building to be cost and energy efficient



## Media Center

- A large multi purpose media center acts as the hub and focus of the school



## Greenhouse & Desert Environment

- Hands-on education about plants from around the world
  - Access to plants from every biome without using excess water
- Desert environment teaches students about what is sustainable in the desert



## Classrooms

- **A true classroom of the future with no textbooks, paper or pencils**
- **Large windows for natural lighting and electricity generation (3M photovoltaic film)**



## Referenced Works

- <http://www.greenhousemegastore.com/images/cottage-greenhouse-pic6.jpg>
- [http://www.reefflix.com/web\\_images/slider/tank.jpg](http://www.reefflix.com/web_images/slider/tank.jpg)
- <http://www.geek.com/articles/chips/3ms-see-through-film-insulates-windows-while-generating-solar-power-20111012/>
- <http://www.physorg.com/news/2011-10-3m-photovoltaic-windows.html>
- <http://green.blogs.nytimes.com/2010/06/08/a-new-twist-on-the-smart-window/>
- <http://www.drsofostersmith.com/pic/article.cfm?aid=1170>
- Special Thanks To:
  - Dan Demland, R.A., AZ School Facilities Board
  - Sue Pierce, Pierce and Associates, Washington Elementary School District

# Mountain Sky

## School of the Future Team

- Abril Arellano Espinoza
- *Alex Light*
- *Garrett Wright*
- Jenna Smith
- Macy Soto
- *Sierra Crimaldi*
- *Sophia Yaghsezian*
- *Sophia Meteer*
- *Ty McNevins*
- Teacher Sponsor – Jonathan Perrone



### Call for Volunteers to participate in the 2012 USGBC AZ LEED Certification Project: LEED for Existing Buildings [School] Operations & Maintenance

Mission:	To LEED Certify an existing school with 100% volunteer participation.	
Benefits:	Local School will gain LEED Certification and reap the benefits of Sustainable Policies, O & M Best practices and get recognition for their high performance building systems. Volunteers will gain experience on a LEED project (especially valuable for those seeking LEED Accreditation) and will help USGBC spread the word on how to green our schools!	
How to Sign up:	Sign in sheet is located in the back of the room – please note the credit categories you are interested in.	
Schedule:	School application period:	February 13 – March 8, 2012
	School selection period:	March 9 – March 23, 2012
	School notified:	March 26, 2012
	LEED Charette:	April 2, 2012



**Call for Volunteers to participate in the 2012 USGBC AZ LEED Certification Project:**  
LEED for Existing Buildings [School] Operations & Maintenance

*One school will be selected to be LEED Certified by USGBC AZ Volunteers!*

[Application period opens February 13, 2012 and will close March 8, 2012]

Must meet (or be able to meet) these 9 prerequisites:

1. Minimum Indoor Plumbing Fixture and Fitting Efficiency
2. Energy Efficiency Best Management Practices (energy star rating of 69+)
3. Minimum Energy Efficiency Performance
4. Fundamental Refrigerant Management
5. Sustainable Purchasing Policy
6. Solid Waste Management Policy
7. Minimum Indoor Air Quality Performance
8. Environmental Tobacco Smoke Control
9. Green Cleaning Policy

Complete application within appropriate time frame.