

## Conversation with Bill McKibben

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The paperback version of *Storms of My Grandchildren: The Truth About the Coming Climate Catastrophe and Our last Chance to Save Humanity* (copyright 2011 by James Hansen and Bill McKibben) is available at <http://www.stormsofmygrandchildren.com/> The paperback includes as an added section a conversation between Bill McKibben and me. Much of that Q&A is below. As was (and is) the case with the hardback and other formats of the book, all royalties go to the organization 350.org. As I mention in the book, 350.org has demonstrated the most effective and responsible leadership in the public struggle for climate justice.

### **Q&A with Bill McKibben, cofounder and global organizer, 350.org**

Bill: Jim, more than a dozen nations have set new high-temperature records this year, and we've seen the all-time marks set for Asia (Pakistan at 129 degrees Fahrenheit) and Southeast Asia. Given that the global temperature has "only" gone up about a degree, can you explain how this kind of heat is possible?

Jim: Sure. What we see happening with new record temperatures, both warm and cold, is in good agreement with what we predicted in the 1980s when I testified to Congress about the expected effect of global warming. I used colored dice then to emphasize that global warming would cause the climate dice to be "loaded." Record local daily high temperatures now occur more than twice as often as record daily cold temperatures. The predominance of new record highs over record lows will continue to increase over the next few decades, so the perceptive person should recognize that climate is changing.

Yes, global average warming is "only" about a degree, but that is actually a lot. During the last major ice age, when New York, Minneapolis, and Seattle were under an ice sheet a mile thick, global average temperature was about 5 degrees colder than it is now. The last time Earth was 2 degrees warmer so much ice melted that sea level was about twenty-five meters (eighty feet) higher than it is today.

We scientists create a communications problem by speaking about average global warming in degrees Celsius. Global warming in degrees Fahrenheit is almost twice as large (exact factor is 1.8) and warming is about twice as much over land (where people live!) than over ocean. Also certain regions and times experience bigger changes than others. (So far the United States has been lucky, with smaller average warming than most land areas. There is no reason to think that luck will continue.)

But remember that weather variability, which can be 10 to 20 degrees from day to day, will always be greater than average warming. And weather variability will become even greater in the future, as I explain in the book, if we don't slow down greenhouse gas emissions. If we let warming continue to the point of rapid ice sheet collapse, all hell will break loose. That's the reason for "Storms" in the book title.

Bill: What was the deal with "climategate"—the East Anglia e-mails and IPCC's "Himalayan error"? Much of the public was left with impression that global warming may be a hoax!

Jim: There was a real hoax, for sure—perpetrated on the public by people who prefer business-as-usual, people who concocted a misinformation campaign. They want the public to think that the science is suspect. Doubt is all they need. Their tactics included swift-boating and character assassination, using e-mails stolen from scientists' computers. They did an effective job. Now policy makers continue to sit on their hands, leaving fossil fuel subsidies in place, allowing fossil fuel companies to call the tune—and the devil with young people and nature.

Yes, the stolen e-mails exposed bad behavior by scientists, notably a reluctance of some scientists to give deniers the input data for global temperature analysis. That allowed global warming deniers to assert that global climate change was “cooked” data. But that assertion is nonsense. The NASA temperature analysis agrees well with the East Anglia results. And the NASA data are all publicly available, as is the computer program that carries out the analysis.

Look at it this way: If anybody could show that the global warming curve was wrong they would become famous, maybe win a Nobel Prize. All the measurement data are available. So why don't the deniers produce a different result? They know that they cannot, so they resort to theft of e-mails, snipping private comments out of context, and character assassination.

IPCC's “Himalayan error” was another hoax perpetrated on the public. The perpetrators, global warming deniers, did a brilliant job of playing the scientifically obtuse media like a fiddle. Here is how they did it.

IPCC (Intergovernmental Panel on Climate Change) produced a series of thick reports, several thousand pages long. Of course it is possible to identify minor flaws in it—it is inconceivable that some flaws would not exist within those thousands of pages. The task of the deniers was to find a minor flaw or flaws, and then work the media so as to make the public suspicious of the entire report. They did their dirty work masterfully, for weeks continually releasing tidbits about possible flaws or uncertainties in the report, dutifully reported by the media even though none of the tidbits altered conclusions about the significance of global warming.

The biggest flaw that global warming deniers could find in the IPCC reports was a statement that all Himalayan glaciers may disappear by 2035 if greenhouse gas emissions continued to increase. Actually, because of the great altitude and size of Himalayan glaciers, some of them almost surely will survive longer than twenty-five years. The estimate of 2035 for glacier demise was not even in the main IPCC report on the physical climate system, but rather in a less-scrutinized report discussing practical implications of global warming.

Here is the real-world situation: Glaciers are melting rapidly all around the world—in the Rockies, the Andes, the Alps, and the Himalayas. All glaciers in Glacier National Park in the United States will be gone in about twenty-five years if greenhouse gas emissions continue to increase. We will need to rename it *Glacierless* National Park.

Observed rapid loss of glaciers *confirms* global warming—it is not a reason to question it! Glacier loss also shows the importance of global warming. During the dry season about half the water in rivers such as the Indus and Brahmaputra is provided by glacier melt. If the glaciers disappear there will be more spring snowmelt and greater floods, but a dangerous reduction of fresh water in dry seasons. Hundreds of millions of people depend on these rivers for fresh water.

Yet climate change deniers scored a coup by trumpeting that IPCC had made an error, turning scientific evidence on its head. Melting glaciers, properly a cause for concern, became a propaganda tool to befuddle the public. A capable media would have exposed the trick. Instead the media facilitated it, spreading “news” that the IPCC report was flawed.

IPCC scientists had done a good job of producing a comprehensive report. It is a rather thankless task, on top of their normal jobs, often requiring them to work sixty, eighty, or more hours per week, with no pay for overtime or for working on the IPCC report. Yet they were portrayed as incompetent or, worse, dishonest. Scientists do indeed have deficiencies—especially in communicating with the public and defending themselves against viscous attacks by professional swift-boaters.

The public, at some point, will realize they were hoodwinked by the deniers. The danger is that deniers may succeed in delaying actions to deal with energy and climate. Delay will enrich fossil fuel executives, but it is a great threat to young people and the planet.

Bill: You must be referring to the urgency created by climate tipping points. Is there new information about tipping points?

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Bill: Can we stop that process? Do we understand what is needed to stabilize the situation?

Jim: We can estimate what is needed pretty well. Stabilizing climate requires, to first order, that we restore Earth's energy balance. If the planet once again radiates as much energy to space as it absorbs from the sun, there no longer will be a drive causing the planet to get warmer. Restoring planetary energy balance would not immediately stop sea level rise, but it should keep sea level rise small. Restoring energy balance also would prevent climate change from becoming a huge force for species extinction and ecosystem collapse.

We can accurately calculate how Earth's energy balance will change if we reduce long-lived greenhouse gases such as carbon dioxide. We would need to reduce carbon dioxide by 35 to 40 ppm (parts per million) to increase Earth's heat radiation to space by one half watt, if other long-lived gases stay the same as today. That reduction would make atmospheric carbon dioxide amount to about 350 ppm.

Bill: Is that how you came up with the policy goal of 350 ppm?

Jim: It is one of several reasons, as we explained in our 2008 "Target CO<sub>2</sub>" paper. For example, there is also ocean acidification. As atmospheric carbon dioxide increases the ocean becomes relatively more acidic. Ocean biologists conclude that for the sake of life in the ocean we need to aim for an atmospheric carbon dioxide amount no higher than 350 ppm.

But yes, Earth's energy balance is indeed the criterion that provides the most fundamental constraint for what must be done to stabilize climate.

Bill: The 350.org team has met opposition from some climate activists who demand an even lower target for CO<sub>2</sub>, say 300 ppm or the preindustrial CO<sub>2</sub> amount, 280 ppm. Would the preindustrial CO<sub>2</sub> amount be a reasonable target?

Jim: All that we can say for sure now is that the target should be "less than 350 ppm." And that is all that is needed for policy purposes. That target tells us that we must rapidly phase out coal

emissions, leave unconventional fossil fuels in the ground, and not go after the last drops of oil and gas. In other words, we must move as quickly as possible to the post-fossil fuel era of clean energies.

Getting back to 350 ppm will be difficult and will take time. By the time we get back to 350 ppm, we will know a lot more and we will be able to be more specific about what “less than 350 ppm” means. By then we should be measuring Earth’s energy balance very accurately. We will know whether the planet is back in energy balance and we will be able to see whether climate is stabilizing.

The reason that we cannot specify now an exact eventual value for CO<sub>2</sub> is because CO<sub>2</sub> is only one of the human-made climate forcings. Humans have also increased the amount of methane and tropospheric ozone in the air—but these gases are short-lived, so if we reduce the sources of these gases the amount in the air will decrease. It is plausible to reduce the amounts of methane and tropospheric ozone and there are good reasons to do so because ozone in the lower atmosphere is harmful to human health and crops. Realistic ozone and methane reductions will alleviate somewhat the amount by which we must reduce CO<sub>2</sub>. On the other hand, we expect that humanity will have some success during the next few decades in reducing atmospheric aerosols (fine particles in the air). Atmospheric aerosols are a health hazard, but they have a cooling effect on climate. Reducing atmospheric aerosols will increase the amount by which we must reduce CO<sub>2</sub>. However, human-made aerosols will not return to the preindustrial amount in the foreseeable future, nor will the human-made increase of the planet’s surface albedo, which also has a cooling effect.

Therefore, it is foolish to demand that policy makers reduce CO<sub>2</sub> to 280 ppm. Indeed, if, with a magic wand, we reduced CO<sub>2</sub> from today’s 389 ppm to 280 ppm that change would increase Earth’s heat radiation to space by almost 2 watts (per square meter). The planet would rapidly move toward a colder climate, probably colder than the Little Ice Age. Whoever wielded the magic wand might receive a Middle Ages punishment, such as being drawn and quartered.

Bill: Speaking of punishments, you were arrested near Coal River Mountain in West Virginia for protesting against the leveling of mountaintops to extract coal. What was that about, and what is the status?

Jim: Still no trial date has been set. According to the law, I could get as much as one year in prison. I am beginning to think that the authorities do not want a trial.

I was drawn into the mountaintop-removal plight when I gave a talk at Virginia Tech. The students told me about nearby Coal River Mountain, which Massey Energy plans to decapitate to extract coal. Mountaintop removal is morally indefensible. It pollutes the water supply and spoils the environment forever, all for a small amount of coal. Windmills on Coal River Mountain could provide as much energy in about a century. But mountaintop removal will lower the peak about four hundred feet, making Coal River Mountain an ineffectual source of wind energy. Mountaintop removal provides only 7 percent of United States coal production, which is less than the amount that we export. So it cannot be argued that it is needed in order to keep the lights on—it is needed only to line the pockets of a few fat-cat coal executives.

I went to Coal River Mountain to help draw attention to both mountaintop removal and the bigger issue, the need to phase out coal and stabilize climate. I was arrested while standing by the side of the road in front of the Massey Energy offices, reading a statement that Massey

should provide funding for a new elementary school, because they had built a huge sludge pond on the side of the mountain right above Marsh Fork elementary school. If that earthen dam breaks, the school could be buried. It seems that Massey is pretty cavalier with the lives of children as well as the lives of miners working for the company.

Despite the publicity, mountaintop removal continues. I am disappointed that the Obama administration has not simply banned mountaintop removal. They could justify that action on environmental grounds. The jobs and economic stimulus from energy alternatives—energy efficiency, renewable energy, and nuclear power—are superior to the kind of jobs and the dirty energy production that is provided by the coal industry. The number of coal jobs has dwindled. Shoving mountaintops into valleys with bulldozers does not require many people.

Bill: Does this indicate that civil disobedience is not useful for solving the climate problem?

Jim: I call it peaceful civil resistance. True, it has failed to achieve the actions needed to solve the climate problem—but every other approach has also failed. Civil resistance is a necessary part of the solution but, by itself, it is too weak as a tool for change.

Bill: Then what else is required?

Jim: The courts, the judiciary branch of government. The courts are less influenced by fossil fuel money than the legislative and executive branches. The situation is analogous to that of civil rights several decades ago. Nonviolent sit-ins drew attention to the immorality of discrimination and helped to get the courts involved. That opened the door to real progress because courts had the ability to order desegregation under the equal protection provision of the Constitution. Eventually lawmakers became involved. Civil resistance was important because it helped broaden public awareness, and high public interest in turn helps to induce judiciary involvement.

What has become crystal clear is that the executive and legislative branches of the government are not going to solve the climate problem on their own. A few years ago I thought that governments may not understand what the science is telling us, the urgency of the matter. But I learned in my interactions with governments in several nations that the governments are not ignorant of the climate problem, they are not unaware of the need to move on promptly to clean energies. Yet at most they set goals and take baby steps because they are under the strong influence of fossil fuel interests. There are too many people profiting from our addiction to fossil fuels—and they have a huge influence on our governments.

Look at what happened in Congress in 2010. The bills that Congress considered were grossly inadequate. The proposed emission reductions were much less than what the science calls for. Also the bills were full of loopholes and giveaways to the fossil fuel industry, guaranteeing continued reliance on fossil fuels. Nor did the president distinguish himself. The president did not make specific proposals or weigh in with the authority of his office. He should have spoken to the public and demanded that Congress take the actions that are needed for the public interest.

Congress and the president are thumbing their noses at young people. Their failure to act means that young people can look forward to climate deteriorating out of their control, a planet that is much more desolate than the one that we inherited from our parents. My grandchildren, the most recent born just four months ago, probably will be alive for most of this century—my parents lived for almost ninety years. My children and grandchildren will experience the effect of our emissions—they will pay for our profligacy.

The attitude of Congress and the president angers me. They think they can do, or not do, whatever they please. It is as if they have no obligations to young people. Their primary concern seems to be their re-election; how they can beat the other party, make the other party look bad. When the public throws out one party, the other one is little different—they also think they can do whatever they please.

Bill: You have argued that we need a third party, but the nature of our Constitution and the electoral system make it very difficult for a third party to succeed. We don't have time to build a third party movement, do we?

Jim: Probably not. We must force the present government to do its job. Politicians are not free to do whatever they darned well please. They have obligations to young people.

Responsibility to future generations is a concept common to most cultures, as I discuss in the book. Native Americans refer to an obligation to “the seventh generation.” Thomas Jefferson wrote that “Earth belongs in usufruct to the living,” meaning that we have the right to use property belonging to future generations, but not the right to damage that property. Jefferson, a farmer, used the usufruct concept specifically with regard to the soil, which, he argued, we must not deplete. He did not explicitly discuss the atmosphere, which seemed so huge to the colonials that they never worried that humans might deplete the atmosphere's ability to sustain our lives and livelihoods.

Obligations to young people, it seems to me, are already clear in the second sentence of the Declaration of Independence, “We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness.” This basic tenet leads directly to the right to equal protection of the laws.

The Fourteenth Amendment of the Constitution declares: “No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws.” Over time the courts ruled that “any person” includes minorities and women, for example, and equal protection provided the principal basis for extension of civil rights to minorities.

Human-made climate change now raises a moral issue as momentous as any that the courts have considered in the past. Today's adults are reaping the benefits of burning fossil fuels while leaving the consequences to be borne by young people and future generations. Are my grandchildren, and other young people, included in the category of “any person” and thus deserving equal protection of the laws? A positive answer, I believe, is obvious.

Bill: You are suggesting that we file suit against the government?

Jim: Precisely so. Begging Congress to be responsible does not work. Exhorting the president to be Churchillian does not work.

On the contrary, Congress has passed laws and the executive branch has defined and carried out policies that trample on the future of young people. Consider the subsidies of fossil fuels and the permission that is given to the fossil fuel industry to use the atmosphere as an open sewer without charge. We cannot let the government pretend that it does not realize the consequences of its actions.

A basis for suing the government is described by legal scholars such as Mary Wood at the University of Oregon. She shows that the Constitution implies a fiduciary responsibility of governments to protect the rights of the young and the unborn. She describes what she calls atmospheric trust litigation. Suits could and should be brought against not only the federal government but also state governments, and perhaps lower levels—and in other nations as well as the United States.

Courts ordered desegregation to achieve civil rights of minorities. Similarly, if a court finds that a government is failing in its obligations to young people, the court can require that government to submit plans for how it will reduce its emissions. Courts have authority to require governments to report back at intervals on the success of their actions and to define corrective actions if they fail to achieve specified reduction.

So we must define the emissions trajectory needed to avoid dangerous human-made climate change. In other words, how fast must emissions decline to avoid passing tipping points with disastrous consequences? I am working with Pushker Kharecha and Makiko Sato to define the required emissions scenario. Our paper will be titled “Sophie, Connor, Jake and Lauren versus Obama and the United States Congress.” Although we have not completed that task, it is clear that the requirement will be an annual emissions reduction of several percent per year.

Bill: Wow. Let’s say the court instructs the government to reduce emissions so as to yield a safe level of greenhouse gases, which would mean getting carbon dioxide back below 350 ppm. Is it practical to achieve such a scenario?

Jim: Absolutely. But it requires the government to be honest about what is needed. They cannot use tricks such as those in the House and Senate energy/climate bills. Science demands actual reductions in fossil fuel emissions, not phony offsets. An inadequate plan will be quickly exposed by emissions data—the amount of coal, oil, and gas being burned is well documented.

A court would not be expected to mandate how emission reductions are to be achieved. The legislative and executive branches are responsible for defining and implementing the laws. But the laws must yield “equal protection.” That requirement will force the government to face up to facts. The most fundamental energy fact is this: As long as fossil fuels are the cheapest energy, they will continue to be used.

Fossil fuels are cheapest only because of government policies. First, there are substantial direct and indirect subsidies of fossil fuels. Second, fossil fuel companies are not made to pay for the damage that fossil fuels do to human health. Instead, the public is forced to bear the costs of air and water pollution. Third, fossil fuel companies are not made to pay for the costs of damage to the environment and the well-being of future generations caused by climate change.

The government must face the fact that fossil fuel use will not decline rapidly unless a rising fee is added to fossil fuels, a fee that should be collected from fossil fuel companies at the source before the first sale. Such a carbon fee will be passed on to consumers in the form of higher prices for fossil fuels. Therefore it is important that 100 percent of the collected funds be distributed to the public, preferably as a monthly “green check,” although the funds could be used in part to reduce taxes. This “fee and green check” approach would leave about 60 percent of the public receiving more from the green check than they would pay in increased energy prices. The objective is to reward people who reduce their carbon footprint and to stimulate the development of clean energies.

Bill: There are people who say that, in principle, your idea for a fee and green check is the appropriate underlying policy. And if it were accompanied by energy efficiency standards, regulations that remove barriers to efficiency, and appropriate government investments in energy technologies, it would be possible to achieve rapid reduction of carbon emissions. But they say it is unrealistic because in practice Congress always builds in giveaways and favors to special interests, which make the legislation less effective than it should be.

Jim: Sure, that is the way it has worked. But solution of the energy/climate problem requires a different approach. For example, there could be a bipartisan commission that defines appropriate policies to achieve court-ordered emission reductions, with Congress agreeing to either accept or reject the proposed policies without the ability to add in special favors. The public, I believe, is getting really fed up with the government, with the role of special interests and congressional earmarks. If we cannot overcome the role of special interest money in Washington, then both our nation and the planet are in deep doo-doo. This is a crisis, but I believe it is one that we are capable of overcoming.

Bill: There are also a lot of people who say that it doesn't matter what the United States does, because China now has the greatest emissions and its emissions are growing the fastest.

Jim: China is taking the right steps to move toward carbon-free energy. They are now number one in the world in production of clean energy technologies: solar power, wind power, and nuclear power. Also, China stands to suffer greatly from global climate change because China has several hundred million people living near sea level and the country is already experiencing large damaging regional climate disasters.

There is no doubt that China will want to move rapidly toward clean carbon-free energies. When the United States realizes that it must impose an internal fee on carbon emissions, it should not be difficult to get China to agree to do the same.

Also, it is important to recognize that the United States is responsible for three times more of the excess (human-made) carbon dioxide in the air today than any other nation, with China being second. The much greater responsibility for accumulated human-made emissions is true despite the fact that China's population is three times greater than the United States'. So there is no reason to expect China to act first to reduce emissions.

However, there are advantages in beginning to act rapidly. China is investing heavily in clean energies, and it is likely that they will recognize the merits of imposing an internal carbon price to spur development and implementation of clean energies. The United States risks becoming second-class technologically and economically this century if it does not stop subsidizing dirty technologies and instead move toward progressive policies such as fee and green check, which will stimulate development of clean energies.