chapter 4

Is the Globe Warming?

I don't want to wait around until the house burns down till I decide whether it's a serious fire or not.

—Oilman T. Boone Pickens on climate change, 2008

Two myths have clouded our understanding of climate science. Believe the first—that climate science is still too uncertain to serve as a guide for action—and we will do nothing. Believe the second—that the signs of imminent disaster are so obvious that we no longer need science—and we may waste trillions.

Fortunately, an easy solution is at our disposal: Believe the Intergovernmental Panel on Climate Change (IPCC), and believe this chapter's quote from T. Boone Pickens. They both make sense, and together they provide the clarity we need. The IPCC is the world's leading scientific authority on global warming, and T. Boone Pickens is a hard-nosed oil billionaire.

Science is cautious. It does not accept the result of one experiment or test but demands cross-checking by many scientists. Consequently, science is slow to reach a firm conclusion, and scientists are prone to say, "It's probably like so, but we aren't sure yet." And that is exactly why we should believe them. Don't trust those who jump to conclusions or have an ax to grind; they are the mythmakers.

The IPCC tells us that human activity is probably causing most of the global warming but that the IPCC isn't sure about that yet. They're scientists. They are only 90 percent sure. That leaves the door open for the first myth—that

we don't know enough to do anything yet. That's where T. Boone Pickens comes into the picture.[1] He admits the scientific uncertainty but draws the obvious conclusion: If our house is on fire, we should not wait for the scientists to tell us precisely how serious it is before we do something about it. The scientists won't be completely sure till it's too late.

In this chapter, I first investigate the sources of the two myths. Then I take a closer look at just what the IPCC has to say and why it makes sense to get moving as soon as possible—which will be none too soon, given the sluggishness of international organizations.

Doubt and Uncertainty Is Their Strategy

A leaked memo reveals the origins of the first myth—that scientific uncertainty means we should do nothing about global warming. It was an internal memo of the Global Climate Coalition, an organization of major corporations that, from 1989 to 2002, fought attempts to reduce greenhouse gas emissions. In the 1998 memo, the group clarified its definition of victory: "Unless 'climate change' becomes a non-issue, meaning that the Kyoto proposal is defeated and there are no further initiatives to thwart the threat of climate change, there may be no moment when we can declare victory."

To the oil, coal, and auto companies that formed this coalition, victory was the defeat of the Kyoto Protocol and the end of all "further initiatives to thwart the threat of climate change." Those companies did not wait for scientific proof that their profits were threatened before forming their coalition just a few months after the United Nations organized the IPCC.

Wary of the new scientific initiative, the coalition focused on casting doubt on the science. The 1998 memo shows them chagrined to find they have been losing the battle, but it points to an opportunity: "The science underpinning global climate change theory has not been challenged effectively in the media." The memo also emphasizes the need to get "average citizens to 'understand' (recognize) uncertainties in climate science."

But as climate science turned up more and more evidence against the coalition's position, the group began to disperse. DuPont, British Petroleum, Shell, Ford, DaimlerChrysler, General Motors, and Texaco all left by 2000. Exxon stuck with the coalition until it became inactive in 2002. By that time, Exxon had found champions in the new Bush administration.

Among top Republicans, Frank Luntz may be the most renowned public relations specialist. He was the principal author of and pollster for Newt

1. Pickens's insight is supported by a difficult but brilliant paper by Martin L. Weitzman, a Harvard professor, "The Stern Review of the Economics of Climate Change."

Gingrich's "Contract with America." In 2002, Luntz advised the Republicans on techniques for "winning the global warming debate":

> The scientific debate is closing [against us] but not yet closed. There is still a window of opportunity to challenge the science. …
>
> Voters believe that there is no consensus about global warming within the scientific community. Should the public come to believe that the scientific issues are settled, their views about global warming will change accordingly. Therefore, you need to continue to make the lack of scientific certainty a primary issue in the debate. …
>
> Emphasize the importance of "acting only with all the facts in hand [bracketed note in original]. (*Winning the Global Warming Debate*, 2002)

Luntz warned that winning would not be easy, because the scientific debate was "closing against" the Republicans. So he urged them to "make the lack of scientific certainty a primary issue." That was an ideal approach for him to choose, because it takes science decades to nail down all the details in a complex field. Emphasizing "the importance of 'acting only with all the facts in hand'" completes the link between "lack of scientific certainty" and taking no action.

Of course, it doesn't really make sense to wait until "all the facts [are] in hand." We normally make intelligent decisions without scientific certainty. Someone puts one bullet in a six-shooter, spins the cylinder, and points the gun at your head. Don't worry; no action is needed. Science has not yet proved you will die. And it never will. Science will always put the odds of your being shot at one in six—an uncertain outcome. Luntz would have us act "only with all the facts in hand"—that is, right after the trigger is pulled.

Global warming is not as dangerous as a gun to your head, but as with the gun a real chance of catastrophe exists. Ignoring such risk because of a "lack of scientific certainty" is not a sensible strategy.

The argument Luntz pitched to the Republicans is psychologically powerful, though not new. The tobacco companies used the same strategy for years to cast doubt on the science about cancer and cigarettes. The idea that the smallest scientific uncertainty indicates that we should do nothing is a recycled myth that goes under the code name of "sound science."

"Sound Science"—a Short History

While I had heard people draw parallels between the denial of cancer risk by the cigarette industry and the denial of global warming by the oil industry, I was surprised to learn that an organizational and strategic link exists as well.

"Sound science," as George Orwell might have predicted, is the code name for questioning the mainstream science behind the hazards of cigarette smoke, global warming, and other phenomena.

In 1993, Philip Morris hired a public relations firm to secretly set up the Advancement of Sound Science Coalition. Its goal was to convince the public that secondhand smoke was not a problem. By then, ten years of scientific studies indicated that secondhand smoke could be lethal. The result was a grassroots movement advocating no-smoking areas. Philip Morris was worried, because, unlike smokers, people exposed to secondhand smoke cannot easily be blamed for inhaling cigarette smoke. Legally, secondhand smoke was hazardous to the health of Philip Morris.

As it turned out, the science continued to point ever more strongly toward such health risks. Today, even Philip Morris admits on its Web site that "particular care should be exercised where children are concerned, and adults should avoid smoking around them."

However, in 1993, when Philip Morris launched the Sound Science Coalition, Steven Milloy—now the Fox News commentator on global warming—was a registered lobbyist working for a company that was receiving $40,000 a month from Philip Morris. And Milloy was calling the EPA's then recent study of secondhand smoke a "joke." That study reached milder conclusions about the danger of secondhand smoke than those now endorsed by Philip Morris itself.

By 1997, Milloy was executive director of the Sound Science Coalition. But in 1998, the press discovered the coalition was actually a front group for the tobacco industry. Once this was public knowledge, the coalition lost its value as a means of deception, and Milloy closed it down. But that same year, he opened the Advancement of Sound Science Center (at the same address as the Advancement of Sound Science Coalition) and used it to begin attacking global warming science. By 2000, Exxon was funding Milloy.

Scientists do not commonly use the phrase *sound science*. A search of the *New York Times* finds it used in only one story in the 1970s, and its new political meaning shows up only in 1986. The *New York Times* first reports its use in high-level politics in 1992, when President George H. W. Bush used it to attack the Food and Drug Administration.

It was also in 1992 that Philip Morris budgeted $880,000 to launch the Sound Science Coalition, kicking the term deep into Republican territory. Let's check back with political strategist Luntz as he teaches Republicans how to cast doubt on the science of global warming. Just before he warns that "the scientific debate is closing against us," he says, "The most important principle in any discussion of global warming is your commitment to sound science."

Evidently, Luntz's Republican students took their lessons seriously. Compared with only sixteen mentions in the *New York Times* between 1970

and 1992, sound science shows up in 143 *New York Times* stories since then. A Google search for the term on the official White House Web site found it on 314 pages.

Steven Milloy spent years pressing the tobacco industry's claims concerning secondhand smoke. But the scientific debate closed against Big Tobacco, and Philip Morris and R.J. Reynolds now admit they had it exactly backward. What they ridiculed as "junk science" was actually sound, mainstream science.

Milloy has now spent years pressing the oil industry's claim that carbon dioxide does not contribute to global warming. In November 2007, on Fox News, Milloy was busy as usual attacking scientists. Commenting on a United Nations report on global warming, he said:

> This glib statement overlooks the fact that from 1940 to 1975 globally-averaged temperature declined. … If there's a cause-and-effect relationship between CO_2 and temperature in the last 50 years at all, it seems to be slightly in the opposite direction from what the U.N. claims.

But the statement Milloy calls "glib" is the central conclusion of a four-volume, 2,000-page United Nations report summarizing five years of research by thousands of scientists and endorsed by roughly a hundred countries. The temperature decline that Milloy refers to as "overlooked" is in fact an aspect of global warming that scientists have studied extensively. The discovery that sulfur emissions caused the decline is a key part of the evidence that CO_2 emissions do cause global temperatures to rise.

Milloy's second Advancement of Sound Science group has folded as the scientific debate has all but closed against him again. The battle is not over, but Big Oil is forced now to shift tactics and become more discreet.

What Does Exxon Really Want?

As a business article in the *New York Times* put it recently, Exxon is "unapologetically geared toward generating returns [profits] for its shareholders." Of course, all corporations are focused on profits, and that's why economists can sometimes predict what they will do. So what does economics predict about Exxon's global warming strategy?

Because Exxon's profits go up and down with the price of oil, the company wants high oil prices. That's a snap. But those prices are hard to control, even for Exxon. Only two influences are powerful enough to make much difference: OPEC and the Kyoto Protocol.

OPEC pushes oil prices up by restricting supply. Kyoto pushes prices down (a little) by restricting demand. Of course, that's not the point of the Kyoto Protocol, but that's one thing it does, and that hurts oil company profits.

So economics—and common sense—make a clear prediction: Exxon wants OPEC to succeed and global warming policies to fail.

Of course, since Exxon wants to maximize its profits, it's unlikely the company would ever admit to all that. It would make the company even more unpopular than it already is, which hurts business.

As attitudes shift in favor of global warming initiatives, Exxon's job becomes more difficult. To be taken seriously, Exxon must now appear to take global warming seriously—and it does appear to. Exxon wants in on the public discussions—wants to be "at the table." As Charles Territo of the Alliance of Automobile Manufacturers explains, "If you're not at the table, you're on the menu." And as Kenneth P. Cohen, Exxon's head of public affairs, told reporters in June 2007, "We're very much not a denier, very much at the table with our sleeves rolled up." But on the sly, Exxon still fights to discredit global warming.

Holly Fretwell's new book is for children. It's called *The Sky's Not Falling! Why It's OK to Chill about Global Warming*. Fretwell, an economist, claims her "expertise is not in climate science," yet after a short discussion, geared for sixth-graders, of what she claims are climate science fallacies, she concludes, "This all makes it highly unlikely that the current warming trends are a result of human activity."

In December 2007, when Fretwell was asked about the group that funded her book, she replied that her organization "does accept a small amount of money from Exxon to help cover our general overhead expenses. I can only assume that this support comes because they like what we do."

Of Islands and Sea Levels

Exxon is worth about half a trillion dollars. Ross Gelbspan, a Pulitzer Prize–winning journalist, rather less. But he enjoys taking on the giant. Al Gore, for one, has commended him for his efforts, and he deserves the praise.

But page 2 of Gelbspan's 2004 book *Boiling Point* begins with a curious statement: "The evidence [for global warming] is not subtle." Gelbspan finds the case for global warming terrifyingly obvious. But if the evidence really is so obvious, why don't the scientists notice? Why do they keep doing all these complicated studies and end up only 90 percent sure? Are they a bit dense? Perhaps they should read Gelbspan's book.

Gelbspan's certainty that global warming is obvious runs through his work as a reporter, making him incautious. Consider this excerpt from *Boiling Point* about a group of Pacific islands:

> In November 2000, officials began the permanent evacuation of more than 40,000 people from their traditional home. As the British newspaper *The Independent* noted, "[this] could be the dress rehearsal for millions of people around the globe affected by rising

> sea levels." … The islands are just 12 feet above sea level, and water levels are rising at 11.8 inches per year.

Gelbspan tells us—based on an article in *The Independent*—that the sea level is rising 11.8 inches per year due to global warming. But an experienced reporter writing his second book on global warming should have noticed something fishy about 11.8 inches per year. That really is awfully fast.

So how might an investigative reporter proceed? First, a close reading of the source newspaper article, which can be found on Gelbspan's Web site, reveals it does not say the sea level was rising 11.8 inches per year. Instead it says "The islands … are sinking 11.8 inches a year." That's a little different.

To check further, a reporter might next try the IPCC's 2001 report. Download the *Summary for Policymakers* from the group's Web site, and search for "sea level." The second hit reads, "Global mean sea level: Increased at an average annual rate of 1 to 2 mm during the 20th century." That's in Table 1. There are about 25 millimeters to an inch. Two millimeters annually is less than a tenth of an inch per year.

So 11.8 inches per year is about 100 times too fast to be caused by global warming. The islands' problem is not the tenth-of-an-inch per year rise in sea level. The problem really is that the islands are sinking. Here's a news report from 2000 explaining why.

> The move from the Duke of York group [of islands] is mostly due to a spectacular clashing of tectonic plates. The shift is extremely violent and this month saw a magnitude eight earthquake and several in the seven range. … The islands are sinking 30 centimetres (11.8 inches) a year. (Michael Field, *Agence France Presse*, November 28, 2000)

The problem really is that the islands are sinking, and they are sinking because of plate tectonics—that is, one part of the earth's crust is sliding under another. This has nothing to do with global warming.*

Unfortunately, Gelbspan's misstatement of the facts appears to be part of a pattern in which Gelbspan and some other members of the press inadvertently undermine the credibility of the science of global warming by overstating its conclusions. For example, in the same book, Gelbspan says, "Were the Greenland Ice Sheet (or a substantial part of the West Antarctic Ice Sheet) to slide into the oceans, it could cause a rapid rise in sea levels. Since about half the world's population lives near coastlines, the consequences could be chaotic."

"Slide," "rapid," "chaotic." All possibly true on the centuries-long timescales that climate scientists normally consider. But when I read that passage, I formed an image like one in an old-time newsreel, in which someone breaks a bottle of champagne across a ship's bow, and the ship slides into the water with a great splash. What Gelbspan and other reporters need to point

Global Warming by the Numbers

Three numbers are key to a basic understanding of global warming.

Temperature has increased:
1° Fahrenheit since 1950

CO_2 has increased:
about 1/3 since 1750

Sea level is rising:
about 1/10 inch per year

If nothing is done about global warming, in the future these trends will likely accelerate.

out when they say "rapid" is that in a worst-case scenario—beyond anything the IPCC predicts—"rapid" means Greenland's ice will take 100 years to slide into the sea and the sea level will rise about half an inch per year.

Warning of extreme possibilities is valuable so that people can consider the risks. But reporting extremes as if they are the likely outcome, and reporting them in misleading language, ends up making people more skeptical of the science—to the delight, I am sure, of the oil companies.

The Scientific Consensus

Some reporters have let us down, as have a few scientists, some in the pay of Exxon. But the vast majority of scientists are true to scientific principles, and they are speaking to us clearly. The IPCC does a remarkable job of reflecting the scientific consensus, and it deserves our attention.

The IPCC's 2007 climate-change report gives us the scientific answer to the central question of climate change: Is human activity responsible for global warming? But to understand the answer, you must think like a gambler. If you ask a gambler: "Will next year be the hottest on record?" he will refuse to say yes or no. Neither will scientists. They will give you the odds. Scientists have reached a solid scientific consensus, and it tells us what we need to know. Here's how the IPCC puts it in its 2007 report:

> Most of the observed increase in globally-averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations.

Here's the IPCC's conclusion in plain English:

> The odds are at least nine in ten that over half of the increase in global temperature since 1950 is due to human activity.

Nine in ten means a 90 percent chance, and that is how the IPCC defines the phrase "very likely." To avoid sounding too geeky, the researchers have redefined certain English phrases to refer to specific probabilities. "Very likely" is one of them. Of course, when a glass is 90 percent full, it is 10 percent empty, so it's also true that there's a one in ten chance that nature—not humans—caused most (not all) of the global warming since 1950.

Because the IPCC does not make these statements unless all the roughly 100 IPCC nations agree, the statement must be weak enough to get the most skeptical nation to consent to it. At present, scientists have produced no other

consensus statement, so for policy purposes it seems best to rely on the IPCC.

Why Act Now?

If scientists are not yet completely sure what's causing global warming, why not wait for them to figure it out? Actually, two good reasons make it urgent that we act now. First, science is already 100 percent sure the world faces a serious risk. Second, the world is extremely slow to organize.

We Are at Risk. Science is not sure that unchecked global warming will cause a catastrophe. But consider the question from the other perspective. Science is not sure the world is safe—in fact, it's not even 10 percent sure. The scientists in the IPCC readily admit their small uncertainty, but the deniers never admit their much greater uncertainty. That is the difference between science and propaganda.

In spite of uncertainties, the IPCC's conclusions tell us that the scientists are 100 percent sure the world is at risk and that the risk is not small. When we know about a risk—say, of a house fire, a car accident, or a terrorist attack—we take precautions to lower that risk. The question is not "Should we do something?" but "How much should we do?"

The IPCC's cautious scientists don't tell us how much to do; they only describe possible changes in temperature and what some of the side effects might be. They present six "equally sound" scenarios based on expected global temperature increases in the twenty-first century. The estimated increases from the 1990s to the 2090s range from 3 degrees Fahrenheit in the most optimistic scenario to 7 degrees Fahrenheit in the most pessimistic.

The gray bar on the right in Figure 1 indicates the uncertainty about the predicted temperature for one of the IPCC's scenarios. Assuming the six scenarios are equally likely, there is a 5 percent chance that the temperature will increase by more than 9 degrees Fahrenheit by 2095.

A temperature increase of 9 degrees brought us to the present balmy conditions on Earth from the depths of the last ice age, when glaciers extended from the North Pole halfway down Long Island. Another 9-degree rise would cause changes of a similar magnitude. Citizens of Washington, D.C., might be building dikes, and temperatures there would top 100 degrees thirty days out of the year instead of just one. In the next century, things would almost certainly get worse.

The Trouble with "Obvious"

If we convince people that they can prove that global warming is serious just by noticing hot weather and glaciers melting, they will think they do not need the help of scientific investigations.

Then when the weather turns cold for a few years and some glaciers stop melting, they will feel disillusioned.

The climate changes because of both human activity and natural forces. Inevitably, the natural forces will play some tricks. That is why we need the scientists—to sort out what is natural and what is not and provide a clear, steady answer.

The IPCC is actually noncommittal, refusing to give the odds on their scenarios. But to be fair, if we again assume the scenarios are equally likely, we find there is also a 5 percent chance that, even with no effective climate policy, global temperature will rise only 2.5 degrees Fahrenheit by 2095. The consequences would be milder.

We can hold our breath and hope for the low number. We have one chance in twenty. But there's just as good a chance of drawing the unlucky 9-degree warming.

When it comes to serious dangers, a 5 percent chance is high—ten times greater than the chance you'll have some type of house fire in the next year. But few people go without fire insurance. Guarding against such risks is clearly worthwhile, and it's not such a good idea to wait until the house is on fire before buying insurance. The risk of a fire is reason enough.

The World Is Slow to Organize. The second reason to act now is that we are slow. Fixing the climate requires that we take two steps, organizing and acting. Organizing is slow but cheap. There is simply no excuse for not getting organized as soon as possible. To organize quickly, we should postpone the squabble over how strict the policy should be. We can start out with a policy that is not too expensive but that's easy to adjust once it's in place.

This approach is the opposite of what happened with the Kyoto Protocol. In Kyoto, most of the effort went into arguing about how strict the caps would be. But because China, India, Brazil, Australia, and the United States were unhappy with the caps, they rejected the policy itself. Third world countries signed on, but only after getting full exemptions. Fifteen years later, we are still trying to agree on an organizational framework. This is the slowest path to getting organized. As a result, in 2007, the world emitted CO_2 25 percent faster than it did in 1992, when the United Nations started the process

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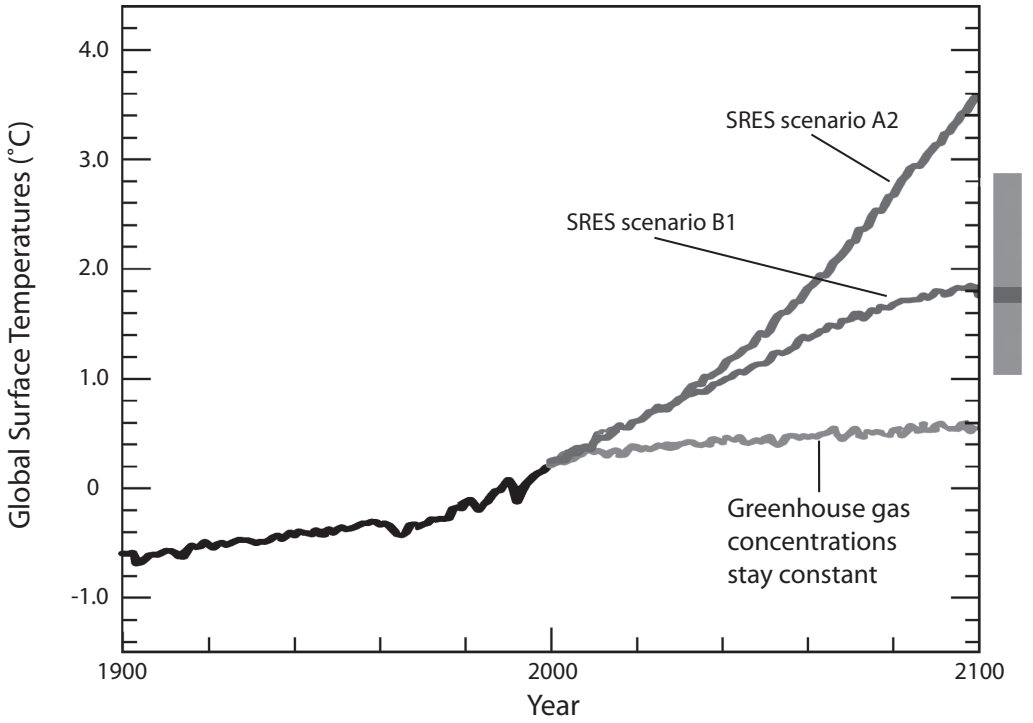
Scientists are uncertain about the impact of human activity on the climate, but they are sure we are running a huge risk on our present course. As with the risk of fire, accident, or terrorist attack, a grave risk requires action. No global warming denier would suggest waiting to be sure of a terrorist attack before taking precautions.

Both the magnitude of the risks and the world's slowness to organize call for a crash program to construct a sound and effective international organization. Progress will be most rapid if we agree on a structure we can start with before adjusting the policy to full strength. By the time the organization is in place, the science will be clearer. This should make it easier to agree on the tough policies that we will likely need.

Figure 1. Two of the IPCC's Six "Equally Sound" Scenarios for Global Warming Analysis



In 2008, atmospheric CO_2 reached a concentration of 386 parts per million (ppm), up from 280 ppm in 1750. The concentration of all greenhouse gases in 2008 is 485 ppm on a CO_2-equivalent basis. The three scenarios above (constant greenhouse gases, B1, and A2) show what might happen by 2100 if greenhouse gas concentrations increase not at all, to 600 ppm, or to 1250 ppm (and CO_2 increases correspondingly not at all, to 490 ppm, or to 850 ppm). The corresponding temperature increases by 2100 are estimated to be 0.6, 1.8, and 3.6 degrees centigrade (or 1.1, 3.2, and 6.5 degrees Fahrenheit).

The IPCC's "Special Report on Emissions Scenarios," (SRES) published in 2000, describes six marker scenarios which do not include additional climate policies beyond the ones in effect in 2000. Scenario B1 is the most optimistic of the six, and A2 is the second most pessimistic . The IPCC estimates that there is a 90 percent chance that the B1 scenario will result in temperatures in the year 2100 that fall within the range of the bar to the right of the graph. Source: Figure 3.2 of the IPCC's "Climate Change 2007: Synthesis Report."