

ENERGY NEWS

of the Southeast Florida Society of Energy Professionals, a Chapter of the Association of Energy Engineers

April 2001 • Volume 14 • Number 4

Energy efficiency is key to climate change mitigation

by Robert Farmer, © 2001

What is Climate Change?

A great many of the world's leading scientists believe that the Earth's atmosphere is gradually warming and that this warming is perturbing our climate systems. Further, it is believed that the warming is being caused by the accumulation of heat-trapping gases in the atmosphere, primarily carbon dioxide released as the result of burning fossil fuels.

In the coming decades, and without appropriate mitigation of these so-called "greenhouse gases" by humankind, this perturbation is expected to increase dramatically and change the very nature of the planet upon which we live. Melting polar ice caps, receding glaciers, widespread flooding, release of stored carbon dioxide from permafrost, migration of tree lines, spread of insect-borne diseases and sea level rise—these are all part of a future that climate change promises us without appropriate corrective action today.

How do we know that fossil fuels are causing this warming, doesn't nature produce carbon dioxide also?

While the role of the sun should not be discounted, there is no question that carbon dioxide emissions are enhancing global warming. It has been known for over 100 years that carbon dioxide in the

atmosphere acts as a "heat trap" because it allows high-frequency sunlight to penetrate freely to the Earth's surface but traps low-frequency infrared radiation, which the Earth re-radiates back toward space. And atmospheric concentrations of CO₂ are accumulating. Scientific measurements taken at Mauna Loa Laboratory in Hawaii since the 1950s, and samples from ice cores confirm that since the beginning of the pre-industrial era, around 1750, CO₂ levels have increased by nearly 30%.

We also know that the origin of these carbon dioxide accumulations lies in the combustion of fossil fuels because it is the difference between the nuclei of carbon atoms emitted by nature and those emitted by burning fossil fuels that tell us fossil fuels are the culprit. The nuclei of carbon atoms in carbon dioxide emitted by burning coal, oil, and natural gas (fossil fuels) differ in characteristics from the nuclei of carbon atoms in carbon dioxide emitted under natural conditions. Coal, oil, and natural gas were formed deep underground tens of millions of years ago, and the fraction of their nuclei that were once radioactive has long ago changed to non-radioactive carbon. But the carbon dioxide emitted from natural sources on the Earth's surface retains a measurable radioactive portion. As carbon dioxide has been emitted through fossil fuel combustion, it has diluted the radioactive fraction

of natural carbon in the atmosphere. This was shown when scientists measured the decreasing fraction of radioactive carbon-14 captured in tree rings, each year [for the 150 years] between 1800 and 1950.

What actions can we take to alleviate the problem?

While nations attempt to negotiate a binding international agreement to limit greenhouse gas emissions (United Nations Framework Convention on Climate Change, 1992) there are many things that individuals and companies can do to reduce energy consumption and therefore reduce our individual greenhouse gas emissions.

The Union of Concerned Scientists recently polled its members and came up with a list of simple, every day energy efficiency measures, some of which we've adapted for South Florida:

1. Turn up the household thermostat one or two degrees. Higher when away for long weekends and trips. Dress down if the house feels warm.
2. Turn off outside lights at night.
3. Install storm doors and windows.
4. Insulate inner walls, especially around wall switches.
5. Close off chimney, vents, and unused rooms.
6. Turn water heater off when away for more than 3 days.

Energy efficiency is key to climate change mitigation (continued)

7. Install low wattage or compact fluorescent lights wherever possible.
8. Replace computer monitor with power saver model, and turn off computer when not in use.
9. Wash only full loads of clothes and dishes.
10. Wash clothes in cold water.
11. Hang clothes to air dry.
12. Put weather stripping on doors and windows.
13. Install double-paned windows. (Look into interest-free loans from your electric utility to change them.)
14. Put an electronic timer on the thermostat to turn it up automatically.
15. Close the shades and curtains on sunny days to keep the sun's heat out.
16. Replace appliances with the most energy-efficient models that meet your needs.
17. Use a microwave and toaster oven for baking and cooking small items.
18. Take shorter showers.
19. Cook meals in large pots/casseroles and freeze serving-size portions for easy/efficient defrosting in the microwave.
20. Use oven for maximum efficiency, i.e., bake several potatoes at once (can be reheated later for other meals).
21. Have candlelit family dinners at least two nights a week.
22. Avoid boiling more water than needed when cooking. Simply measure before boiling, not after. When not in use, the teapot is empty, ready for a measured amount of water to boil, even if it's just for one cup of tea.
23. Put a blanket around the hot water heater, keep it just hot enough for a hot shower.
24. Use hand-held appliances like can openers instead of electric versions.
25. Don't keep the door open while taking several loads of stuff to or from the car. •



Robert Farmer is an energy planning engineer and energy policy specialist. A comprehensive resource on technologies, issues, and policies, he offers clients strategies, briefings, and presentations on planning a sustainable energy future.

His technical expertise includes large scale to small scale power generation, combined heat and power (CHP), marine and surface transportation, and alternative fuel applications.

A Florida resident since 1984, Robert was a member of the Energy Advisory Committee of Governor Chiles' Commission for a Sustainable South Florida.

He is a Regional member and Market Development Chair of the Gold Coast Clean Cities Coalition (a U.S. Department of Energy program), and a member of the Southeast Air Coalition for Outreach (SEACO, an initiative of the Florida Department of Environmental Protection).

He is a member of the international Association of Energy Engineers (AEE) and since 1992 has served on the Board of the Southeast Florida Society of Energy Professionals, the local AEE chapter. He is a member of the Sound Science Initiative of the Union of Concerned Scientists, and a member of the United States Association for Energy Economics (USAEE).

He is also a member of the Board of Directors of the Tallahassee-based law firm, Legal Environmental Assistance Foundation, Inc. (LEAF), and of Third Planet, a Fort Lauderdale-based public charity.

He graduated as a Planning Engineer with Bristol-Siddeley Engines/Rolls Royce Gas Turbines Ltd. in the United Kingdom and has over 30 years engineering, sales and service management experience in the engine power industry in North America.

robertfarmer@conceptcommuniques.com
CONCEPT COMMUNIQUE'S INC.
5200 N Federal Hwy Ste 2
Fort Lauderdale FL 33308
(954) 493-8127

www.conceptcommuniques.com