



Promoting environmental sustainability



Professional Development Training

Karla Utting Dream in Green Programs Director



Nick Gunia

Dream in Green Co-founder, President of Alterna Corp.

Victor Alonso

Miami-Dade County Public Schools, Administrative Director- Design and Sustainability



Donna Fries

Miami-Dade County Department of Water and Sewer, Water Use Efficiency Manager



Jesse Rittenhouse

Recycling Energy Forum, Co-founder



Jennifer Diaz

The Everglades Foundation, Director of Education



Elena Gibson USGBC Green Apple Day of Service, South Florida Green Schools Chair



How to implement the Green Schools Challenge



Click this slide to watch the Green Schools Challenge training video

Dream Green TAKE CHAPSE

Questions & Answers



Mid-morning Break 9:50 am- 10:20 am



Sustainable Energy for a Warming Planet

John Parker

Florida International University, Professor Emeritus, Environmental Science



SUSTAINABLE ENERGY FOR A WARMING PLANET Jack Parker, Professor Emeritus Chemistry, Environmental Science, Florida International University







GLOBAL ENVIRONMENTAL SUSTAINABILITY

- > Ocean Degradation/Pollution
- Tropical Deforestation, Endangered Species



Population Growth & Gender Equality

ENERGY AND CLIMATE CHANGE

WORST IMPACTS WILL BE ON POOREST COUNTRIES, WOMEN, FOOD SECURITY



IMPACTS ON WATER & WORLD FOOD SUPPLY





Carbon Dioxide Concentrations





CO₂ & FOSSIL FUEL COMBUSTION



GLOBAL WARMING OR NATURAL VARIABILITY??



GLOBAL WARMING AND NATURAL VARIABILITY



CLIMATE CHANGE DENIERS: No Warming Last 15 Years!

1998-2013. Slight increase in Temperature of the Atmosphere **BUT**

- LAST DECADE: VERY LIKELY THE WARMEST FOR 2000 YEARS
- 13 WARMEST YEARS WERE IN THE LAST 15 YEARS
- INCREASE IN COOLING AEROSOLS FROM CHINA COAL BURNING,

AND, **CHANGING OCEAN CURRENTS LEADING TO RAPID WARMING OF DEEP OCEANS





MAJOR FEEDBACKS (Reinforcing Cycles = +)



In Models

Melting Glaciers/Sea Ice + (Darker surfaces & from SOOT)

> More water vapor +

More clouds + Or ---

<u>NOT in Models</u> <u>Methane</u> from Permafrost & Seabeds + or +++

Climate Change Science

U.S. NATIONAL ACADEMY OF SCIENCES: "Global climate change caused by human activities is occurring now, and it is <u>A GROWING THREAT TO SOCIETY.</u>"

> 97% OF CLIMATE RESEARCH SCIENTISTS SURVEYED SAID <u>HUMANS ARE CAUSING</u> GLOBAL WARMING

IMPACTS/OBSERVATIONS



RECENT INCREASE: EXTREME WEATHER EVENTS "WATER CYCLE ON STEROIDS" 4% INCREASE IN WATER VAPOR

WEATHER EVENTS **ARIZONA 2014 LORADO 2012**

CLIMATE CHANGE



Observed Change in Very Heavy Precipitation



EXTREME HEAT, DROUGHT, **FIRE**

- United States 2011/12
 - HOTTEST MONTH and <u>12 MONTH</u>
 PERIOD ever recorded
 - MORE BILLION-DOLLAR DISASTERS than in U.S. history
 - WORST DROUGHT since 1930's
- > Fire
 - FIRE SEASON: 40% LONGER
 - LARGER MORE INTENSE FIRES



WEATHER ON STEROIDS



Future Climate Shift





ARCTIC SEA ICE NEW ALLTIME LOW 2012



WORSE THAN WE THOUGHT: SURPRISES



INCREASE IN HEAVY SNOWFALL EVENTS

WHAT HAPPENS IN THE ARCTIC DOESN'T STAY IN THE ARCTIC!

WORSE THAN WE THOUGHT: SEA LEVEL RISE

RAPID ICE MELT IN GREENLAND



ANTARCTICA WARMING

NASA



SEA LEVEL RISE

NEXT TWO DECADES

South Florida Shoreline Change after a 1-Meter Rise in Sea Level



Tampa

St. Petersburg

FLORIDA

20757

Fort Myers

Areas shown in red are subject to inundation after a 1-meter rise in sea level

Source: Elevations from USGS digital data Prepared by the U.S. Geological Survey, 1997 Fort Pierce

West Palm Beach

Fort Lauderdale

Miami



FROM SFWMD

OCEAN and COASTAL ECOSYSTEMS

"FUNDAMENTAL AND IRREVERSIBLE TRANSFORMATIONS"

 Temperature up over 1°F
 Ocean Acidification impact on calcifiers
 Rapid decline in Phytoplankton

CORAL REEFS

BLEACHING

MANGROVES

QUESTIONS ????

CLIMATE CHANGE:

SCIENCE AND ENVIRONMENTAL IMPACTS

CLIMATE CRISIS: WARMEST IN 10,000 YEARS!!



SOLUTIONS 80% REDUCTION IN CO₂ BY 2050

ADAPTATION/RESILIENCE

GREEN INFRASTRUCTURE:

 USE NATURAL SYSTEMS SUCH AS SAND DUNES/ MANGROVES/CORAL REEFS TO BUFFER WAVES AND STORM SURGES







HIGHEST PRIORITIES:

> STOP BURNING COAL: U.S. & CHINA!

> CARBON TAX/OFFSET FEE ON ALL FOSSIL FUELS



> EXPAND

- USE OF ENERGY EFFICIENCY & CONSERVATION
- RENEWABLE ENERGY

HIGHEST PRIORITY: CAP TOTAL EMISSIONS @ ~900 GTONS OF CO₂ STOP THE KEYSTONE TAR-SANDS PIPELINE! 350.org

REPLACE

EFFICIENT

WITH MORE

NATURAL GAS ???





LEAVE DIRTY FOSSIL FUELS IN THEGROUND!

METHANE SOURCES (ABOUT 60X THE WARMING!)

> Livestock (Particularly Cows) EAT LESS MEAT AND DAIRY



> Oil And Gas Drilling (Fracking)







NATURAL GAS THE KEY TO HIGH-EFFICIENCY ELECTRICITY?? Only Expand Natural Gas/Fracking with stringent regulations on 1. METHANE LEAKS 2. WATER POLLUTION 3. WATER USE

Natural Gas High Efficiency Power Plants

 On-site Power with Natural Gas CHP (Combined Heat and Power)

Solar/Natural Gas

Power Plant



FPL SOLAR/GAS HYBRID





Keep Waste out of Landfills!

RECYCLING—Most Important: <u>BUY Recycled</u>

➢ REUSE

- Buy at Goodwill, not just donate
- Reuseable Grocery Bag
- Rechargeable Batteries
- REDUCE Food Waste
 - Restaurants: Reusable
 Take-out Container



- REDUCE Yard Waste
 - COMPOST
 - Mulch
 - Make Biochar







WASTE-TO-ENERGY POWER PLANTS

Biomass Power Plant using <u>LOCAL</u> Resources like Wood, Wood Waste, Wood pellets



Municipal Waste-to-Energy Plant using Pyrolysis or Gasifier



Use Algae to Convert Sewage into Biofuel



ENERGY – EFFICIENT BUILDINGS

- MORE THAN 40% OF ALL ENERGY FOR BUILDINGS
- NEXT TWO DECADES: <u>GREATER POTENTIAL THAN</u> <u>ALL RENEWABLE ENERGY</u> <u>SOURCES COMBINED</u>







HANDOUT ON RESIDENTIAL ENERGY EFFICIENCY

HOT WATER: Water Efficiency and Conservation

- Low-flow showerheads
- Faucet aerators
- Shorter showers
- Wash clothes in cold water (Use cold water detergent)
- Buy WATER-EFFICIENT
 FRONT-LOADING
 CLOTHES WASHER





SOLAR WATER HEATER

ENERGY STAR APPLIANCES:

- 1. REFRIGERATOR (NOT IN GARAGE!)
- 2. DISHWASHER

Reduce Air Conditioning by 50%

- SMALL, HIGH-EFFICIENCY (SEER 16) AIR CONDITIONER
- White Reflective Roof or Radiant Barrier
- More Insulation and weather-stripping
- Plug <u>Duct</u> Leaks
- A.C Thermostat up 1°F (saves ~5%)
- Ceiling Fans (particularly in <u>bedrooms</u>)
- ENERGY EFFICIENT

LANDSCAPING:

- Drought-resistant native trees
- on East, South and West sides
- Mature canopies

adjacent to building



WALL UP TO 25°F COOLER

XERISCAPING--Water Efficient Landscaping

Irrigation Water

- Largest use of residential water
- 2. Energy-intensive
- 1. Water grass only <u>once</u> <u>per week</u> in dry season
- 2. <u>Reduce grass area</u> with shrubs/ground cover
- 3. Plant <u>drought-tolerant</u> <u>native plants</u>
- 4. Mulch heavily



URBAN SUSTAINABILITY





SOLAR ELECTRICITY

SOLAR PV CELLS

Increasing about 44%/yr,

- World: 140,000 MW: Germany#1 (U.S:12 GW)
- Costs rapidly declining: 7c/kwh to 20c/kwh
- Minimal environmental impacts, NO CO₂
- BUT Low Efficiency

GREEN JOBS





RAPID ADVANCES IN SOLAR ELECTRICITY BUILDINGS: MINI-POWER PLANTS!

Nano-layer of Graphene (bottom) plus molybdenum disulfide (above)





SOLAR WINDOWS

junction compound solar cell



ENERGY STORAGE & FUTURE MOBILITY

2012 PRIUS PLUG-IN HYBRID--95MPG



LITHUM ION BATTERY



SOLAR ROADWAY

Stacked + Driverless Cars for Parking and Expressways





Global Warming is "BREATHTAKING OPPORTUNITIES DISGUISED AS INSOLUBLE PROBLEMS" John Gardner, Founder, Common Cause



ORGANIC SOLAR CELLS



MOST IMPORTANT POINTS THINK GLOBALLY, ACT LOCALLY Get informed on Climate Change: Science, Mitigation and Adaptation Skepticalscience.com 350.org CLEOInstitute.org

- 1. <u>Stop burning coal</u>; stop the Keystone oil-sands pipeline
- 2. Make our cities more livable/sustainable
- 3. Expand the use of <u>energy-efficiency technologies and</u> <u>conservation, particularly in developing countries</u>
- 4. Expand Renewables--wind and solar energy
- 5. **Promote earth ethics** and <u>urban</u> sustainability education (MDC Earth Ethics Institute and Citizens for a Better South Florida)

Breakout Group #1

New & Second Year Schools

Activity 1: Energy, Water & Waste Mapping

Activity 2: Energy, Water Walkthrough Survey

Presenter: Karla Utting, Programs Director; Melissa Hunsberger, Green Schools Challenge Coordinator; Yida Hernandez, Programs Assistant, Dream in Green **Breakout Group #2** Selected Schools, 3+ Years

Activity 1: Water/Energy Learning & Behavior (WE-LAB) Mapping

Activity 2: Energy, Water Walkthrough Survey

Presenter: Maggie Fernandez, WE-LAB Manger, Dream in Green and Donna Fries, Water Efficiency Use Manger, Miami-Dade County Department of Water & Sewer

Energy, Water & Waste Mapping New & Second Year Schools

MININAMANA



Energy, Water & Waste Mapping New & Second Year Schools

Objectives

- Why save energy and water? Why reduce waste?
- Learn ways to save energy and water and reduce waste at school
- Learn about the benefits and incentives
- Begin your plan to save money at your school

Why save energy and water? Why reduce waste?



Understanding Energy Use in Schools



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

End Uses of Water in Various Types of Commercial and Institutional Facilities



Ways to save energy, water and reduce waste



MINY





MAN

GREEN SCHOOLS = BETTER

- Operational Costs
- Management of Facilities
- School Brand
- Long-Term Community Sustainability
- 🗸 Attendance
- Student Academic Performance
- 🖌 Health
- Teacher Morale and Effectiveness

Begin your plan

CREATE A GREEN TEAM

TAKE A PLEDGE

SAVE ENERGY & WATER

TAKE ACTION

Energy Reports Public Schools



OFFICE OF SCHOOL FACILITIES

Department of Planning, Design and Sustainability / Department of Energy Management



Energy Reports

Private Schools



Billing/Charges History

FPL Account Number:1686090497

Date	Service Days	KWH Used	Maximum	Debit Amount	Description of
			Demand		charges
04/30/2014	30	31080	88	3,055.69	Electric Bill
03/31/2014	31	24720	76	2,490.85	Electric Bill
02/28/2014	28	24120	74	2,425.71	Electric Bill
01/31/2014	31	21600	79	2,337.83	Electric Bill
12/31/2013	34	26520	85	2,588.30	Electric Bill
11/27/2013	28	29640	94	2,877.51	Electric Bill
10/30/2013	30	35640	95	3,241.88	Electric Bill
09/30/2013	31	38760	100	3,481.32	Electric Bill
08/30/2013	30	38640	91	3,373.33	Electric Bill
07/31/2013	33	38160	85	3,269.35	Electric Bill
06/28/2013	28	33720	92	3,107.77	Electric Bill
05/31/2013	31	35040	103	3,323.32	Electric Bill
04/30/2013	32	34080	103	3,268.98	Electric Bill
03/29/2013	29	21000	80	2,231.43	Electric Bill
02/28/2013	28	23640	95	2,550.47	Electric Bill
01/31/2013	31	25200	95	2,645.36	Electric Bill
12/31/2012	31	24480	108	2,744.46	Electric Bill
12/26/2012				38.69	Late Payment
11/30/2012	30	23880	97	2,579.28	Electric Bill
10/31/2012	33	39960	110	3,686.78	Electric Bill
09/28/2012	28	38160	108	3,555.48	Electric Bill
08/31/2012	31	41880	104	3,738.34	Electric Bill
07/31/2012	32	34920	90	3,159.05	Electric Bill
06/29/2012	29	31920	97	3,071.54	Electric Bill
05/31/2012	31	36120	107	3,440.52	Electric Bill
04/30/2012	31	29760	100	2.974.77	Electric Bill

Water Bills

MIAMI-DADE	Miami-Dade Water and Sewer Department P O Box 026055 Miami, Fl. 33102-6055		
Name: Account Number: Billing Date: Past Due Date:	JOHN W.SMITH 1234567890 07/18/2003 08/08/2003	Billing Inquiries (hours 8:00 - 7:00 PM) 305-665-7477 All Other Inquiries (hours 8:00 - 7:00 PM) 305-665-7488 Page 1 of 2	

waterconservation@miamidade.gov

Energy & Water Walkthrough Survey

What to look for at your school



Energy Mapping Exercise

Materials Needed:

- Black marker and colored markers
- 1 Large sheet of paper
- Stickers: Green/Red/Blue/Yellow

Activity Description:

- 1. Draw a map of your school building and campus using a black marker.
- 2. Once you have drawn your map, use colored stickers to identify sources of energy and water use, waste and recycling. That is, areas where energy and water are significantly used and the waste collection and recycling areas around the school.
- 3. Next use your Brainstorming form, see reverse.
- 4. On the map, place stickers with a "C" for Current or "N" for New to identify practices that save energy, water and reduce waste and become a greener school.

Lunch Cafeteria from 12:20 pm- 1:00 pm



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Young Voices for the Planet

Click this slide to watch the Young Voices for the Planet video.

Action Planning

Objective: Participants articulate a vision for the Green Schools Challenge at their individual school and develop a plan for implementing the program and achieving their vision.



Review, Evaluations, Closing Remarks



1 Martin Martin

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