

A global warming primer and plea, continued

For the last 10,000 years, atmospheric CO₂ has hovered at 280 parts per million. Since the Industrial Revolution beginning around 1760 it has increased now to 420 ppm, the highest in 14 million years. It's accelerating. The increase comes primarily from deforestation and humans burning fossil fuels — wood burning and other heating, transportation, power plants.

Worse still, greenhouse gas emissions are reaching tipping points of no return where heating will continue even if we eliminate fossil fuel contributions. For example, ice and snow reflect much of the sun's heat energy back out into space. But we're causing ice packs to disappear. Newly exposed land and sea absorb more heat, more heat is bounced back and the heat cycle escalates all by itself.

We need to agree globally to fix this. We cannot let Earth's gorgeous landscape grow ever more Martian.

We must universally become aware how the proverbial "tragedy of the commons" applies: If my town has a common grazing area that can only support five sheep for me and 45 among my neighbors, when I add 10 more sheep, I'm better off even though every sheep is then getting only 5/6 of what it needs, because I have 15 sheep and my neighbors still have only 45. In the same way, my CO₂ pollution benefits me but hurts everyone else. That's why it is probably necessary to put a

price on CO₂ emissions to make its reduction cost effective.

Collective action affecting the whole planet requires responses both within and among nations. We've begun (the Kyoto Protocol of 1997 and successive amendments), but it's not enough.

Worldwide efforts can be successful: think of smallpox and polio. But CO₂ emission can't be eliminated, only reduced. After all, we humans, and other animals, exhale CO₂. Plants (that survive deforestation) take it up and use it to grow. It's that equilibrium that's being destroyed.

We've developed nuclear power that does not release CO₂. The atomic bomb is uncontrolled nuclear fission — breaking apart heavy uranium atoms to produce explosive energy. We've tamed it to produce controlled energy, but the fuel and waste products are radioactive for centuries, and there have been catastrophes (Three Mile Island; Chernobyl; Fukushima Daiichi, Japan).

The H-bomb is uncontrolled nuclear fusion — fusing simple hydrogen atoms to form helium, the same that powers our sun. If we could control it, we'd have an endless supply of fuel from hydrogen in sea water (H₂O), and the helium byproduct is inert. We could electrify almost everything. Research on controlled fusion energy is ongoing, but it may be never-

ending. We must try nevertheless, and development should be accelerated, along with further improvement of wind, solar, geothermal and battery power.

Some people deny or seem hopelessly incapable of caring about global warming, even in relation to their own descendants. For those we must rigorously "follow the money" and expose their hypocrisy.

If further incentive were needed, the cost of cleanup from fire, wind, drought, flood, rising sea level and temperatures, landslides, melting ice and permafrost, and migration (of humans, animals, insects) is beginning to exceed the expense of long-term prevention.

We must convince our politicians to be knowledgeable, empathetic and ethical about this issue. Collective control of our excesses and sacrifice for the common good are inevitably necessary.

We can't just slug along, as humanity often has, through slow avenues of progress. We need worldwide wisdom and urgency. We'd better be snappy about it; it's later than we think.

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