



WE CAN'T AFFORD TO "WAIT AND SEE" ON CLIMATE CHANGES

BY ANDREW JONES AND DON SEVILLE

Recent Bush administration statements on climate change just do not add up. The U.S. President and his advisers refer to the heat-trapping effects of greenhouse gases (GHGs) as though we can wait for overwhelming signs of trouble and then switch our course in time to avoid environmental—and human—hardship. Scientists have long known that the Earth's climate is notoriously slow to respond to human actions. Nevertheless, the Bush administration talks as though we are driving a sports car, when we really are steering an ocean liner.

For example, in August, White House Science Adviser John Marburger briefed a Senate panel on climate change, saying, "We know we have to make very large changes if this turns out to be a problem. The consequences of human-induced global warming could be quite severe." Yet at the same briefing, the administration stood behind its "wait and see" policy, articulated by President Bush in February: we should only "slow the growth of greenhouse gas emissions, and—as the science justifies—stop, and then reverse that growth."

Climate change could be severe, and yet we should wait before acting. How can U.S. leadership reconcile these two seemingly contradictory statements?

Climate As a Delayed System

MIT professor John Sterman and Harvard's Linda Booth Sweeney explain that this "wait and see" approach makes sense if you believe the world's climate to be a non-delayed, responsive system in which a change in human activity has an immediate effect. Their recent experiments confirm that many highly competent people instinctively see

climate as behaving this way. Most of their business-school student subjects thought that if humans reduced emissions of GHGs, the storehouse of those gases in the atmosphere would promptly decline and global temperature would follow.

However, Sterman and Booth Sweeney point to computer models to explain that changing the Earth's climate system actually involves long delays. Consider carbon dioxide (CO₂), the primary greenhouse gas. CO₂ enters the atmosphere primarily through burning fossil fuels and natural processes (see "CO₂ in the Atmosphere" on page 9). It leaves the atmosphere as it is taken up by plants and absorbed into the oceans. Because the inflow has increasingly surpassed the outflow over the past century, CO₂ has been accumulating in the atmosphere.

The inflow is currently about double the outflow. If we were to reduce the inflow by, say, 20 percent, it would still be greater than the outflow and the level of CO₂ would continue to rise, albeit at a slower rate. No wonder the students predicted incorrectly—it is counterintuitive to think that the CO₂ emission rate can go down while the level of CO₂ in the atmosphere continues to go up! Nevertheless, it's true. If the removal rate were constant, we would need to cut the inflow rate by more than 50 percent to finally begin to lower the CO₂ level. The bottom line is this: If we, as the Bush administration says, "slow the growth of greenhouse gas emissions, and—as the science justifies—stop, and then reverse that growth," it could still take

many decades for levels of CO₂ in the atmosphere to decline.

A Robust Plan

If we believe Mr. Marburger that the effects of climate change could be "quite severe," we need a robust plan. The Bush administration's plan would work well if the climate had short delays. But the plan is not robust when managing a slow-responding system like our climate; the possibility of negative, irreversible effects from waiting are too high.

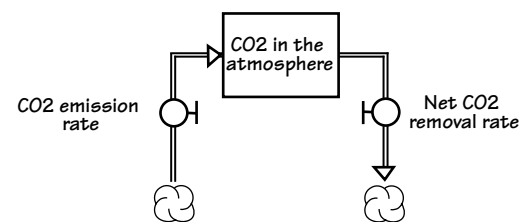
We see two important steps.

1. *Teach ourselves the basic mechanics of our climate.*

If Sterman and Booth Sweeney are right, our generally poor intuition about the climate enables many of us to accept a "wait and see" approach. For our society to engage in an effective public discourse about global warming, we need to ground ourselves in the basics of the climate inflows, levels, and outflows. Then we can evaluate the impact of national-level proposals and really understand

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CO₂ IN THE ATMOSPHERE



Carbon dioxide (CO₂) in the atmosphere, the primary heat-trapping gas, can be thought of as a stock or accumulation. The stock is now at its highest level in almost half a million years. To reduce the ecological and economic changes from producing global warming, we need to lower the level of the stock by reducing the inflow (CO₂ emission rate) to less than the outflow (Net CO₂ removal rate).

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the challenge that we face in stabilizing the climate.

2. *Act now to reduce GHG emissions.*

The best way to deal with a slow-moving system in which we know we will eventually need to make a change is to begin the change as early as possible. We need not initially focus on retooling our entire industrial base; we can begin with the significant reduction in emissions available through hybrid cars, better-designed industrial motors, fuel cells, and renewable energy production. Such improvements could come at relatively low cost, improve our short-term economic vitality, and reduce energy dependence.

Prudence leads us to act now to educate ourselves about the dynamics of the climate system and to address the source of the problem with practical measures.

How can we get the process started? We suggest designing incentives and rewards that would unleash people's tremendous capacity for innovation. A similar outpouring of new ideas came as a result of the ban on CFCs to prevent additional damage to the ozone layer. Let's introduce similar mechanisms into our market

system to encourage technological and behavioral changes for reducing GHG emissions.

Prudence leads us to act now to educate ourselves about the dynamics of the climate system and to address the source of the problem with practical measures. These actions will not be easy—technologically, culturally, or politically. But they are certainly easier than navigating a barge while pretending it will handle like a Ferrari. ■

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