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Southern Alliance for Clean Energy

Climate Change in the Coastal Southeast

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Jacksonville Environmental Symposium

About Us

- **The Southern Alliance for Clean Energy (SACE) promotes responsible energy choices that create global warming solutions and ensure clean, safe, and healthy communities throughout the Southeast.**

- **As we look towards the future, SACE remains steadfast to our commitment to preserve, restore and protect our environment through the use of innovative technology, education, and pioneer policy work.**

Buffalo Mountain Wind Farm – Oliver Springs, TN

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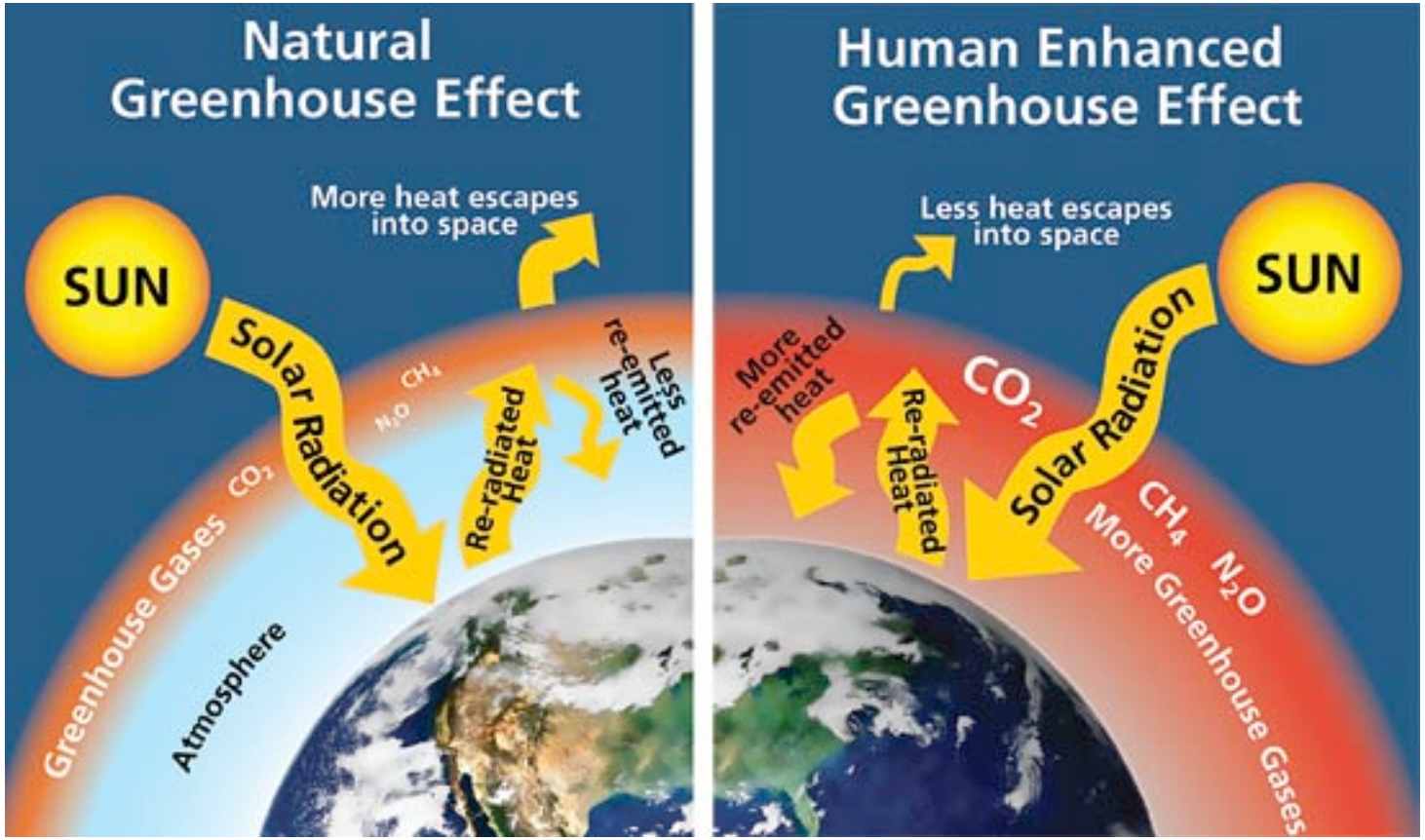
Presentation Outline

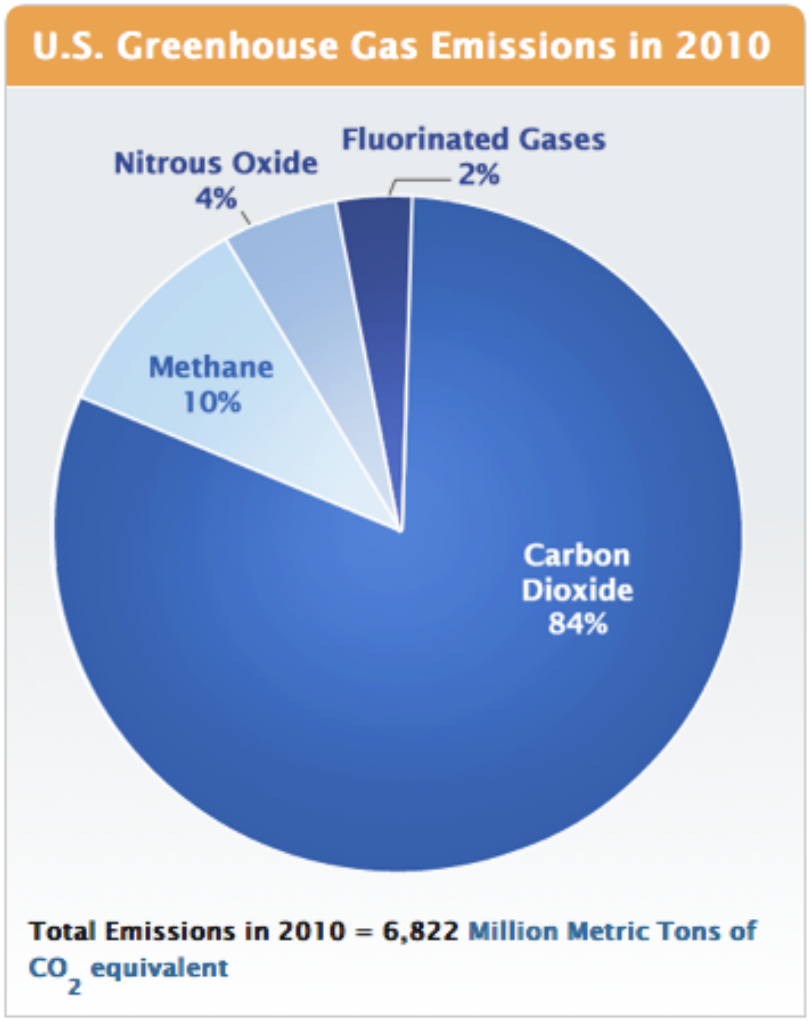
I. Climate Change Science
II. Coastal Southeast Regional Impacts
III. Solutions

Climate Change Science



Source: National Park Service - http://www.nps.gov/goga/naturescience/climate-change-causes.htm

Main Greenhouse Gases



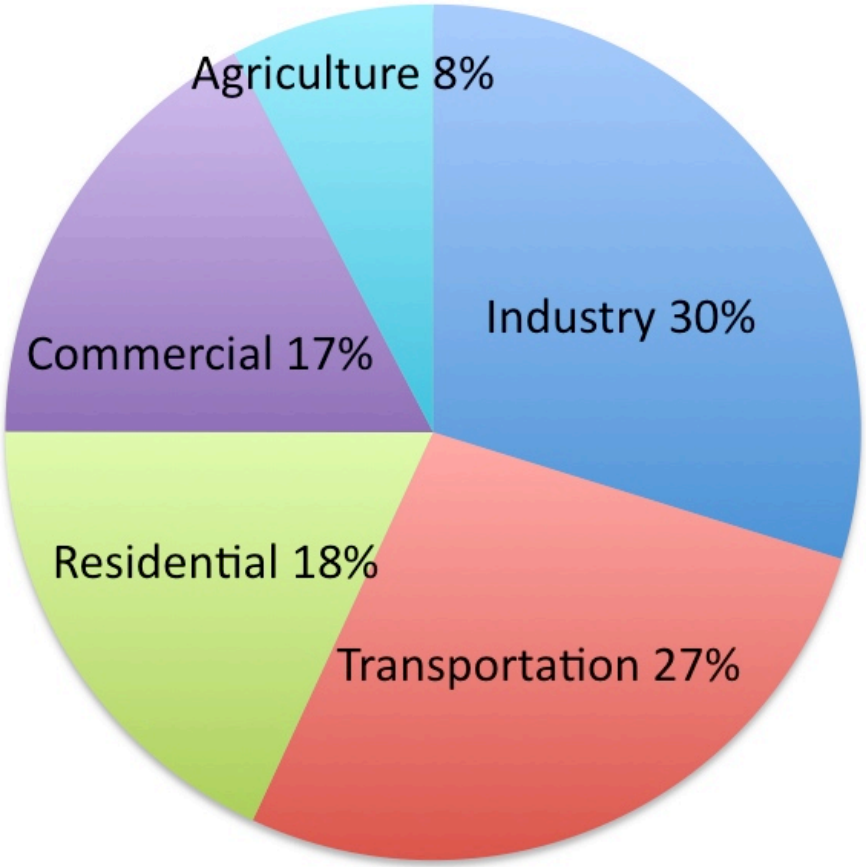
Top Manmade Emissions

1. Carbon Dioxide	84%
2. Methane	10%
3. Nitrous Oxide	4%
4. Fluorinated Gases	2%

Source: Environmental Protection Agency - http://epa.gov/climatechange/ghgemissions/gases.html

Top Emissions Activities

U.S. 2010 Greenhouse Gas Emissions (CO_2e)

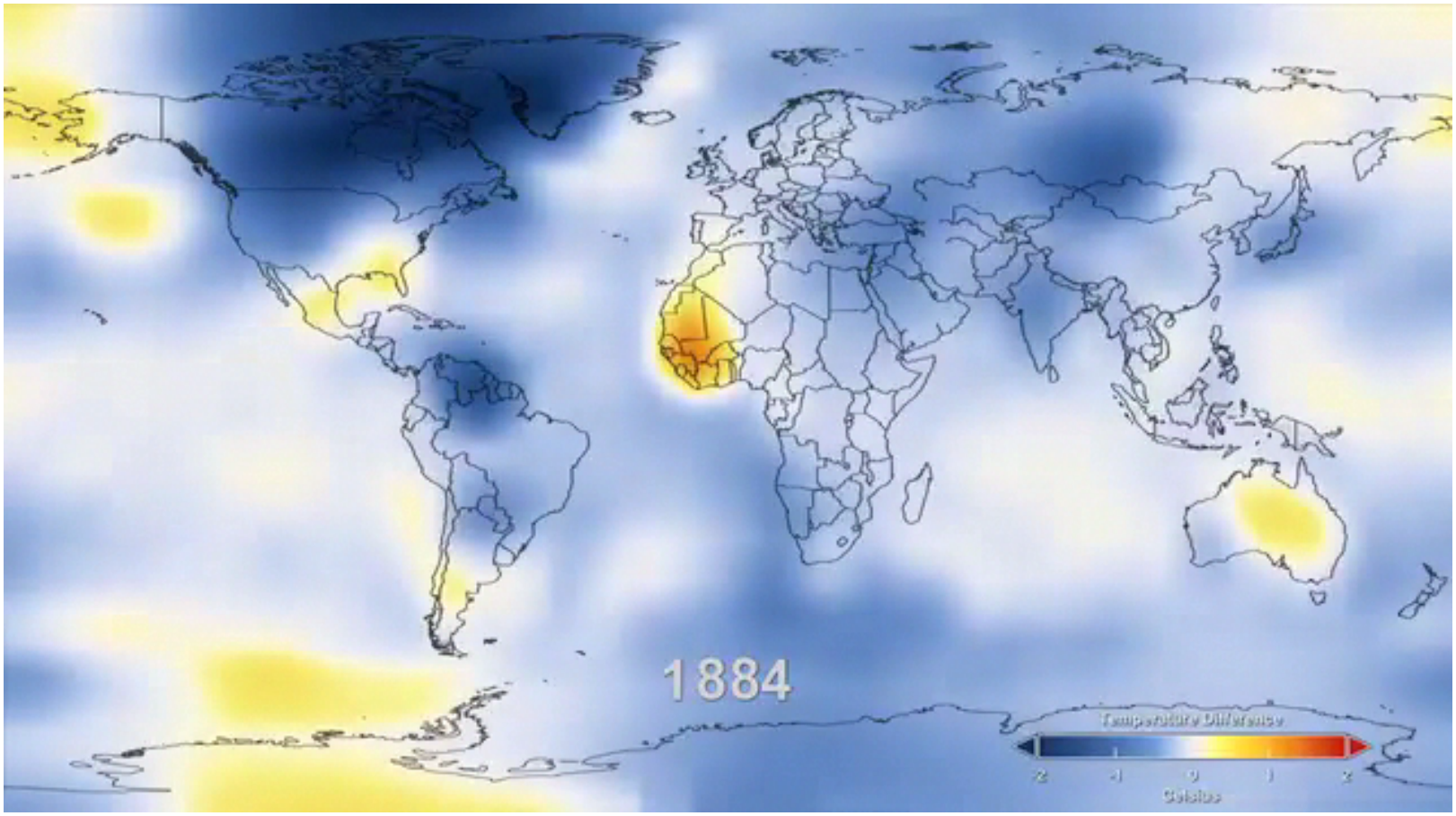


34% of total emissions across sectors is due to electricity generation.

Source: Environmental Protection Agency – "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2010" http://epa.gov/climatechange/ghgemissions/usinventoryreport.html

Global Warming

Global Warming Animation – 1884 to Present



Source: NASA/Goddard Space Flight Center Scientific Visualization Studio - http://svs.gsfc.nasa.gov/goto?3901

Climate Change Impacts in the Southeast

A. Sea level rise
B. Salt water intrusion
C. Ocean acidification
D. Coral bleaching & health
E. Hurricane intensification
F. Hot weather & drought

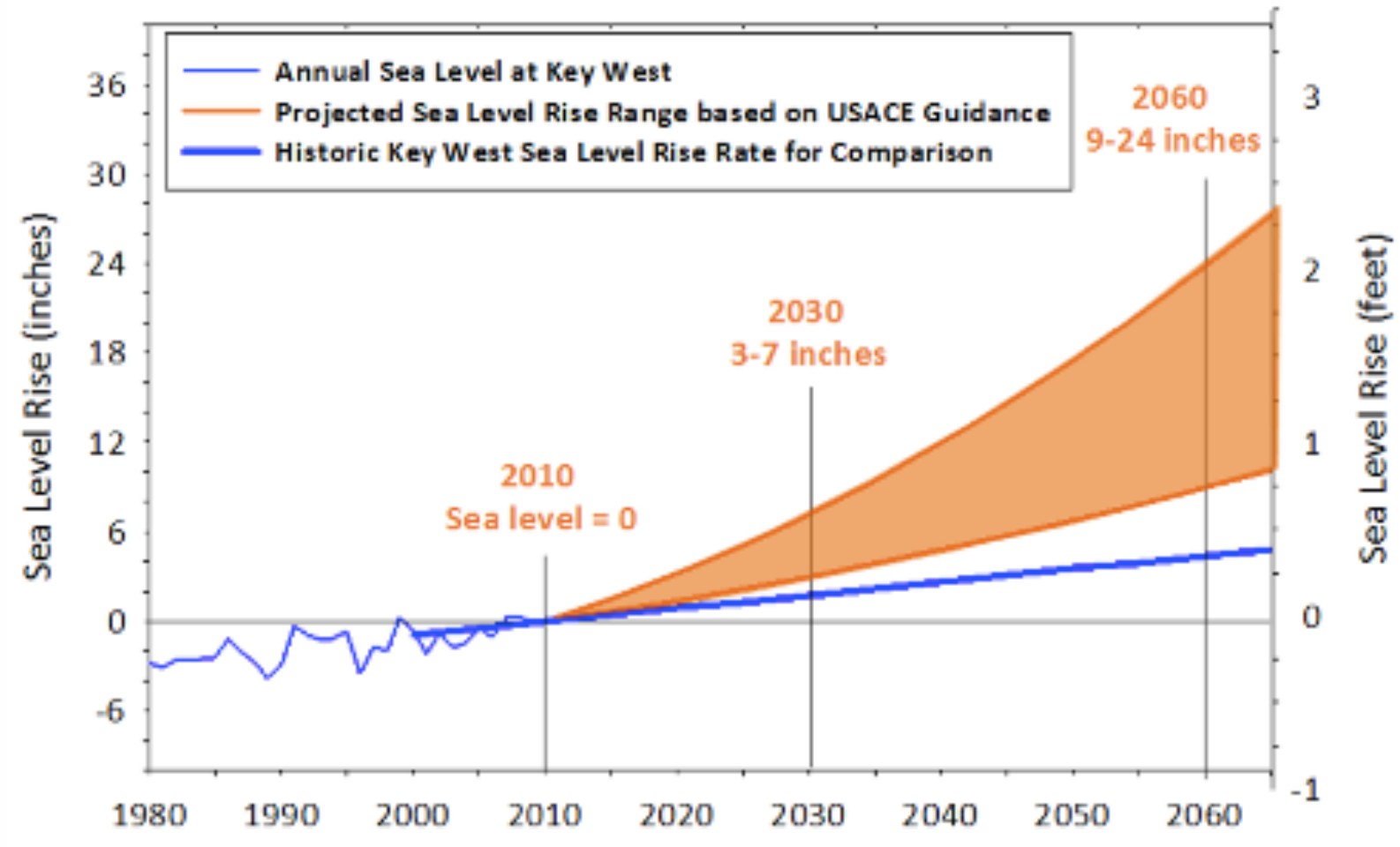
Source: NASA - http://visibleearth.nasa.gov/view.php?id=57723

Sea Level Rise

As the globe heats up, the sea level rises for two main reasons:

1. Thermal expansion
2. Glacial melting

Sea Level Rise



Source: "A Unified Sea Level Rise Projection for Southeast Florida" - http://www.broward.org/NaturalResources/ClimateChange/Documents/SE%20FL%20Sea%20Level%20Rise%20White%20Paper%20April%202011%20ADA%20FINAL.pdf

Sea Level Rise

Jacksonville Beach with 2 meters of sea level rise

Source: Architecture 2030 - http://architecture2030.org/hot_topics/nation_under_siege

Sea Level Rise

St. Augustine with 1 meter of sea level rise

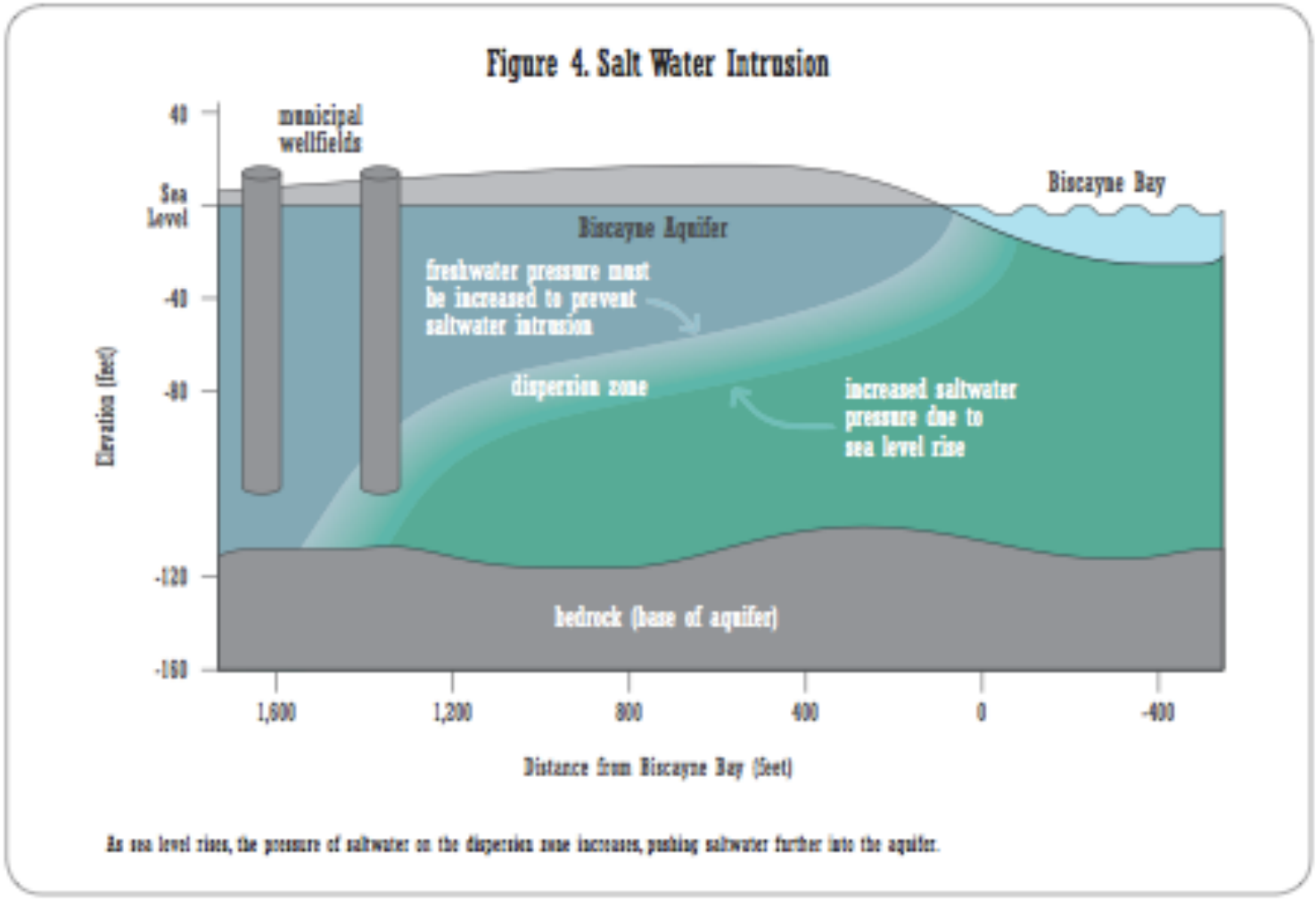
Source: Architecture 2030 - http://architecture2030.org/hot_topics/nation_under_siege

Sea Level Rise

Miami Beach with 1 meter of sea level rise.

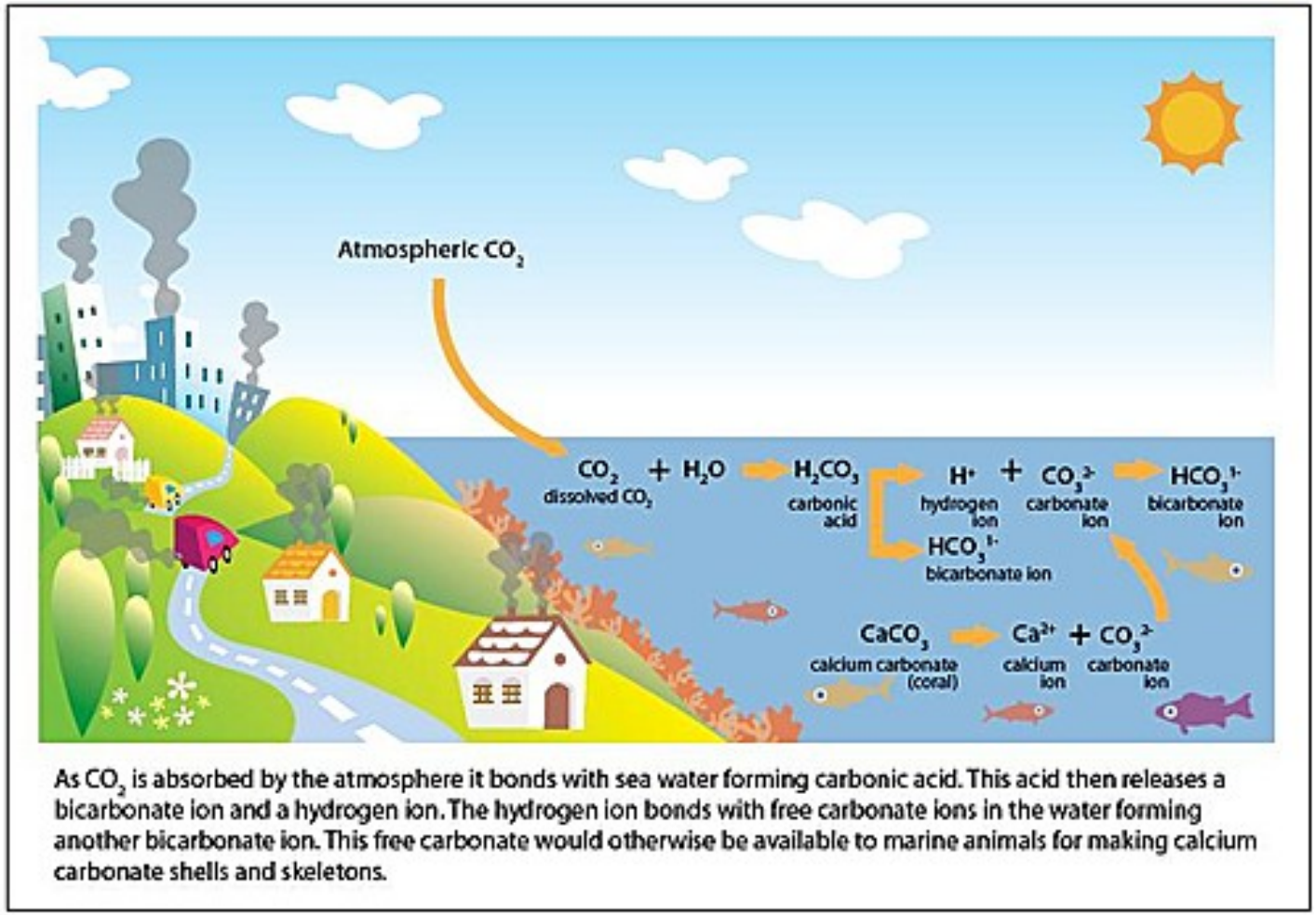
Source: Architecture 2030 - http://architecture2030.org/hot_topics/nation_under_siege

Salt Water Intrusion



Source: Florida Atlantic University – “Southeast Florida’s Resilient Water Resources” -http://www.ces.fau.edu/climate_change

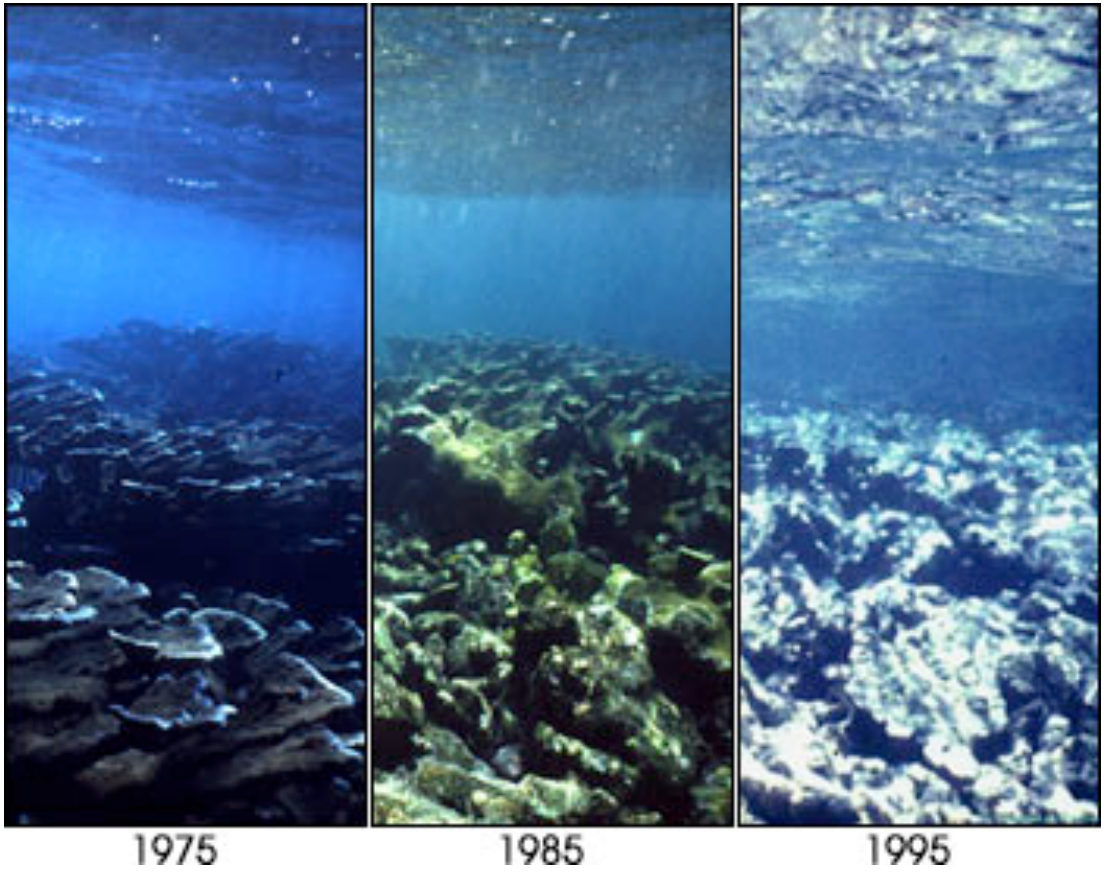
Ocean Acidification



As CO_2 is absorbed by the atmosphere it bonds with sea water forming carbonic acid. This acid then releases a bicarbonate ion and a hydrogen ion. The hydrogen ion bonds with free carbonate ions in the water forming another bicarbonate ion. This free carbonate would otherwise be available to marine animals for making calcium carbonate shells and skeletons.

Source: Oceana - http://oceana.org/en/our-work/climate-energy/ocean-acidification/learn-act/what-is-ocean-acidification

Coral Bleaching & Health



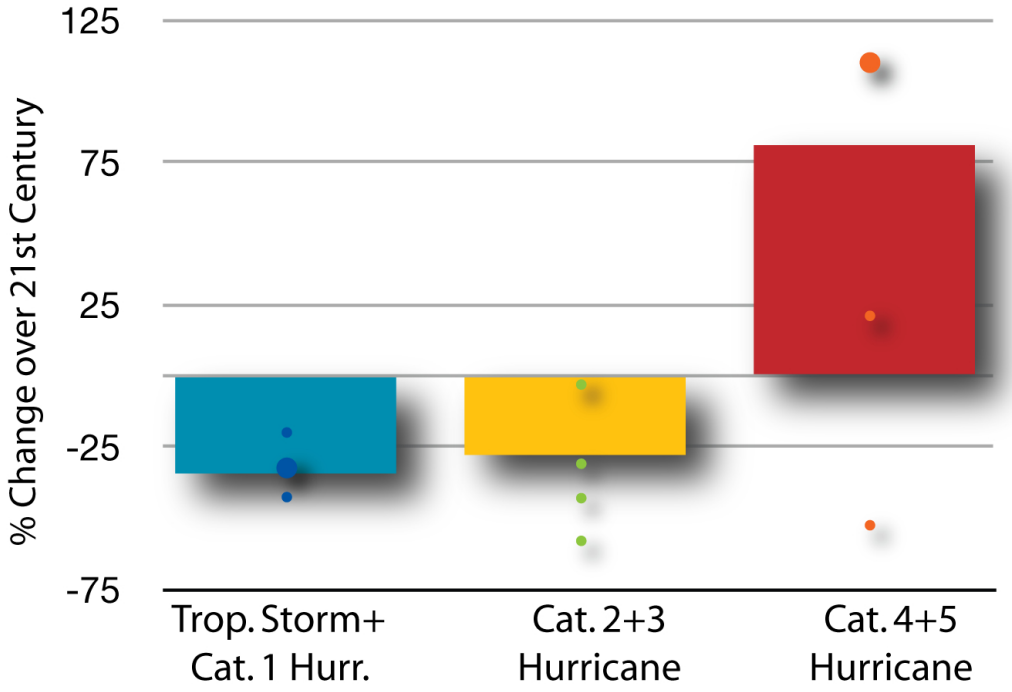
Carysfort Reef, 1975 -95

Source: Philip Dustan, College of Charleston - http://earthobservatory.nasa.gov/Features/Coral/coral2.php

Hurricane Intensification

As the climate warms, we are likely to see an increase in Category 4 & 5 hurricanes.

Projected Changes in Atlantic Hurricane Frequency over 21st Century

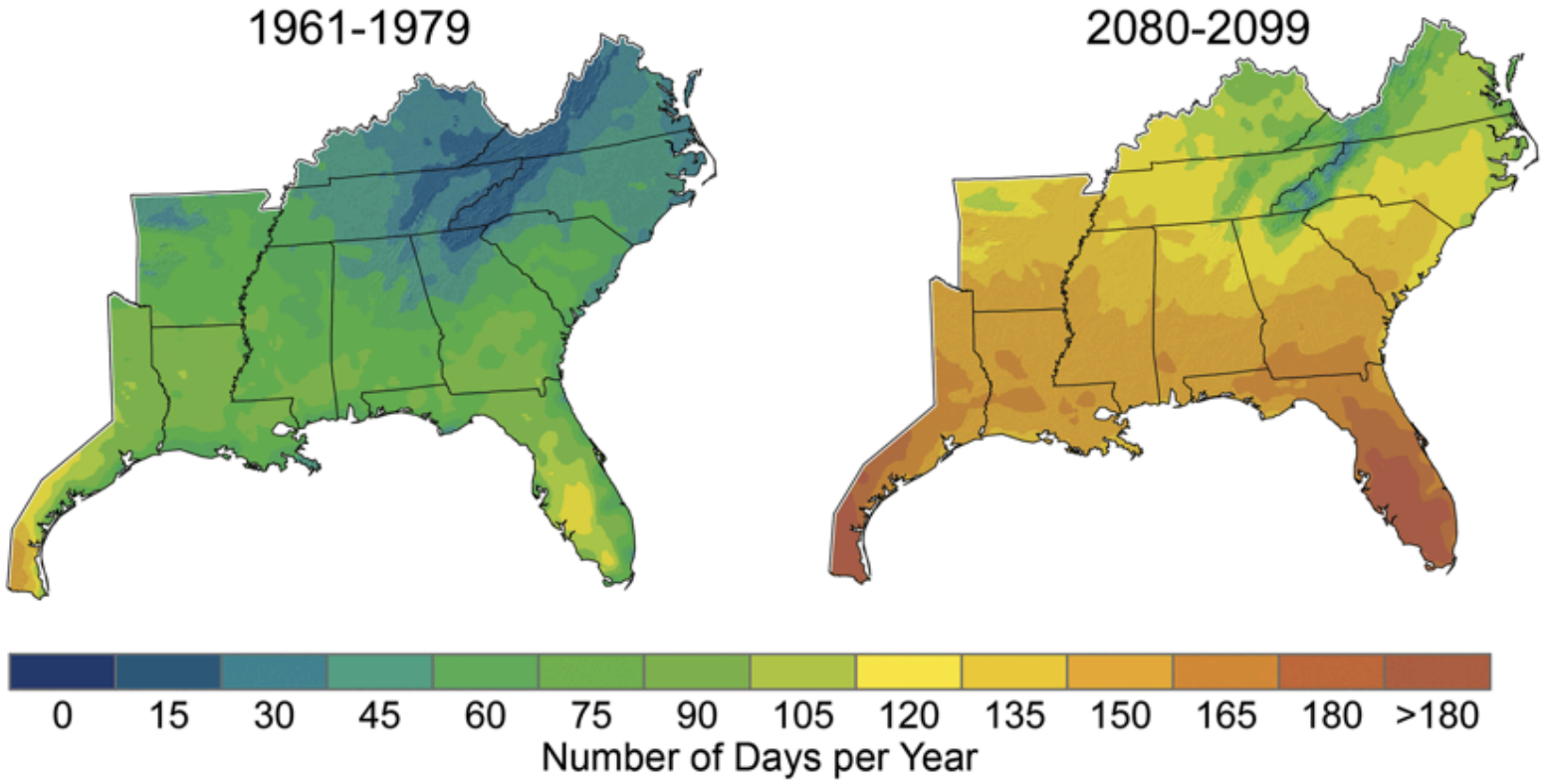


- an increase in average **storm intensity** by 2% – 11%, even factoring in the decrease of smaller storms
- an overall increase in **hurricane damages** by 30%, not taking into account future sea level rise
- substantially higher **rainfall rates** than present-day hurricanes—perhaps 20% more rainfall within 100 km of the storm center

Sources: NOAA Geophysical Fluid Dynamics Laboratory - http://www.gfdl.noaa.gov/global-warming-and-hurricanes
http://www.gfdl.noaa.gov/21st-century-projections-of-intense-hurricanes

Hot Weather & Drought

Number of Days Per Year Above 90 Degrees F



Source: US Global Change Research Program - http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/regional-climate-change-impacts/southeast

Hot Weather & Drought

Hot, dry summers put electricity and water supplies at risk, with serious consequences for people and wildlife.

NOT ENOUGH WATER

Without enough water for cooling, power plants must cut back production or even shut down.

INCOMING WATER TOO WARM

Hot weather can make water supplies too warm for cooling, forcing power plants to reduce their electricity production when it's needed most.

OUTGOING WATER TOO WARM

Wildlife can be harmed or killed when power plants discharge hot water back into rivers and other water bodies.

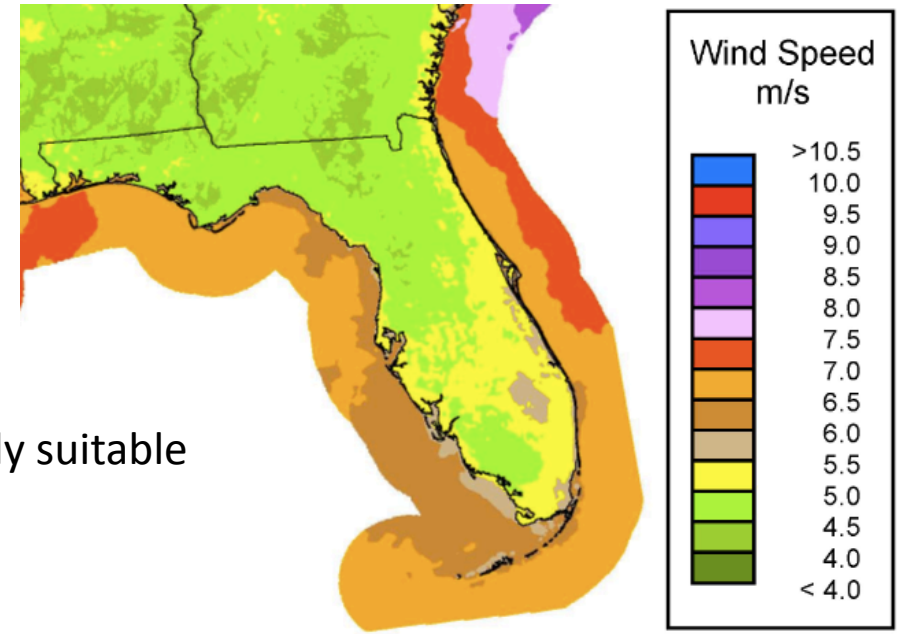
Source: Union of Concerned Scientists - http://www.ucsusa.org/clean_energy/our-energy-choices/energy-and-water-use/infographic-energy-water-collision.html

Solution: A Clean Energy Future

- **Renewable energy**, such as solar and wind creates no greenhouse gas emissions, does not use water, and supports robust industry.
- **Energy efficiency** curbs the need to generate more energy.
- **Better transportation** solutions, such as biofuels and electric vehicles can clean up a lot of our pollution.

Renewable Energy

Wind



- NREL says FL has 28 mi^2 currently suitable for onshore wind farms
  - -375 MW
  - -70,000 homes
- Sugarland Wind – 200 MW proposed in Palm Beach County
- Over 2,000 Floridians currently employed in the wind industry
- Offshore resource could be great, more research needed

Sources: National Renewable Energy Laboratory, AWS Truepower - http://www.nrel.gov/gis/wind.html
Wind Capital Group - http://sugarlandwind.com/

Renewable Energy

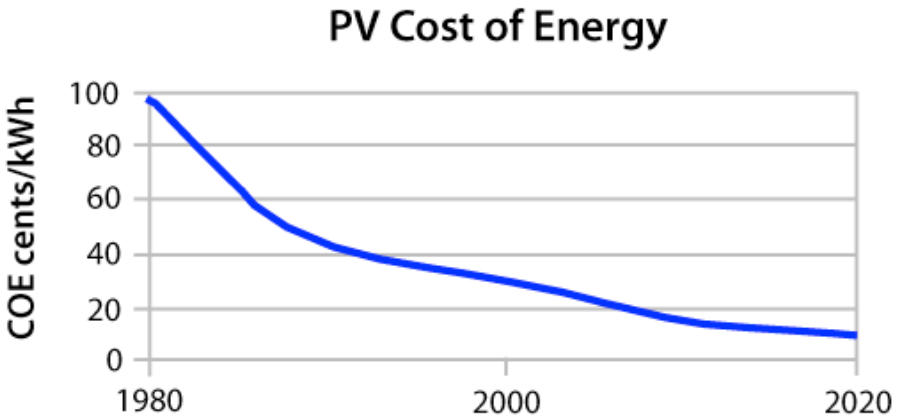
Biomass

- Generally considered carbon neutral or carbon negative
- Often waste products used for biopower
- Gainesville Renewable Energy Center – 100 MW ~ 70,000 homes – 2013
- Hamilton County Renewable Energy Center – 100 MW

Source: American Renewables - http://www.amrenewables.com/our-projects/gainesville-renewable-energy-center.php

Renewable Energy

Solar

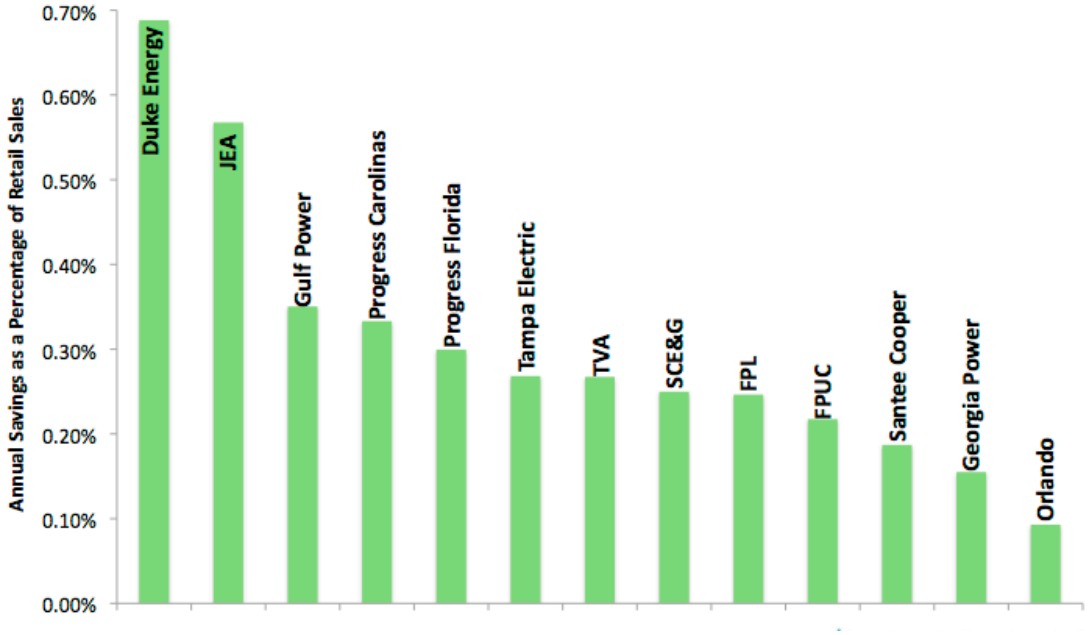


- Lots of potential in the SUNSHINE STATE!
- Net metering means that you get credited for extra energy you produce
- Expensive on a utility scale, but economic for utility customers
- FPL has 3 solar plants for 110 MW + Next Era has a 310 MW thermal plant in CA
- Cost coming down quickly

Source: Department of Energy, Office of Energy Efficiency and Renewable Energy - http://www1.eere.energy.gov/tribalenergy/guide/costs_solar_photovoltaics.html

Energy Efficiency

•The cheapest and fastest energy and climate solution
• "The cheapest fuel is that which you don't use."
• Intrinsically local economic development
• Overall savings in the Southeast have nearly tripled since 2009.



• ACEEE says that since FEECA was approved in 1980, efficiency measures have offset the need for eleven 500 MW powerplants
• Since 1980, the Energy Building Code has saved approximately $4.7 billion

Source: Southern Alliance for Clean Energy - http://blog.cleanenergy.org/2012/08/07/energy-efficiency-the-southeasts-new-energy-superhero/

Transportation

- Biofuels
- Electric vehicles
- Transit
- Mobility
- Fuel Efficiency
- CAFE Standards

Source: Southern Alliance for Clean Energy - http://www.flickr.com/photos/cleanenergy/

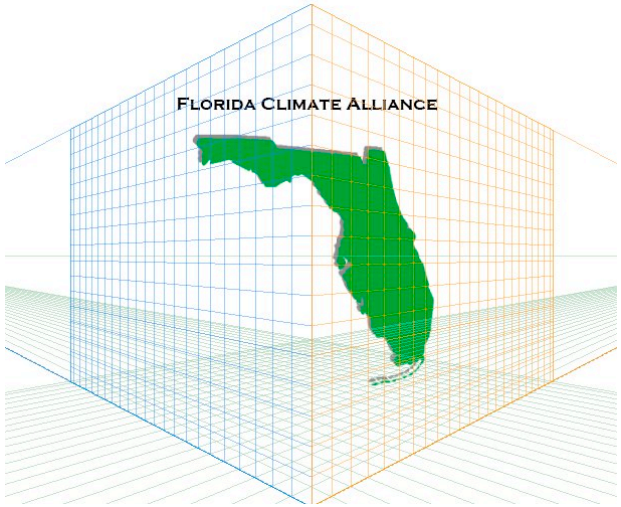
What Individuals Can Do

1) Perform an energy audit!
2) Weatherize your house
3) Replace inefficient equipment and appliances
4) Conserve water
5) Plant trees
6) Install solar – 30% tax credit til 2016, City of Jacksonville has $1,000 rebates for SHW, JEA has $800
7) Change commute habits—ride bike and take bus
8) Push public officials
9) Tell a friend
10) Stay active and engaged!

What Local Governments Can Do

1) Climate/Energy Plan & GHG Inventory
2) ESCOs & Performance Contracting
3) PACE program
4) QECBs
5) Check with Florida Energy Office for opportunities
6) Efficient Building Codes (IECC 2012) if it makes sense
7) Transit oriented development
8) Municipal resolutions in support of clean energy or climate goals
9) Push other public officials

Additional resources: ICLEI, Natural Step, EPA Green Communities Program, NREL



Southeast Coastal Climate Network **Florida Climate Alliance**

- Coalitions of individuals and organizations working on the issue of climate change in the coastal Southeast
- Diverse membership includes representatives from small businesses, government, academia, nonprofit organizations, and concerned citizens
- From Maryland southward to Florida and along the Gulf coast to Louisiana
- Online communication tools, engagement opportunities, and monthly webinars

Join Today!

seccn.groupsite.com **floridaclimatealliance.groupsite.com**

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Questions?

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Working for a clean energy future