R E P R I N T E D F R O M

ENERGY NEWS

of the Southeast Florida Chapter of the Association of Energy Engineers

March 1998 • Volume 11 • Number 3

How many tons of CO2 are you responsible for?

by Robert Farmer, ©1998

Don Holte, ASHRAE's president, made the most of a brief appearance last month to deliver a frank and incisive assessment of the problems, and the solutions, facing his organization and other practitioners in the building environment as we head into the 21st century.

With a theme of "Let's Get Smarter" he gave some history of the "drastic" changes in ASHRAE since the 1973 oil embargo when they were asked to write their first building energy Standard, 90.1. Standard 62, "Ventilation for Acceptable Indoor Air Quality", followed and he characterized the process of writing building energy standards as "nothing but arguments". On Standard 62, "we have spent 20 years arguing it and we will never quit". But this was a personal frame-of-reference for him to convey that changes are coming.

We've long known that current ASHRAE Standards are inadequate for our sub-tropical climate in South Florida. With 90.1 as the basis for the *Florida Energy Efficiency Code*, it too does not address our regional climatic differences in a satisfactory manner. In fact, The Florida Engineering Society's Energy Committee petitioned ASHRAE to revise its manufacturer design standards for air conditioning units to be more efficient in warm, humid climates....with no success.

The problem is geography and our regional climatic differences. ASHRAE has been a *national* standards writing body for the past 25 years. No wonder that their standards-writing process is fraught with difficulty and argument when regional differences are not included. Another larger problem is that of the outdoor environment itself and what we are doing to it by our actions.

To address these problems, in January ASHRAE formed two task groups: *Buildings' Impact on the Environment* and *Integrated Building Design*" to look at a bigger picture than pumps, and fans, and cooling coils. It's time we started looking very, very much at the whole structure we call a building and how it impacts the outdoor environment."

Telling the audience that "we're trying to come to grips with the ideas and concerns of our work on the outdoor environment," he posed a question. Taking the primary electrical power generation mix in the United States—thermal from fossil fuels, nuclear and hydroelectric electricity, "how many kilograms of carbon dioxide do you produce for each kilowatt-hour of energy used? Anybody in the room got any idea? And yet that's the problem starting to face us. How many kilograms of sulfur dioxide? Any idea? Do you see what has happened to us? We forgot where things are coming from. How many kilograms of nitrous oxide? We've lost track of where we're going. So, what we're saying to our organization, and hopefully to most of us—why don't we go back and start to understand what we're doing?"

"The answers are: for every KWh of electrical power produced in the United States, you dump 0.68 of a kilogram (1½ pounds) of carbon dioxide into the atmosphere. You dump .0068 kilograms of sulfur dioxide (¼ ounce) and .0023 kilograms (1/16 ounce) of nitrous oxides." Multiply these numbers by the KWh on your next FPL bill to see the impact you're having on the environment every month!

I performed a very cursory calculation for my own edification, and, based on Energy Information Administration data from 1995, U.S. electric utilities emitted 493.7 million metric tons of carbon from fossil energy consumption alone in 1995. This did not include additional C02 emissions from flue gas desulfurization. During the same period they sold 3,013,287 million KWh. This equates to 1.32 pounds (0.60 kilograms) of carbon dioxide per KWh, which puts it in the ballpark of Mr. Holte's number.

"All of a sudden you start having a different look of what we're doing in the world. So the answer is—Let's get smarter! I'm not going to suggest we change our comfort. We're not going to change that—we're just going to get smarter." •

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.

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