

I should start by saying a few words about me:

- First, I am a Christian. Although this certainly informs my views on policy, I don't think it should influence the interpretation of scientific observations or the evaluation of scientific theories. I don't feel comfortable saying, as Dr. Spencer just did, that God is likely to have made the climate system insensitive to human emissions of greenhouse gases. If this is so, why did God make the ozone layer so sensitive to human emissions of CFCs—a phenomenon which is beyond dispute? Albert Einstein famously rejected quantum theory, reasoning that “God does not play dice with the Universe.” On one occasion, Neils Bohr responded “Einstein, stop telling God what to do.” Of course, Einstein later admitted that he was absolutely wrong about quantum mechanics, which illustrates the dangers of this sort of thinking.

I also think it's unfair to impute religious beliefs to climate researchers—as Dr. Spencer did when he said that atheists are likely to believe that are standing at the edge of disaster. The vast majority of climate scientists are simply trying to call it as they see it, and are base their views on past and future climate change on their understanding of the facts, with as little conscious bias as possible.

- Second, I'm not a climate scientist. I'm trained in physics, I've followed the literature on climate change for 30 years, since taking a course on the subject as an undergraduate at MIT, and I've taught a graduate course on the subject for the last 15 years. But I long ago made the transition from science to policy, so I won't debate any of the specific scientific points that were raised by Dr. Spencer.

I won't debate these points not because I don't think they are debatable, but because I don't think they are that important to one's overall views on climate change policy—in particular, whether we should be concerned enough about the possibility of climate change to reduce human emissions of greenhouse gases.

Dr. Spencer admitted that his is a minority view, and that a majority (I would say an overwhelming majority) of climate scientists believe that carbon dioxide emissions from the burning of fossil fuels have caused most of our recent global warming. The majority view may be wrong; or even if it is correct about the past, climate in the future may not turn out to be as sensitive to increasing GHG concentrations as many scientists believe it may be. I sincerely hope so, because if they are correct, severe climate change is unavoidable as a result of the CO₂ and other greenhouse gases we've already put into the atmosphere.

But I think we can all agree that the majority view could be correct. And so we cannot avoid considering what our moral obligations may be on this issue.

We do not have to be sure that a danger exists to take actions to protect ourselves and others. We buy fire insurance for our house, even though there is a very small risk that it will burn down; we require that cars be equipped with seat belts and airbags and we choose (or not) to buckle up or buy a more expensive car that is more crash-worthy. In each of these cases, we weigh the costs and benefits, and we take precautionary actions, like buying insurance, when the costs are smaller than the risks of inaction.

You may say that this isn't the same thing—we know from experience that these things happen, but we don't know for sure that climate is changing, or if it is, that we are the cause, or if we are the cause, that future climate change will be severe. Perhaps a better example is the Cold War: the United States spent trillions of dollars to deter an attack by the Soviet Union, even though we had no proof that the Soviet Union would otherwise have attacked.

Now, you may say that it just was common sense to protect against such a serious risk. But the risk of climate change is common sense, too. We know without doubt that the concentrations of CO₂ and other GHGs have risen very substantially, and also we know without doubt that this is due to human activity—primarily the burning of fossil fuels. We also know without doubt that these gases absorb infrared radiation and warm the surface of the Earth.

All of this was recognized many years ago. Since then, we've been steadily collecting data. The large majority of these data are in accord with theory that human emissions of GHGs are causing climate to change. Eleven of the last 12 years have been the warmest on record. Not only has the average temperature of surface increased, the warming has been greater at higher latitudes than near the equator; it has been greater at night than during the day. The warming has caused the melting of sea ice and the increase of sea levels, an increase of precipitation and storms and the intensity of hurricanes. Is this just a coincidence? Or is it common sense to expect that this would be the result of increasing concentrations of gasses that trap infrared?

Even so, you may argue that we should wait until we know for sure. But the climate system is so complex that there is no prospect that our understanding of it or our models of it will be very substantially improved in 10 or even 20 years. The sad fact is that estimates in climate sensitivity—and the very large uncertainties in these estimates—have hardly changed at all in the last 30 years. By the time we find out for sure it will be too late to do anything about it. The longer we wait, the more drastic and expensive control measures would have to be.

As you can no doubt tell, I believe it is clear that the risks of inaction are intolerable. Without policy action soon, greenhouse gas concentrations 50 years from now are likely to be equivalent to a doubling of the preindustrial concentration of CO₂. The resulting change in global-average surface temperature is likely to be 4 to 8 degrees Fahrenheit. To put this in perspective, the average temperature increase at the end of the last ice age was about 10 degrees F. But it doesn't stop there; if we continue to rely on burning fossil fuels, GHG concentrations and temperatures will continue to rise.

These are the risks of inaction. I'm not saying that catastrophic climate change will occur if we don't reduce GHG emissions. I'm only saying that it's a realistic possibility, and that we're not going to be able to prove the case one way or the other any time soon. We must make a decision to act—or not to act—under uncertainty.

Now, we might decline to act if the costs are high. But I and many other people who have studied the problem believe that very significant reductions in CO₂ emissions can be achieved at modest cost—equivalent to a carbon tax of about \$100 per ton of carbon. To put this in perspective, this would increase the price of oil by \$12 per barrel, and the price of gasoline by 25 cents per gallon. We can afford this—we are a wealthy country. We've already seen price increases much larger than this, and it hasn't caused the collapse of our economy. A tax of this magnitude would make alternatives, such as nuclear and wind, economically competitive with coal, or could lead to the sequestration of carbon from coal use. Although the total amount of money collected would be large, the effect on family incomes would be modest in most cases, and could be largely offset by reducing income taxes—in effect, taxing pollution rather than income.

Quite frankly, I have difficulty understanding the reasons that Christians would oppose action to decrease GHG emissions.

- Either they are so confident that climate will not change significantly in response to the continued and indefinite increase in GHG concentrations, that they are able to dismiss completely the analysis of most climate scientists. This seems unwise at best, arrogant at worst.
- Or they admit that significant change is a possibility, but they aren't willing to pay to try to avoid it. Perhaps because they understand that people alive today in the wealthiest countries will bear much of the cost, while the benefits will accrue mostly to future generations—especially those in the poorest countries. This exhibits an indifference to the welfare to our neighbors, both current and future generations, and to creation itself.

Thank you for your attention.