Global Warming and Carbon Fuels

Chapter 41

I. Earth's atmosphere brings both warming and cooling influence

A. Warming effects from the atmosphere

1. "greenhouse effect" - the atmosphere retains the heat energy that comes from the sun. Nitrogen, 78% of atmosphere, oxygen, 21%, does not retain heat. 99% of atmosphere doesn't function as "greenhouse gas."

2. 1% of the atmosphere = 14 elements, most do not retain heat. "greenhouse gases" = 0.45% of the atmosphere; 89% of which is water vapor.

3. Other greenhouse gases: carbon dioxide (about 0.039% of the total atmosphere), methane (about 0.00018%), nitrous oxide (about 0.00003%), ozone (less than 0.000007%), and miscellaneous trace gases—all of these other greenhouse gases (apart from water) totaling under 0.05% of the atmosphere. 0.55% of the atmosphere = elements/compounds that do not retain heat.

4. 80% of the total warming effect of the entire atmosphere = Water Vapor, 15% = high-altitude cirrus clouds

5. For convenience we can say: water = 95% of "greenhouse warming." remaining approximately 5% = carbon dioxide (about 3.6%), methane (about 0.36%), nitrous oxide (about 0.95%), & miscellaneous gases including ozone (about 0.072%).

6. Does not actually work like a greenhouse: 1) energy comes from the sun mostly in the form of light, 2) the earth absorbs light energy, 3) radiates it back in the form of infrared energy—what we call heat.

7. Greenhouse gases absorb infrared energy (heat) and then, radiate it outward. Some goes up into space, thus cooling the earth, some of it radiates heat back down to the earth's surface warming the earth.

8. It is good for us that not all of the sun's energy stays at earth's surface, or we would cook. It is also good that not all of it bounces back into space, or we would freeze

B. Cooling effects from the atmosphere

1. Without the "greenhouse effect," earth's average surface temperature = 0°F and with it, actually = 59°F.

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2. However, without balancing factors to modify the greenhouse effect = would average 140° temp. on earth.

3. Cooling influences - Climate "Feedbacks" = changes in the atmosphere that are caused by other changes in the atmosphere, which then lead to other changes.

4. Feedbacks = evaporation, precipitation (rain, snow, dew, and sleet), convection (upward movement of warm air), and advection (sideways movement of air—that is, wind!). AKA weather (gentle breezes to hurricanes, from the violent downdrafts of wind shear to the massive, twisting updrafts of tornados, + much more)

5. Other feedbacks = changes in cloudiness (which can warm or cool the earth), expansion or contraction of ice (ice reflects solar energy away from earth and so cools it), expansion or contraction of forests and grasslands and deserts, and changes in how rapidly plants take up or give off water through their leaves.

6. On balance, these feedbacks decrease the greenhouse effect by 58% (no greenhouse effect = 0° earth, w/greenhouse effect minus feedbacks = 140°, w/greenhouse effect + feedback = 59°; 59 is about 42% of 140 = 58% elimination of greenhouse warming).

C. Then what is the controversy about carbon dioxide (CO2)?

1. Global Warming alarmists say: human activities are causing the concentration of greenhouse gases—primarily carbon dioxide, secondarily methane, and to a much lesser extent ozone and chlorofluorocarbons—to increase, and that their increased concentration could warm the earth enough to cause significant, perhaps even catastrophic, harm to people and ecosystems.

2. CO2 = biggest culprit, is responsible for 3.6% of the total greenhouse effect – according to this position.

   a. CO2? = colorless, nearly odorless gas used to produce carbonation. In a frozen form = dry ice. Organic material, like wood, burn – releases CO2. Also released when coal or gasoline or natural gas (methane) burns. In our bodies, CO2 plays an important role in regulating our blood flow & rate of breathing. Humans breathe in oxygen, exhale CO2. All insects, animals, and people emit carbon dioxide. Oceans, volcanoes, and other natural sources emit it too. Also crucial for plants, needed for photosynthesis. During photosynthesis, plants absorb carbon dioxide and release oxygen. Thus, animals and people continually use up oxygen and release carbon dioxide for plants to use, and then plants use up that carbon dioxide and release oxygen for people and animals

to use. So, rather than a pollutant, CO2 is essential to all the major life systems on the earth.

b. According to many atmospheric scientists: increase in CO2 - 270 to about 385 parts per million by volume (ppmv), 0.027% to 0.039%, since 1750.

3. Effect of increase? doubling (from 270 to 540 ppmv) CO2 concentration = raising the earth's average surface temperature, before feedbacks, by about 1.8° to 2.16°F. This = small increase that does not scare anybody.

4. Cause of fear of greater warming? = belief that climate "feedbacks" magnify this warming.

5. All of the computer models used by the United Nation's Intergovernmental Panel on Climate Change (IPCC) assume that climate feedbacks magnify the warming that comes from greenhouse gases.

6. Fears of future global warming rest on predictions of future weather produced by computer "models" that give different weights to different factors; they will predict whatever is required by the data &formulas fed to them.

7. Therefore the fears of future global warming rest on hypotheses represented by computer models, not on empirical world. These models, by assuming various feedbacks that add to the greenhouse effect, predict that warming from doubled carbon dioxide since preindustrial time would result in an increase of 3.5°F to a midrange estimate of 5.4°F to a high estimate of about 7°F.

8. Then some other computer formulas (other models) have used the upper range of this first set of predictions and have gone on to predict serious harm from such warming. (But remember: model results are not evidence; they are merely hypotheses. Only empirical observations are evidence.)

9. Other scientists, however, point out that there is no reason to think the feedbacks will act differently on man-made "greenhouse gases" than on natural ones. Since the feedbacks currently eliminate about 58% of the warming effect of natural greenhouse gases, it stands to reason that they will do the same to the warming effect of man-made ones.

10. These scientists say that the proponents of global warming have the feedbacks backward in their computer formulas. Appealing to what we already know by observing the real world, they say that although some feedbacks may be positive and tend to warm the earth, the combined feedback effect must be negative—very strongly negative—and therefore the feedbacks will tend to have an overall cooling effect on additional

manmade greenhouse gases.

11. The result? Doubling CO2 before feedbacks (270-540 ppmv)= increase by about 1.8° to 2.16°F. But if feedbacks subtract from warming as has always been the case = lower the warming effects by about 58% to between 0.76°F to 0.9°F—in other words, actually doubling the amount of carbon dioxide from preindustrial times would lead to a total "global warming" of less than 1°F. An increase of 1°F is not dangerous.

12. Possible Beneficial result? Longer growing seasons in cooler climates, less crop damage from frost, and fewer deadly cold snaps (which tend to kill about ten times as many people per day as heat waves). Longer growing seasons would make food more abundant and therefore more affordable, a great benefit to the world's poor.

II. The Bible's Teaching About the Earth

A. Did God design a fragile earth or a resilient one?

B. Genesis 1:31, "**God saw everything that he had made, and behold, it was very good**."

C. God created, more reasonable to think that the fundamental mechanisms of the earth's climate system are robust, selfregulating, and self-correcting—that they are designed to operate somewhat like a thermostat, cooling the planet when it begins to warm, and warming it when it begins to cool.

D. God's promises to maintain stability in seasons and oceans.

1. God promised, "While the earth remains, seedtime and harvest, cold and heat, summer and winter, day and night, shall not cease" (Gen. 8:22).

E. people displease God when they fail to acknowledge his control of the weather.

F. God did not design the earth so that we would destroy it by obeying his commands

G. God has placed in the earth and its atmosphere a number of self-regulating, self-correcting mechanisms by which it can manage its own temperature.

H. The Bible praises God for his creation of the earth (Gen. 1:31, Ps. 24:1, 1 Tim. 4:4).

III. What does the scientific evidence say about global warming?

A. Scientific opinion is strongly divided about global warming

B. The earth's temperature has fallen or remained steady for the past fifteen years, a result not predicted by global warming computer models

C. Earlier changes in average global temperatures have not coincided with changes in

atmospheric concentrations of carbon dioxide.

D. Are glaciers melting and sea levels rising?

1. If yes, cause could = variations in sun activity, in ocean currents, and ordinary long-term weather cycles.

2. Short-term observations do not prove anything. Ice melts in warmer seasons and freezes in cooler seasons.

3. Pictures of melting Arctic ice prove nothing.

4. There has been no more frequent or intense severe weather caused by a warming earth.

IV. Benefits from increased Carbon Dioxide in the atmosphere:

A. Effect on plant life—and therefore on all other life—is large and overwhelmingly beneficial.

B. Hundreds of peer-reviewed scientific studies claimed increased CO2 = increased plant growth.

C. Atmospheric CO2 level is now very low compared to past geologic periods—when plant & animal life thrived.

D. CO2 levels throughout the earth's history have drastically changed to much higher and much lower than today's levels with no significant correlation to temperature change.

E. CO2 released now, by our burning of fossil fuels, is restoring some of it to the atmosphere and greatly benefiting life on earth (much more prolific plant growth).