

TURNING UP THE HEAT

By *RICHARD L. HILL of the Oregonian Staff* October 1, 1997 Publication: *Oregonian, The (Portland, OR)* Page: *F01* Word Count: 2262

Summary: Scientists around the world debate whether fossil fuels contribute to global warming. The debate over global warming is heating up, with the complex issue being pulled to the front burner of public attention. During the next few weeks, expect to hear confusing charges and countercharges about the issue. The focus will be on what steps -- if any -- to take to curb the prospects of a warmer planet in the next century.

President Clinton has launched a public-education campaign, saying that the overwhelming scientific opinion is that global warming is a fact, not just a theory.

"We have evidence, we see the train coming, but most ordinary Americans . . . can't hear the whistle blowing," Clinton said in July at a White House meeting with a group of prominent scientists.

Dozens of TV weather forecasters will meet today at the White House to discuss global warming with the president.

He also will host a climate-change conference Monday at Georgetown University. Two

hundred scientists, economists, policy-makers, and business and environmental leaders are invited to the day-long meeting, which will help the administration craft U.S. proposals for a December meeting in Kyoto, Japan.

Representatives of about 165 nations will converge on Kyoto to complete work on a treaty that would reduce emissions of carbon dioxide and other heat-trapping greenhouse gases -- primarily from the combustion of fossil fuels, such as coal, oil and gasoline.

More than 2,600 scientists and 2,000 economists recently sent letters to the president, urging him to take strong steps to limit greenhouse-gas emissions.

But an industry-labor coalition called the Global Climate Information Project has mounted a \$13 million ad campaign against the proposed treaty, warning that imposing targets and deadlines for limiting emissions could hurt the nation's economy. The group especially doesn't want a treaty that would require 36 industrialized countries, including the United States, to reduce carbon dioxide emissions without requiring the same of China and 128 other developing countries.

In July, the U.S. Senate voted 95-0 that it would not ratify a treaty if developing countries were excluded from cutting back on emissions.

While policy-makers ponder the details of an agreement, thousands of scientists continue to investigate the intricacies of climate -- past, present and future.

From examining solar radiation and mountain glaciers to volcanic eruptions and polar ice,

using an array of instruments that include supercomputers and sophisticated sensors aboard satellites, they strive to figure out a system that affects each of Earth's 6 billion inhabitants.

CLIMATE CHANGE: CAUSES AND EFFECTS

Humans are conducting a unique experiment with the planet.

Since the beginning of the Industrial Age, an enormous amount of carbon dioxide has been pumped into the atmosphere from fossil-fuel burning. Although the United States has only 4 percent of the world's population, it produces nearly one-quarter of the planet's carbon dioxide emissions. Cars and light trucks contribute 15 percent of those U.S. emissions.

The level of CO

2 has risen worldwide from 280 parts per million to 360 ppm since the mid-1800s. And it's continuing to rise at the rate of 1.5 parts per million each year.

At the same time, the average global temperature has risen about 1 degree Fahrenheit, and four of the five warmest years have occurred since 1990. Glaciers are in retreat worldwide, and sea levels have risen 4 to 10 inches because they expand when warmed.

But has the climate changed because of natural causes, or have humans had a hand in it? What would the climate be like in the 21st century if the trends continue? For several years, most

scientists had been reluctant to make a flat-out connection between human-produced emissions and climate change. But things have changed.

Two years ago, a scientific panel announced that the evidence of global warming was undeniable though tough to accurately quantify. ``Nevertheless, the balance of evidence suggests that there is a discernible human influence on global climate," said a report by the Intergovernmental Panel on Climate Change.

Formed in 1988 by the United Nations and the World Meteorological Organization, the panel represents 2,500 scientists worldwide. It was charged with assessing scientific information and the possible effects of climate change.

The panel predicted that if emissions continued at current rates, it could mean problems for the planet during the 21st century:

- * Global temperatures would rise 2 to 6 degrees F by 2100.

- * Seas levels would rise 6 inches to 3 feet, inundating coastal areas and destroying marine ecosystems.

- * Extremes in weather would be more prevalent, with more severe floods and droughts, fires and pest outbreaks.

* Tropical diseases such as malaria and dengue fever would spread northward. More heat-related deaths would occur.

* Virtually every ecosystem would feel the change, including forests, oceans, rangelands, deserts, mountains, lakes, streams and wetlands.

REGIONAL EFFECTS: THE NORTHWEST

During the past two decades, computer models have been developed to help scientists study climate change. The many components that go into shaping the Earth's climate -- solar radiation, the oceans, atmospheric chemistry, winds, clouds and soils, to name a few -- are extremely complex and difficult to model.

Scientists say such models are useful, albeit imperfect, in helping determine what might happen if the planet does warm. Although the models have helped researchers get a look at the possible worldwide future climate, the fledgling technology hasn't been able to zero in on a smaller scale, such as the Northwest and other regions.

But about 100 scientists who gathered recently in Seattle attempted to assess the effects global climate change might have in Oregon and Washington. Using a global climate model developed by the Max Planck Institute in Germany, researchers at the Joint Institute for the Study of Atmosphere and Ocean at the University of Washington said the region's annual average temperature could increase by 2 degrees F by 2020 and 4.5 degrees by 2050. If that happens, these are some possible results:

* Sea levels would rise 3 inches by 2020, 8 inches by 2050 and 20 inches by 2100. The coastline would be flooded, and habitat for migratory birds, fish, shellfish and waterfowl would be lost.

* Winters would be warmer and wetter, and summers would be warmer and drier. Less wintertime precipitation could fall as snow and more fall as rain, resulting in a decreased snowpack and water storage.

* On the Columbia and other main rivers, projected shifts in runoff timing and changes in average streamflow would affect energy production, fish protection and irrigation. Municipal water supplies could diminish, and flooding would increase west of the Cascades.

* Electricity demands would shift from supplying heating needs in winter to supplying air conditioning in summer.

* Agriculture might benefit from a longer growing season and new crops, but growers might not have enough water.

* More cases of asthma, rhinitis and infectious diseases would be seen. Vector-borne diseases, such as those carried by ticks, also would rise. The warmer weather could increase shellfish poisoning, and rising sea levels could contaminate drinking water with salt. Significant changes in social and economic systems could cause mental health problems.

* Drought would stress forests and other vegetation, making them more susceptible to diseases and pests. The risk of wildfires would increase along with fire intensity. Tree seedlings might

not grow.

The scientists and government officials who met at the two-day workshop emphasized that they weren't aiming to present a doomsday message, but wanted to determine how research and planning efforts should be focused.

WHAT THE SCIENTISTS SAY

The prevailing opinion among climate scientists is that human activities -- primarily from burning fossil fuels and deforestation -- probably are having an effect on the world's climate.

But even researchers who are strong advocates of cutting emissions and warn of the possibly dire consequences of global warming say that many uncertainties exist.

For example, Stephen H. Schneider, a climate scientist at Stanford University and author of "Laboratory Earth: The Planetary Gamble We Can't Afford to Lose," says the consensus among his colleagues is that evidence points to a discernible human impact on climate.

"But that consensus does not mean that all the uncertainties are resolved," he said. "Rather, what it implies is that we know enough about basic issues and about what's been observed to suggest that there's a very good chance that there could be significant changes and that some of those changes could be damaging.

"That's where the consensus arises, not that anyone is certain about anything."

Patrick J. Michaels, a climatologist at the University of Virginia and a leading critic of tighter emission controls, argues that the primary question is not whether the planet will warm but by how much. He says future climate change will be mild and could even be beneficial.

“How much do we want to spend to deal with a problem that we're not even so sure is a problem?” he said.

Michaels and other skeptics, such as George H. Taylor, Oregon state climatologist, say that computer climate models used to examine possible change are too simplistic. Taylor thinks that many of the warming scenarios predicted by computer models may be exaggerated. He says the models have not done a good job replicating past climate, and the temperature change that models say should have occurred by now hasn't happened.

“We're not seeing global warming in Oregon, and furthermore there is strong evidence that suggests we are not seeing systematic, human-induced climate change on a global basis either,” said Taylor, who is president-elect of the American Association of State Climatologists.

Taylor would like to see emissions reduced without “hamstringing our economy,” he said.

“But I'm seeing global warming used as an excuse for very significant energy controls, if not taxes, and I don't think there's enough evidence that global warming is going to occur to make those kinds of statements and changes.”

A former Oregon state climatologist, Kelly T. Redmond, said it would be wise to reduce emissions if ways could be found that wouldn't “break our backs economically.”

“The nature of the problem is that once global warming gets going, there's really no turning back,” Redmond said. “It's hard to undo once it gets started. You're talking about decades or a century or so to be able to reverse the effects.”

Redmond, who is regional climatologist at the Western Regional Climate Center in Reno, Nev., has been cautious about deciding whether the planet is warming and whether human activities are playing a role. But growing evidence, such as receding mountain glaciers and temperature data from thousands of bore holes in the Earth's crust that show the upper soil temperatures are climbing, is beginning to sway him.

“I'm starting to tilt toward the warm viewpoint,” Redmond said. “This spate of warm years that the Earth and the Northern Hemisphere have experienced recently -- and these El Ninos that we've been getting -- really do make me stop and pause and wonder if there is some kind of connection.”

SCRATCHING HEADS OVER EL NINO

Scientists have no evidence that the current strong El Nino is linked to global warming, but many say such an event gives the public a good idea of what climate change entails.

Putting unprecedented amounts of CO

2 nto the atmosphere could bring many surprises, Schneider said.

“Is this El Nino a natural part of the climate system or one of those unexpected surprises caused by humans meddling in a system they don't fully understand?” he said. “There's no theories to suggest that El Nino and global warming are connected, but it's one of those intriguing things that has us scratching our heads. El Nino demonstrates that we're still vulnerable to changes.”

Gerald M. Stokes, who directs one of the nation's largest environmental and climate-change programs at Battelle Pacific Northwest National Laboratory in Richland, Wash., thinks human activities are causing changes in the climate system. On a scale of 1 to 10 -- with 10 being the highest degree of confidence -- Stokes puts himself at a 9. “I think the great majority of climate scientists would put that number between 7 and 10,” he said.

“We're seeing the effect of humankind starting to manifest itself on the climate, but whether that's good or bad in the long run is kind of hard to assess.”

Placing strict controls on emissions might not be the best policy right now, Stokes said, although he thinks limits are needed.

“Very few people think in terms of the fact that every time you put a gallon of gasoline in your car that you've made a personal commitment for putting 5 pounds of carbon into the atmosphere,” Stokes said. “So each individual is responsible for putting a ton or more of carbon into the air every year.”

Michael E. Schlesinger, a climate scientist formerly at Oregon State University and now at the

University of Illinois, proposes what he calls an "adaptive strategy" for dealing with emissions. Taking initial steps now, such as exercising conservation, beginning to switch to forms of energy that don't require fossil fuels and allowing new technologies to develop, would be prudent, he said.

"We shouldn't do nothing," Schlesinger said. "We certainly ought to become more energy-efficient. By investing in technological development -- with cars, for example, we can go a long way in solving this problem. But there's no need to punch the panic button now."

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