



Energy Savings: help Stop Global Warming

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This presentation is at:

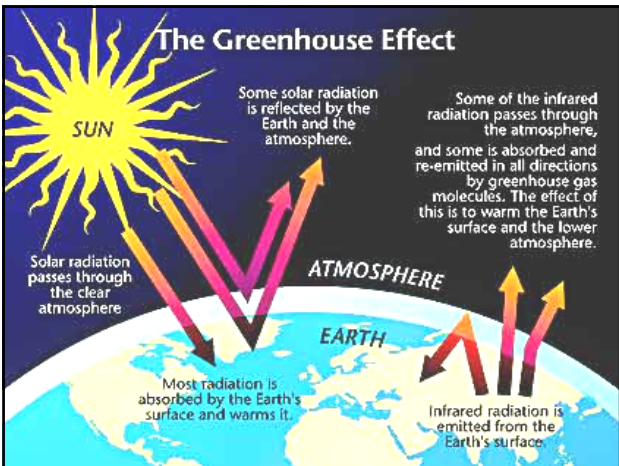
<http://ece.uprm.edu/~pol/outreach>

GLobal Warming...




1. Is not a Theory; is a Fact.*
2. Is happening right now*
3. **Scientific Consensus**: is primary caused by Human Activities, like emissions of CO₂.*
4. Some of the consequences are **irreversible!***

* According to the most recent report from UN-IPCC 4th published in Feb 2, 2007.



Lake Chad



Was the 6th largest lake in the World!

A study by U. Wisconsin-Madison and NASA's EOS, the lake is now 1/20th of the size it was 35 years ago.

W. Africa (Chad, Niger, Nigeria, & Cameroon), the region has suffered from an increasingly dry climate, experiencing decline in rain since early 1960s.

We are causing Extreme poverty in Africa due to our emissions which accounts for 25% of all world emissions compared to Africa's 3%.

SPECIAL REPORT GLOBAL WARMING

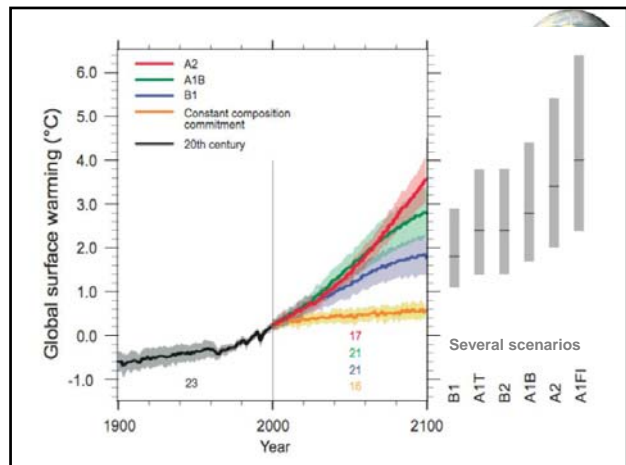
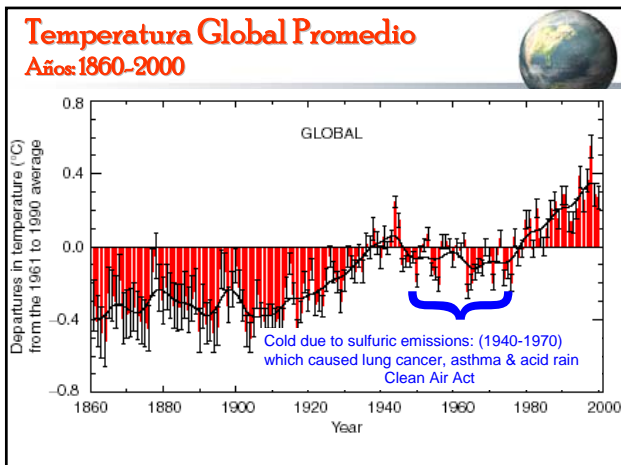
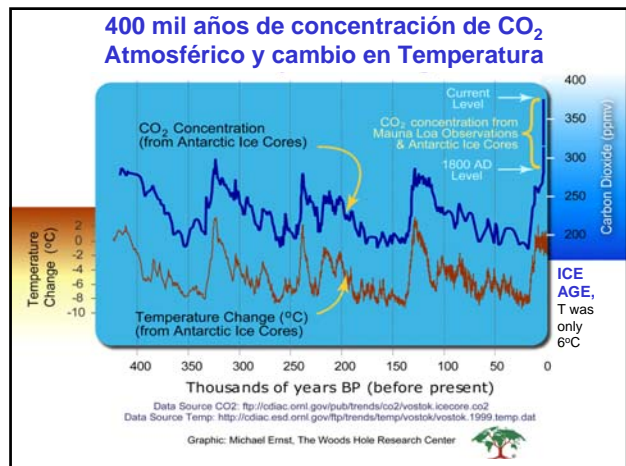
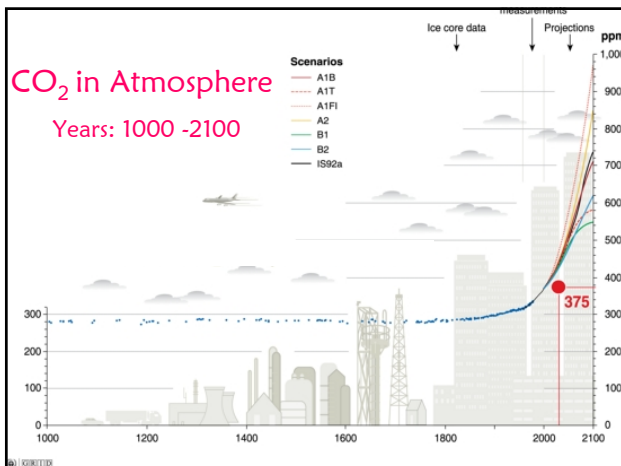
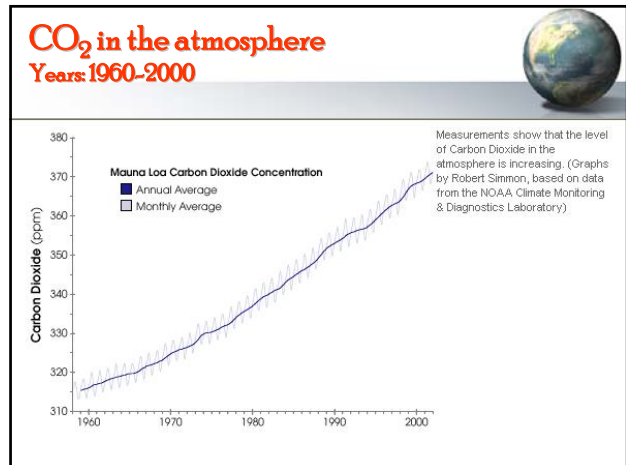
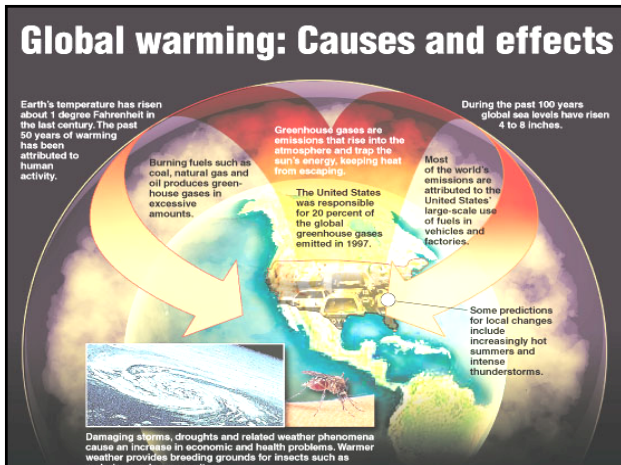
TIME

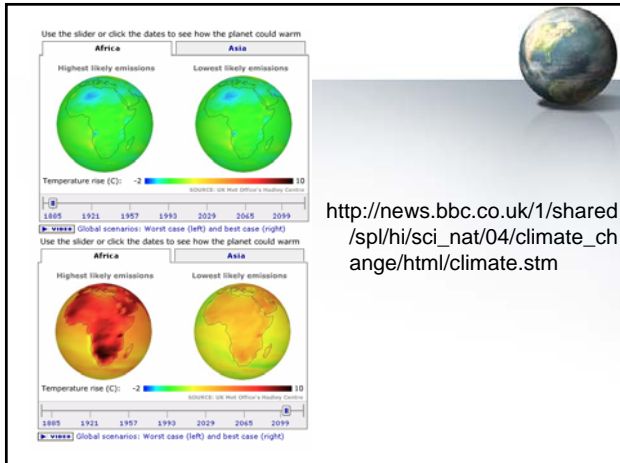
BE WORRIED. BE VERY WORRIED.

Climate change isn't some vague future problem—it's already damaging the planet at an alarming pace. Here's how it affects you, your kids and their kids as well.

EARTH AT THE TIPPING POINT
 HOW IT THREATENS YOUR HEALTH
 HOW CHINA & INDIA CAN HELP SAVE THE WORLD—OR DESTROY IT
 THE CLIMATE CRUSADERS

A report by economist Sir Nicholas Stern suggests that **global warming** could shrink the **global economy** by 20%!

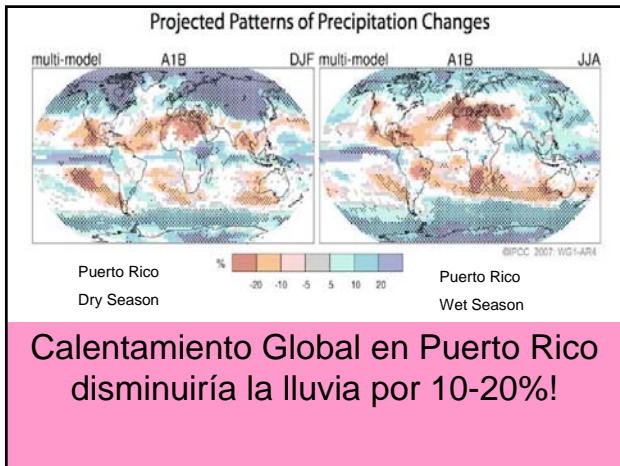




http://news.bbc.co.uk/1/shared/spl/hi/sci_nat/04/climate_change/html/climate.stm

Consequences:

- Polar caps melt
- Sea level rise
- Extreme temperatures
- Cyclones/tornadoes
- Drought / floods
- Disease
- Agriculture losses
- Water (potable) scarcity
- Extinction of animal species, corals, vegetation
- Worst case scenario: stop ocean conveyor belt



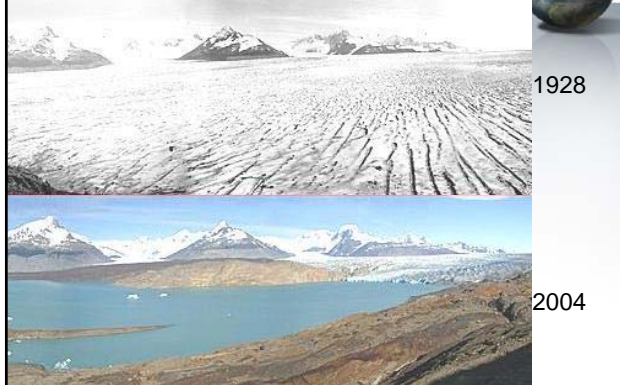
Calentamiento Global en Puerto Rico disminuiría la lluvia por 10-20%!

Kilimanjaro (Tanzania, Africa)



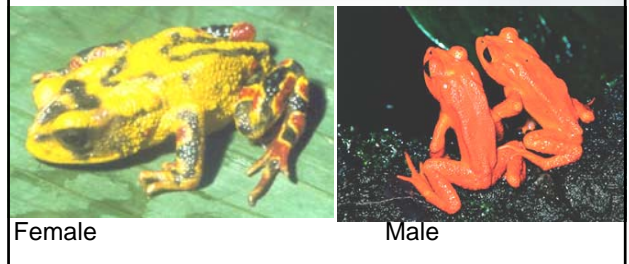
Patagonia (Argentina)

Longest Glacier in S.A.

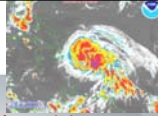


Costa Rica

First official lost species due to Global warming:
golden toad



Hurricanes



- 10 hottest years ever, occurred in the last 14 yrs.
- Hottest of all time, 2006.
- 2004 1st hurricane ever in the S. Atlantic Ocean
- 2005 highest # of hurricanes,
 - most intense, 6 Greek letters
- 2005 Wilma strongest hurricane ever recorded AO
- Then...
- 2006 Monica strongest hurricane ever recorded
- Luckily, year 2006, El Niño decreases # hurricanes
- 2007: La Niña!

Icebergs with caves = broken food chain

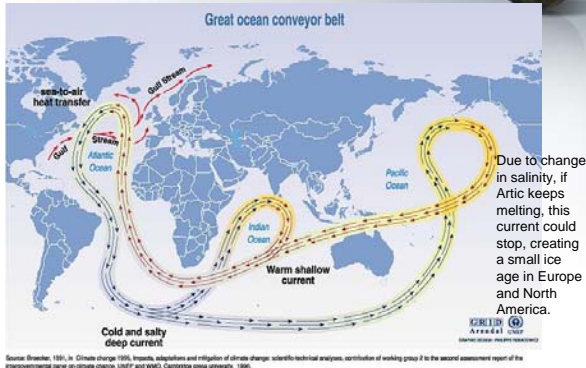
60% of krill population killed because of this.



Krill are small shrimp-like crustaceans zooplankton, food for baleen whales, mantas, whale sharks, seals, and a few seabird species

Iceberg with cave
Australian Antarctic Division photo by Robert Reeves © Commonwealth of Australia

Worst case scenario: abrupt change IPCC (Intergovernmental Panel on Climate Change)



On top of this...

New blooming economies want to live their own version of the "American Dream".



Example: in China, the traditional bicycle lane was closed to lay way to an extra automobile lane. India is now also flourishing economically and greatly increasing their CO2 emissions.

Crecimiento Población Mundial

Tardó TODA la historia de la humanidad para llegar a 1,000 millones en 1800.



Also Political Issues



- Oil industry interests,
 - Lobbyists
- Governments covering up scientific evidence
 - (e.g. NASA climatologist, Jim Hansen)
- Real cost of Nuclear energy
 - versus cost of clean energy like solar or wind
 - Health hazards, radioactive waste deposit

Potential Solutions

Reduce CO₂ emissions:

- Reduce energy consumption
- Alternative green power: solar, wind, biofuels,...
- Reforestation
- Increase fuel efficiency; e.g. fuel cell, hybrid cars

Scientific propositions:

- CO₂ sequestration
- Inject sulfur in stratosphere
- Distribute iron oxide to SA ocean

CO₂ Emission trading- Kyoto Protocol:

- Signed by 135 nations to reduce emissions.
- **Not signed by U.S. or Australia!**, the 2 nations with the highest emissions.



The Good News is...

You can **save over \$2,000 every year** while **helping the planet!**



Save \$\$\$

Every time we use:
electricity or **gasoline**,
products, even **water**, we
 are sending emissions
 like **CO₂** to the
atmosphere that **warm it**
 even more.



Electricity



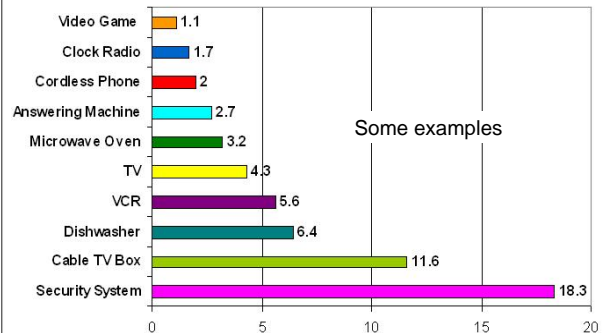
Electric appliances use energy
 even when turned OFF!



This is call **Phantom Loads!!**



Phantom Loads: Small electrical loads from appliances that constantly draw power when plugged, even if turned OFF



Sum of the phantom loads is **55W**, which is **40 kWh/mo!**

Watts consumed



Save \$5 - \$50 /month if you **turn off** (or better yet **disconnect**) **them when not in use.**

Use a power strip to connect **several appliances** so you can turn them all at once.

- **Turn off printer & speakers** if not using.

Unplug them at night.

Computers

- **Turn off PC** if you will not use it in ~1-2 hours.
- **NO** leave the adapter plugged in!!

Cellphone Chargers

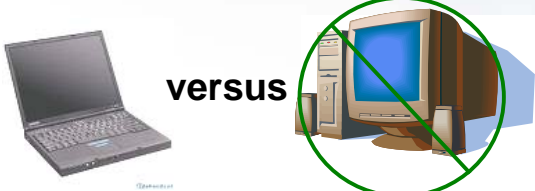
- **Don't leave plugged in!**
- **Uses 70-95% of the energy as if charging!**

Mith vs. Fact: turning off appliances damages them.

FALSE! New appliances can be turned off to save money.

What should I buy?


- Laptop uses **1/3** of the electricity than a regular computer!



versus

& it doesn't need a UPS.

What should I buy?




Plasma **LCD**

Un **LCD** gasta **1/3 menos** luz que un **televisor Plasma!**

Luces FLUORESCENTES COMPACTAS

AHORRAS \$50 por bombilla durante la vida de la bombilla

- Usan 1/4 electricidad.
- Duran 10 veces más.



Una Brillante Idea
Las bombillas fluorescentes compactas (CFL) ahorran \$35-\$60 cada una


Use CFL whenever 75% energy!
CFL
Bombilla regular

Use CFL about 10 times wild!
CFL
Bombilla regular

visit www.myeenergystar.com
Source: U.S. Environmental Protection Agency

A/C

Si usas **aire acondicionado**, ajusta la **temperatura 1-2 grados menos frío**, esto te ahorrará dinero y emisiones de bióxido de carbono al ambiente.




Un **abanico** en la ventana atrae el aire fresco de afuera. AHORRA \$25 al mes por cada unidad de aire!

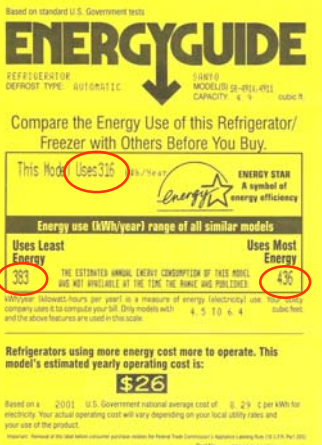
What to buy?

Compra enseres que tengan un bajo uso de energía.

¡Compara!



Ahorra \$10-60/ mes c/u!!



Based on standard U.S. Government tests

ENERGYGUIDE

REFRIGERATOR
DEFROST TYPE: AUTOMATIC ENERGY CONSUMPTION (KWH/YEAR): 393

Compare the Energy Use of this Refrigerator/Freezer with Others Before You Buy.

This Model Uses **393** kWh/year

ENERGY STAR
A symbol of energy efficiency

Energy use (kWh/year) range of all similar models

Uses Least Energy Uses Most Energy

393 436

THE ESTIMATED ANNUAL ENERGY CONSUMPTION OF THIS MODEL USES NET AVAILABLE AT THE TIME THE RANGE WAS PUBLISHED.

Refrigerators using more energy cost more to operate. This model's estimated yearly operating cost is:

\$26

Based on a 2001 U.S. Government national average cost of 0.29¢ per kWh for electricity. Your actual operating cost will vary depending on your local utility rates and your use of the product.

What to buy?

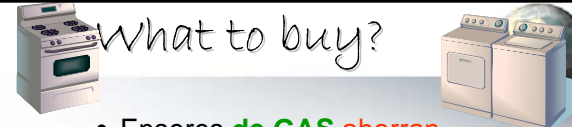

Un **calentador solar**

- Ahorra \$40-\$100/mes
- Dura 30+ años!



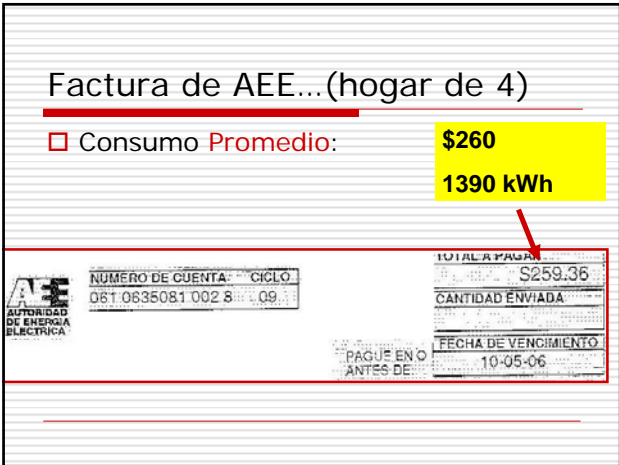
What to buy?

- Enseres **de GAS** ahorran unos **\$25-\$50/mes!**
- Tender la ropa **al sol**, ahorra aún más.

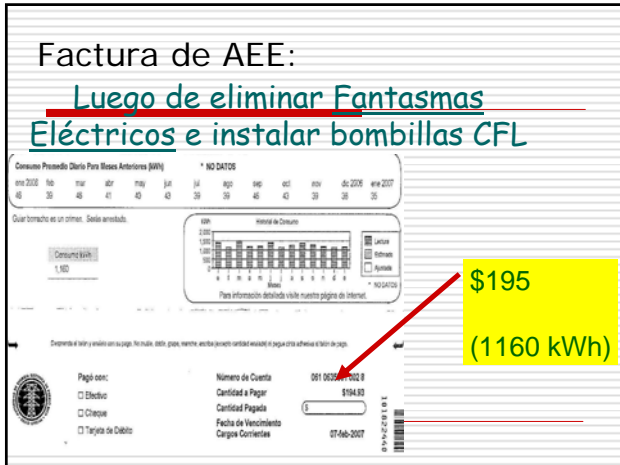
Factura de AEE...(hogar de 4)

Consumo Promedio: **\$260**
1390 kWh



Factura de AEE:

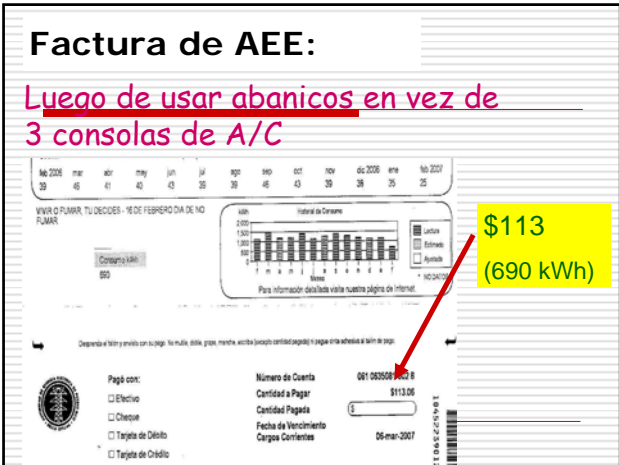
Luego de eliminar Fantasma Eléctricos e instalar bombillas CFL



\$195
(1160 kWh)

Factura de AEE:

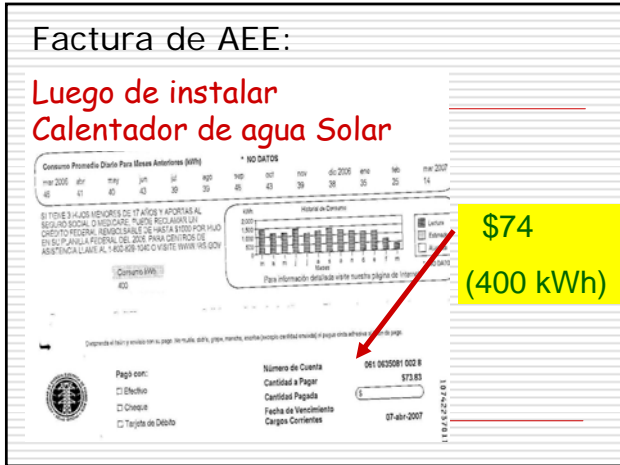
Luego de usar abanicos en vez de 3 consolas de A/C



\$113
(690 kWh)

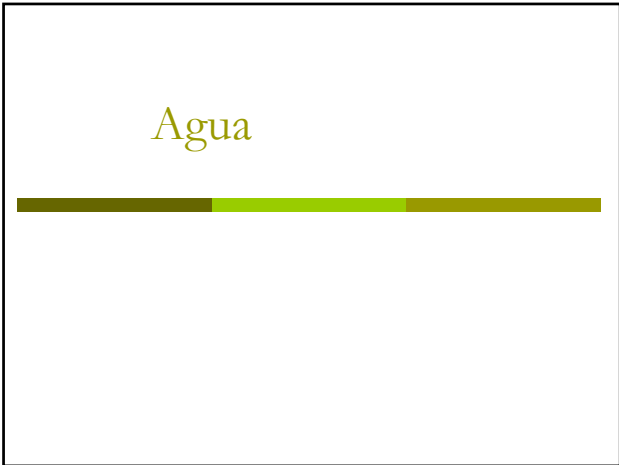
Factura de AEE:

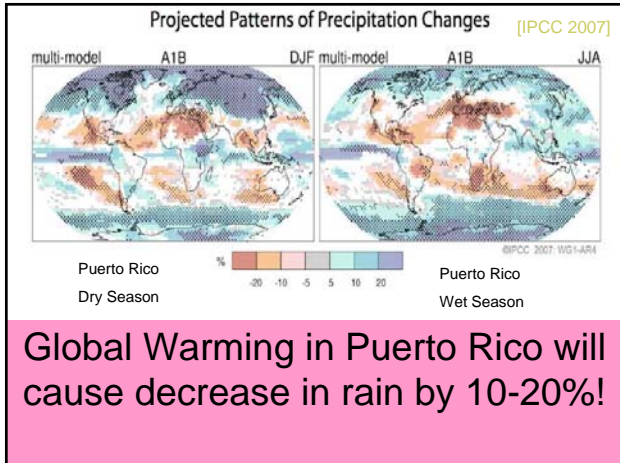
Luego de instalar Calentador de agua Solar



\$74
(400 kWh)

Agua





Agua

- Al ahorrar agua, ahorramos \$ y emisiones de CO₂
- Compra duchas de 2.5 galones por minuto (gpm)

Use of Paper

- Print on both sides, minimize color.
- Use recycled paper, 100% post-consumer
- Cancel multiple Catalog subscriptions
- Subscribe to online magazines

Avoid lost of millions of trees

Reforestation

- Plant Trees
 - Can lower home temperature by 10F!
 - Increase propriety value!
 - Reduce CO₂ emissions

Products

Rechargeable Bateriaes (4 AA & 4 AAA)

Save >\$100 for each rechargeable battery!

Styrofoam



- Generates many **toxic gases** & CO_2 during it's manufacture.
 - **Is not biodegradable**, it's prohibited in many US cities.
- Provide **incentives** to use refillable cups for coffee & sodas.

Styrofoam costs \$\$\$...



Avoid use of disposable plates, dinnerware & napkins (Styrofoam® or Paper)

*Dinnerware = \$7,000 savings per month at UPRM's cafeteria = cost analysis.



Small things, ...big difference:

By using this napkin, the World Bank Group Food Services is proudly saving valuable natural resources annually.

- *268 Trees
- *110,000 Gallons of Water
- *47 Cubic Yards of Landfill Space
- *65,000 Kilowatt Hours of Electricity
- *945 Pounds of Greenhouse Gas Emissions

GSD

100% Recycled Paper • 100% Soy based Ink • 100% Bleach-Free Process

Eat less Meat



- **Methane gas** is 20x powerfull as CO_2
- Could be captured & use as fuel.



Wastelands produce Methane



Farm animals produce Methane

Sell your "Trash"

Recycle, Reuse & Reduce:



- cardboard
- **Plastic**
- **Aluminum**
- **Glass**
- **Batteries**
- **Water**
- **Cooking oil**
- leaves
- **Methane**
- **MBytes**

Centro de reciclaje en Cabo Rojo:
Compra Aluminio, vidrio y cartón
No acepta plásticos.

Oil Energy 832-5757
Recicla aceite usado

Ponce Resources en Mayaguez
824-3503

What to buy?

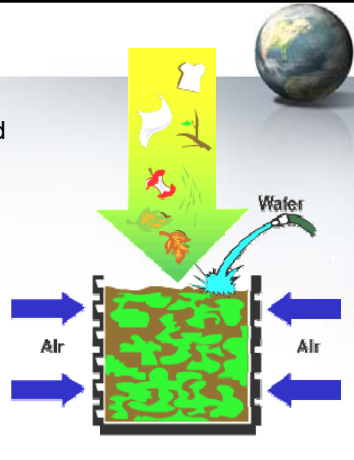
Reduced packages
Concentrated Products



*Packages need large amounts of energy to produce & many liberate tones of CO_2 to the atmosphere annually.

Compost

- Recycle leaves, and other waste
- Better for your health & the environment.



¿Qué compro?

- **Fiberglass uses 1/3 the energy than a concrete pool**
- **Fiberglass pools have less water filtrations.**

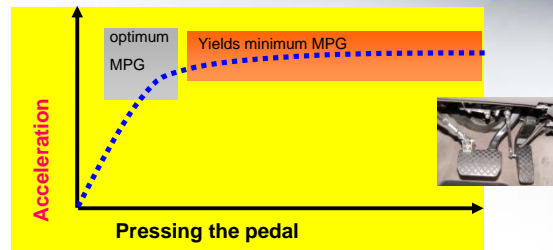


Escoge piscina de fibra de vidrio

Gasoline



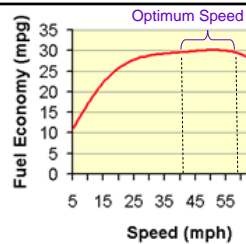
Increase your MPG



Don't press the accelerator too much.
Learn to keep on optimum range.

Increase MPG

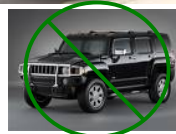
1. Use optimum acceleration
2. Drive less, Combine trips
3. No leave car idle > 1min
4. Remove excess wait
5. Park in the shade
6. Keep auto tune-up & tires inflated
7. Consider an Hybrid
8. Turn A/C if driving uphill
9. Avoid holes
10. Use Overdrive



*http://www.ucsusa.org/clean_vehicles/fuel_economy/practical-driving-tips.html

Each mile saves 20 pounds of CO₂ emissions!

Carros Híbridos



**Save \$6,000
in 5 years*
& \$12,000
in 10
years*!**

*\$0.65 per gas liter

Taking into account initial costs and costs due to gas inefficiency.

Economic Advantages

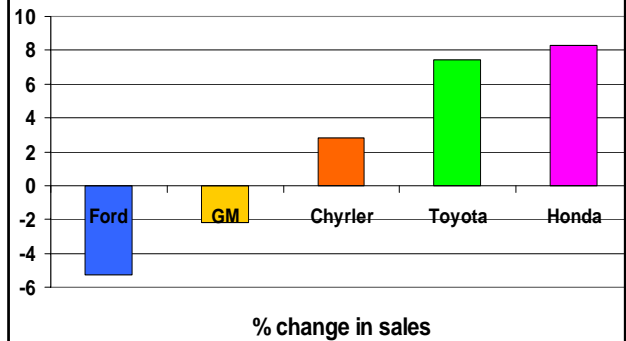


- For the industries that are leaders in developing the technologies in renewable energy, green building and energy conservation and efficiency.



Example: Auto Sales in US 2006

[1st quarter 2006 %change]



<http://advisor.investopedia.com/news/>

Many solutions

Use Renewable Energy



[Non-renewables: carbon, oil]

RENEWABLES;

- SOLAR
- WIND
- OCEANIC-THERMAL
- BIO-DIESEL
- ETHANOL - SUGAR

MITIGATION

ITEAS
ACEER



Oil from cooking and cars



- Biodiesel
- Bioethanol from sugar cane

Use old oil for fuel!



Solar charger for cellphones



Eco Urbana – Renewable Solutions



Solar powered & rainwater filtration system.

Airplane Travel



- Emit many gasses but the overall effect is to cool own the atmosphere due to sulfur emissions.



Save Mbytes!



- Save materials & energy

Name	Size
PR_Genera_compress.ppt	4,439 KB
PR_General_Info.ppt	1,579 KB
PR_General_Info_jpeg_y_compresspix.ppt	959 KB
PR_General_Information.ppt	22,240 KB

HOW?> Right-click on figure, press Format Figure, Compress, All, or change with Paste Special to Jpeg or gif Format. Save a lot of space on your USB memory sticks! Up to 20x!!

More Things to DO: & Save \$\$



- Clean A/C filters
- Take a ride, walk, use bikes
- Eat:
 - Local Products



- Lower T of water heater and AC
 - Use sheets not blankets
- Use cold water to wash clothes
 - Hang clothes for drying
- Use dishwasher only if
 - Wash by hand if possible!



- Be a Wise Consumer
 - Buy Less
 - Give away things you don't use.



Everex.com

Things to do everyday

Transportation accounts for 67% of oil used!

- Use public transportation
- Eat organic (better health, less Br)
- silicón or dark baking pan : Bake T-25°F
- Coffee Filter reusable: plastic or cloth

Green means it's also good for your HEALTH.



Buy products w/Less Package

- Family Packs: not individually wrapped
- Use gift bags instead of wrapping paper
- Reuse water bottles! ☹



*Plastics need large quantities of energy to produce & emit tons of CO₂ to the atmosphere annually.

- Email your government:
 - Sign petition at www.undoit.org
 - climatecrisis.org
 - www.cienciapr.org/peticion_calentamientoglobal.php



Greenhouse Gases in the Atmosphere



In summary

- Concentrate on the big items - in residential, this includes air conditioning, high-powered or constantly active household appliances (Clothes dryers, kitchen stoves, refrigerators, and televisions), and hot water.
- In transportation, reduce trip generation, aggressive driving habits, big vehicles, and avoid congestion when possible.
- Try to learn something about energy usage, yours and others. Measure what you can. Avoid energy-saving suggestions not based on facts.
- Don't generate so much waste. The most efficient recycling program is not to purchase products with expensive packaging. Reduce paper consumption - it's the fourth largest industrial energy consumer.
- Support governmental and business practices to reduce energy use, especially passive and active solar. Encourage the government to begin making energy-related statistics and information available and to begin to cooperate with the highly effective work of US agencies.

* From Dr. Tom Noack, UPRM ECE
http://ece.uprm.edu/~noack/temps/Energy_conservation-later.doc

We have only ONE planet.

Let's use its resources efficiently.



Book References:



- The End of Poverty by Jeffrey Sachs
- Weather Makers by Tim Flannery
- An Inconvenient Truth by Al Gore
- The World is Flat by Thomas Friedman
- Global Warming by Chris Spence
- Pathologies of Power, Paul Farmer
- Mini Atlas of Global Development, The World Bank
- Economics of Climate Change, Sir Nick Stern

Web References...



- www.nasa.gov
- www.ncdc.noaa.gov/oa/climate/globalwarming
- www.povertymap.net
- www.unmillenniumproject.org
- www.st-edmunds.cam.ac.uk
- www.noaa.gov
- www.ucsusa.org
- www.borgenproject.org
- www.unicef.org
- www.energyhog.org FUN!! (PC games)
- cacique.uprm.edu/aceer

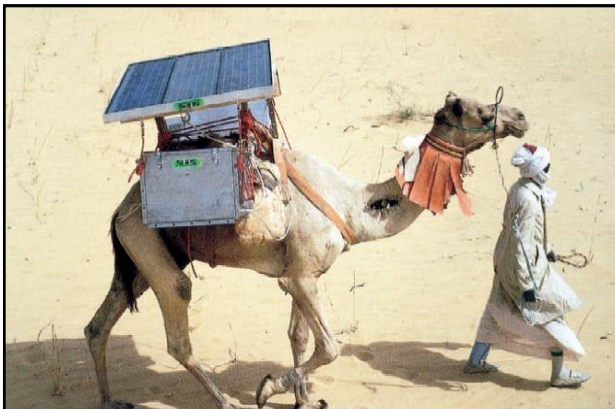
Potential Flooding in PR



<http://flood.firetree.net>

This presentation can be found at:

<http://ece.uprm.edu/~pol/outreach>



The "Camel Fridge." Camels wearing solar-powered refrigeration units helped deliver vaccines to remote African villages in the 1980s. (photo courtesy Naps Systems)