

We, Too, Must Change

When the topic of global warming arises the discussion usually turns to what we are driving and whether we are using the right light bulbs. Those things are important because cumulatively they can have a real impact on how much carbon we add to the atmosphere. But they are not the key. That would be how we produce our energy.

If everyone on earth drove hybrids, used compact fluorescent bulbs, and bought energy star appliances—and still used coal and natural gas to produce most of their electricity—we would still be headed for serious trouble. On the other hand, if we produced our energy by means which did not put out greenhouse gasses, and were still gluttonous about the amount of energy we used, we would be in good shape.

Once the sun or the winds are producing our energy we can use as much as we can manage to produce and not endanger the earth. No matter how much we conserve, coal, oil, and natural gas put us in danger.

While we research nuclear fusion as an energy source, adding to the tens of billions of dollars and decades we have already spent researching this option, we continue to burn coal, oil, and natural gas. While we talk about hydrogen fuel cells as an automotive fuel source, knowing that it is unlikely we will be able to produce, store, distribute, or use it in any practical or renewable way on an appropriate scale, we continue to burn gasoline. While we plant 30% of our corn crop to make ethanol, knowing as we do that it saves no carbon because we produce as much carbon planting, processing, and transporting the fuel as we would if we just burned gas, we burn gas.

The latest research shows that we must achieve near zero greenhouse gas emissions if we wish to live on this planet. Luckily, we know how to achieve that. It will not be easy. But it will be rewarding in many ways, economically, culturally, and spiritually. It will mean a change which spreads to most of our daily life. At the end, and along the way, too, we will know that we are becoming more at home on the earth.

Our Viable Options for Energy Sources

We must cease building any fossil fuel plant which emits greenhouse gasses. Further, we must decommission such existing plants. We must derive our power from renewable sources.

Nuclear energy operates at all by externalizing costs—especially those of waste and liability. But when those costs are externalized they do not go away. They simply disappear from the company's cost and profit calculations. We will still pay them, now and for all our future. Nuclear power is not a viable option. Luckily, we have other options.

No one energy source will do for all times and places. To achieve near zero emissions, we may choose among the developed technologies of renewable energy: solar, wind, geothermal, hydroelectric, tidal, and wave power.

Florida Power and Light is using Ausra Corporation to build a 300 megawatt solar plant in south Florida which intends to produce energy for a price competitive with fossil fuels. The project will in the next few years produce 2000 megawatts in several plants. Wind power in Texas and other favorable locations is competitive in cost with fossil fuels. Tidal power is already being used elsewhere in the world and is a natural direction for Florida.

All power sources suggested here have difficulties.

No difficulties should be allowed to trump our need to shift to renewable power sources and a sustainable culture. We are headed for the cliff. We must change direction.

The transition to renewable energy will be dislocating. Many occupations, and whole industries, will disappear. But new ones will arise.

We may console ourselves that fossil fuels, already rising in cost, will become prohibitively expensive in the lifetime of any power plants we would build. The final bottom line, though, is not economic. The earth cannot tolerate the climate change we are generating.

Sierra Club

Explore, enjoy and protect the planet

Where We Must Go

We are headed for a different earth, one way or another. On the other side of a successful transition to renewable energy we will find our material lives changed in almost every aspect, and our cultural life as well.

The cheapest power is that we do not use. We can conserve energy and ease the transition to renewable energy. Refitting our houses and re-equipping our kitchens should keep us busy for awhile.

If our leading climate scientist James Hansen is right and we must take carbon out of the system to avoid dangerous change, charcoal is the primary candidate. When you burn any organic matter at a relatively low temperature by controlling the oxygen input you produce charcoal. If you bury that you are taking its carbon out of the system for thousands of years—and you are permanently increasing the fertility of the land where you bury it. The process is called terra preta, biochar, or agrichar, and was first discovered in the Amazon where it has been in use for hundreds of years. If farms around the world were induced to produce biochar they would benefit and we could sequester billions of tons of carbon.

Some greenhouse gas emission sources are a challenge to imagine eliminating. Cement contributes 5-10% of global emissions (but half that when produced using renewable energy); shipping contributes 4.5%, and air travel 2.5%.

Geopolymeric cement is even stronger than Portland cement, uses commonly available materials, and has much lower greenhouse gas emissions. Because it requires lower temperatures it uses less energy to produce. Economies of scale should make it competitive with Portland cement in cost. We will, however, need to convert cement production facilities worldwide.

We must find some way to travel by sea and air without emitting carbon. Wind power and solar in combination might do for the oceans; lighter than air travel might be more in the future of air travel than in the past, or perhaps algaic or cellulosic ethanol can provide carbon-neutral fuels for aircraft. Finally,

though, we may find that we do less transport and less travel than now, whether by ship or by air.

Auto travel is easier to imagine. Compressed air and electric autos can derive their energy in the form of electricity from any of the renewable options. Certainly we will turn to more public transportation. We may even find that personal motorized transportation is not so necessary as we thought, or that longer trips can be left to public systems.

Trades people are going to need our support if we do move to public transportation. A plumber cannot take the necessary gear on a bus. Also, we are going to have to invest in clean commercial transportation for the exchange of goods necessary to our economy.

If we are going to make war, we will need to do so without emitting carbon. Nothing gets a pass on the approaching energy transition. Our personal lives and our collective habits are due for a great revision.

The internal combustion engine running on fossil fuels will probably have to disappear (unless our hopes for algae and switchgrass as fuel sources work out). Electric and rotary lawnmowers are in our future—so long as we have lawns. It may be that lawns themselves are due for a transformation. Most of us now face a water shortage arising partly from climate change. Lawns also generate pollution from the fertilizers, pesticides, and herbicides which we spread on the grass and greet again in our oceans and streams.

We have every reason to welcome the transition to renewable energy and a sustainable culture. Our lives have been impoverished by much of what we thought was making us richer. There is a delight to be had from living in harmony with the earth's resources. We may look back on our previous way of life as isolated.

Finally, there is no away to throw anything. We are going toward an awareness of how our actions impact everything around us. We shall live more consciously, and, perhaps, more joyfully. The earth has told us that it is time for that, and will accept nothing less than our full effort and our full attention.

For More Information

For a fuller presentation of the material here, see *A White Paper on Energy and Global Warming*, published by the Sierra Club Northeast Florida Group. The report and its reference documentation are available at <http://florida.sierraclub.org/Northeast/>.

Or you may request a printed copy from the Group by mail at 2029 3rd Street N, Jacksonville Beach, FL 32250, or e-mail NEFLSierraClub@yahoo.com.

The best single book on the basics of global warming is Tim Flannery's *The Weather Makers*, now out in paperback. Flannery is an Australian biologist who was named Man of the Year in Australia in 2007 for the book.

For a history and a more technical study, try Spencer Weart's *The Discovery of Global Warming* from Harvard University Press. Weart maintains a web site with as much supplementary detail as you could wish: www.aip.org/history/exhibits/climate.

A great deal of ignorant rant and even propaganda appears constantly on the topic of global warming. The best site, run by climate scientists, to track down informed opinion is *RealClimate*: <http://realclimate.org/>.

Fred Krupp and Miriam Horn's *Earth: The Sequel, The Race to Reinvent Energy and Stop Global Warming* (Norton, 2008) is an up-to-date insider's view of the research and development of alternative energy in the US. Krupp is President of the Environmental Defense Fund.

The Sierra Club Northeast Florida Group meets in Jacksonville on the 2nd Monday of each month at the Lakewood Presbyterian Church, 2001 University Blvd. W., east of San Jose Blvd., west of I-95, US-1 & St. Aug. Rd.



Explore, enjoy and protect the planet

<http://Florida.SierraClub.org/Northeast>

Energy and Global Warming

Sierra Club Northeast Florida Group

Our World Is Changing

The atmosphere is made up of gasses which have accumulated in the long history of the earth as well as newer gasses which humans have made and released. Greenhouse gasses let in more energy than they let out.

Since the industrial revolution began the earth has gotten .8 degrees centigrade hotter, on the average.

The number and intensity of forest fires has increased. So, according to most studies, have the number and intensity of hurricanes. Heat and increasing acidity (from the new CO2 dissolving in the oceans) have already killed 40% of our coral reefs, nurseries of ocean life. As 95% of the earth's glaciers have begun to melt, the oceans have begun to rise—slowly, now, but more and more quickly, both from the melting of land-based ice and from the way water expands when it is heated.

Greenland and the West Antarctic are already showing signs of instability. Low-lying coastal areas everywhere in the world are likely to be under water by the end of this century, and some are likely to go under in our lifetimes—even if we are not young.

People are already suffering from the drought, storms, and fires. As the climate changes our world food production is dropping, and people are starving. But other life on earth is suffering too, in the oceans and everywhere else.

So far as we know we have it in our power to preserve the world in something like its current state. But unless we act quickly to moderate the amount of greenhouse gasses we are putting into the air the world will become more and more unlivable. We must change our lives, and begin now, whether we want to or not.

Crafted by Prof. Allen Tilley, with the Sierra Club Northeast Florida Group Copyright ©2008

May-08, Jacksonville, Florida