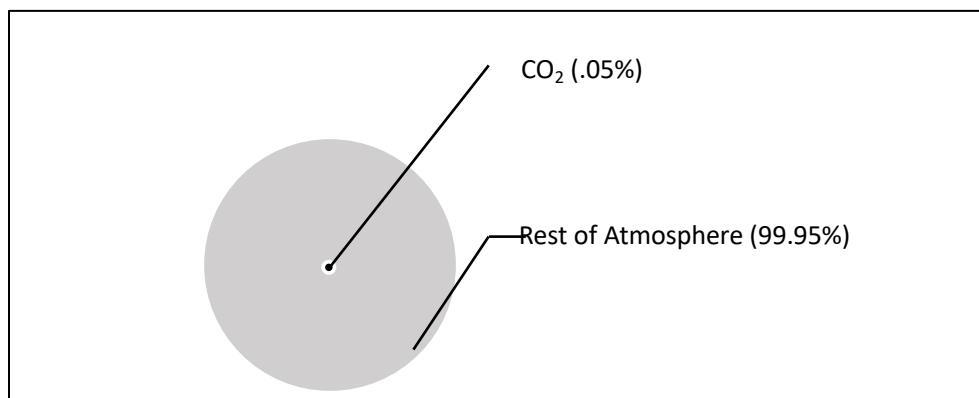


Is CO₂ the Achilles Heel of Energy-Based Economies?

James Alexander Webb

Decades of rhetoric warning of CO₂'s dire effects on the climate have been translated into obstructive energy policies that the world can ill afford. Here is a brief overview of some of the relevant evidence.

The AGW (Anthropogenic Global Warming) hypothesis posits an increased greenhouse gas effect due to CO₂. No doubt, industrialization has materially contributed to the increase in CO₂ from its pre-industrial level of 280 ppm to its current level of nearly 420 ppm, accounting for approximately 0.05% of the composition of dry air below the ionosphere. There is agreement for a benchmark doubling of this number by the end of the Century.



Volume comparison

Global Climate Models (GCMs) predict that the contribution of CO₂ warming alone will range near 1 degree Celsius by 2100. They then project a temperature rise, enhanced by a consequent increase in water vapor, of approximately 2 degrees Celsius, enough to raise broad expectations of climate disruptions, such as storm intensification and sea-level rise of several feet.

Approximately 1% of the atmosphere is composed of water vapor. That the greenhouse gas effect is "primarily attributable to H₂O" is long established. (Sverre Petterssen *Introduction to Meteorology*, 1969, New York, McGraw-Hill, Inc., p. 50).

The key to their case is that GCMs have projected a quasi-constant relative humidity, which translates into a significantly greater rise in absolute humidity because warmer air increases its moisture-holding capacity. However, according to observational [research and satellite data analysis](#) by William M. Gray, no such increase in absolute humidity appears likely.

“The resulting increased upper tropospheric moisture is assumed to block large amounts of additional outgoing infrared (IR) radiation to space beyond the blockage of CO₂ by itself. This consequently leads to significant additional global temperature increases, which are two to three times larger than the temperature increase from CO₂ doubling alone. Our observational analysis shows that these additional feedback warming assumptions are unrealistic.” (Gray p. 6)

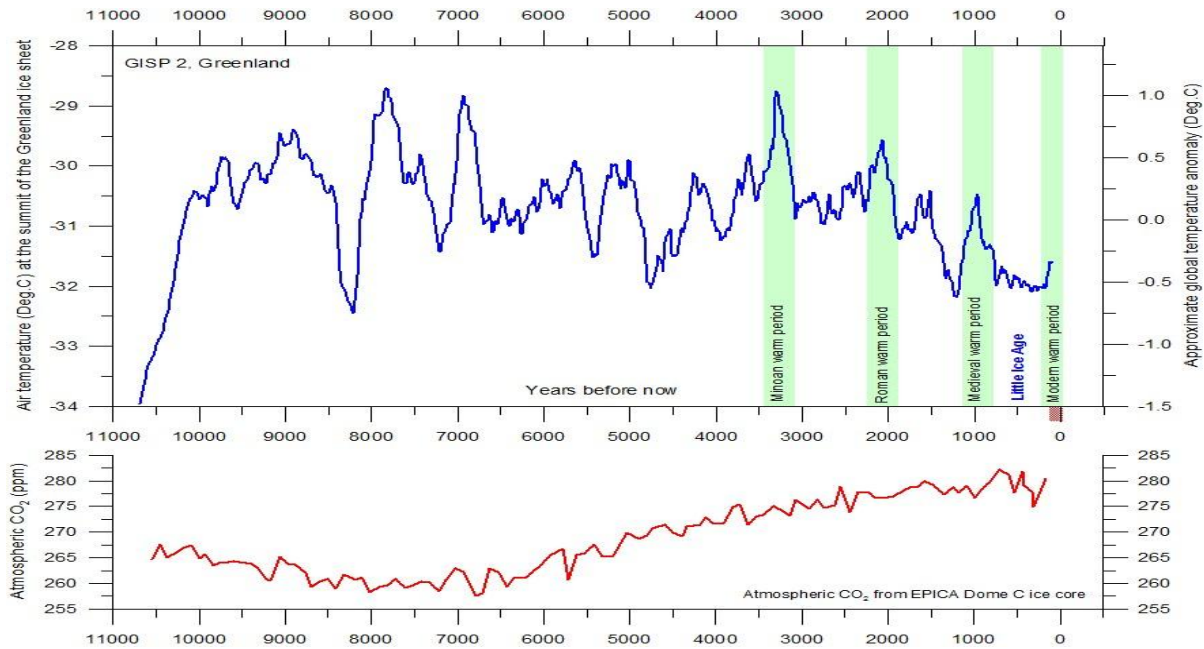
The overall AGW hypothesis begins with a calculated net increase in infrared radiation returning to Earth from doubling CO₂ by the end of the Century. Given this, the surface temperature must rise approximately 1 degree Celsius to stabilize the terrestrial heat budget. This is referred to as climate sensitivity to CO₂ forcing. It reaches a stable equilibrium because of the more-than-linear increase in the rate of radiative emission (heat loss) per unit temperature increase as the Earth warms.

The next step involves temperature-induced increases in water vapor, followed by additional (feedback) warming, for a total of approximately 3 degrees Celsius. William Gray has considered 19 of the Global Climate Models of the 2007 IPCC-AR4 report: “All models give strong positive energy feedbacks equivalent to about 2°C warming.”(p. 15)

As a matter of record, these models have tracked too hot since the 1990s (see graphic here and the [Article](#) for in-depth treatment of this failure).

Following GCM logic, amplification would occur from any marginal source of natural warming. And such warming has been observed in cycles that have occurred numerous times in the past for various reasons, without an increase in CO₂. During the past 10,000 years of the present (Holocene) interglacial period, CO₂ levels remained below their pre-industrial level of 280 ppm. In Gray’s words:

“...it is hypothesized that the back-and-forth variations of the globe’s deep ocean circulation patterns operating on multi-century and multi-decadal time scales can explain most of our globe’s prominent surface temperature variations... CO₂ changes could not have played any significant role in these long multi-century temperature changes of the past.”(p. 9)



climate4you.com – Ole Humlum – Professor, University of Oslo Department of Geosciences

During the more remote [Eemian](#) interglacial, when the sea level was nearly 20 feet higher than it is at present, CO₂ also remained below 280 ppm.

Surprising to some, not all scientists agree in a net warming effect from increased CO₂. In *Hot Talk, Cold Science* (Oakland, CA, Independent Institute, 2021), S. Fred Singer argues for a likely negative feedback (cooling) effect that offsets CO₂ warming in the terrestrial heat budget.

Increased cloudiness has a cooling effect. Increased water vapor affects [snowfall](#) (enhanced since 1967, primarily over the Antarctic). Singer advanced this possibility to account for the lack of any recent increase in the gradual long-term (Holocene) sea level trend rate of 18 cm per century, projecting only another 6 inches by 2100 (p. 140).

Singer further challenges GCM assumptions of increased water vapor in the upper troposphere, citing William Gray's research on increased tropical deep cumulus convection, which found negligible increases in upper-tropospheric moisture (p. 123). Gray considered increased albedo (reflectivity) from increased cumulonimbus development (Gray p. 9). This evidence contradicts the warming hypothesis.

Singer points to evaporative cooling effects on the heat budget; he explains a mechanism in which CO₂ removes heat due to the stratospheric positive lapse rate, where temperatures rise with height. Increased CO₂ at these higher levels would enhance the net heat flux to space

because the greenhouse gas produces a logarithmically increasing infrared radiation response as temperatures rise (p. 133).

Singer highlights factors that create chaotic variability, which AGW advocates exclude. For instance, variations in solar output or influences from deep-ocean currents are avoided in models because they cannot be computed reliably.

Beyond these findings, climate alarmists offer little discussion about the beneficial effects of increased CO₂ on vegetation, specifically the fertilization effect; some estimates suggest a global increase in the Leaf Area Index of over 13% per 100 ppm. Clearly, forces are arrayed to ramp up appropriations and invoke measures attending to select [corporatist](#), academic, and regulatory interests

With these weaknesses, one may wonder what really drives the anti-CO₂ narrative. There may be genuine concerns challenging conventional energy-based economies, but the AGW hypothesis appears to be contradicted by the evidence.