



# The United States Needs a Tougher Greenhouse Gas Emissions Reduction Target for 2020

Joseph Romm, Ph.D.

---

## Executive summary

A U.S. climate bill should set a target of reducing U.S. greenhouse gas emissions 20 to 30 percent below 1990 levels by 2020. That conclusion is based on the latest science from the Intergovernmental Panel on Climate Change and NASA, among others, but it also involves matters of timing and U.S. cap-and-trade design. To achieve its goals, domestic climate legislation should limit the use of both international and domestic offsets. The United States has the technology and resources to reduce its emissions levels substantially below 1990 levels by 2020, and having already lost much of its credibility in the international community by failing to act, there is no time to lose in adoption of binding targets to avoid the risks of dangerous impacts of global warming.

---

## The IPCC science behind emissions targets

The United States finally appears likely to adopt a domestic climate bill in the 111th Congress. Like many U.S. policymakers, President-elect Barack Obama has endorsed two targets:

1. Cutting U.S. greenhouse gas emissions back to 1990 levels by 2020
2. Cutting emissions to 80 percent below 1990 levels by 2050

The 2050 target is based on the science-driven conclusion that the risks of dangerous impacts rise sharply as planetary warming exceeds 2°C from preindustrial levels.

Many groups and countries have embraced the 2°C target, including the 2005 International Climate Change Taskforce (in its report “[Meeting the Climate Challenge](#)”), the European Union (see “[EU action against climate change](#)”), and more than 200 of the world’s leading climate scientists (see the [Bali Declaration by Scientists](#)).

The 2007 U.N. Intergovernmental Panel on Climate Change’s “[Fourth Assessment Report](#)” represents the best review and analysis of the state of scientific knowledge on climate. The Working Group I [summary report](#) from the panel concludes that the best estimate of “equilibrium climate sensitivity,” which is “the global average surface warming following a doubling of carbon dioxide concentrations” is “likely to be in the range 2°C to 4.5°C with a best estimate of about 3°C, and is very unlikely to be less than 1.5°C. Values substantially higher than 4.5°C cannot be excluded.”

Therefore, to have any plausible chance of avoiding 2°C total warming and its effects, the nation and the world must keep CO2 concentrations substantially below a doubling from preindustrial levels, which were roughly 280 parts per million. Currently, concentrations are 383 ppm and rising at a rate of about 2 ppm a year, a rate that has been rising and is expected to continue doing so.

The IPCC’s Synthesis Report “[Summary for Policymakers](#)” (Table SPM.6) finds that using the best estimate climate sensitivity, stabilizing at a warming of 2.0°C to 2.4°C requires stabilizing carbon dioxide emissions in the range of 350-400 ppm CO2, or 445-495ppm CO2-equivalent.

The [full Working Group III report](#) (Box 13.7, page 776) lays out the 2020 and 2050 targets needed for a variety of stabilization ranges for both Annex I (developed) countries and Annex II (developing) countries:

### The range of difference between emissions in 1990 and emission allowances in 2020/2050 for various GHG concentration levels for Annex I and non-Annex I countries as a group

Scenario category	Region	2020	2050
A-450 ppm CO2-eq	Annex I	-25% to -40%	-80% to -95%
	Non-Annex I	Substantial deviation from baseline in Latin America, Middle East, East Asia, and Centrally-Planned Asia	Substantial deviation from baseline in all regions
B-550 ppm CO2-eq	Annex I	-10% to -30%	-40% to -90%
	Non-Annex I	Deviation from baseline in Latin America, Middle East, and East Asia	Deviation from baseline in most regions, especially Latin America and Middle East
C-650 ppm CO2-eq	Annex I	0% to -25%	-30% to -80%
	Non-Annex I	Baseline	Deviation from baseline in Latin America, Middle East, and East Asia

Source: IPCC.

For a 450 CO<sub>2</sub>-eq target, Annex I countries such as the United States need to hit a target of 25 percent to 40 percent below 1990 levels by 2020. The accompanying text concludes:

For low and medium stabilization levels [450 and 550 ppm CO<sub>2</sub>-eq], developed countries as a group would need to reduce their emissions to below 1990 levels in 2020 (on the order of -10 percent to 40 percent below 1990 levels for most of the considered regimes) and to still lower levels by 2050 (40 percent to 95 percent below 1990 levels), even if developing countries make substantial reductions.

The table authors, Michel den Elzen and Niklas Hohne, published a long article last year in the journal *Climatic Change*, entitled, “Reductions of greenhouse gas emissions in Annex I and non-Annex I countries for meeting concentration stabilization targets,” which elaborates on the studies they relied on, their assumptions, and the studies done subsequently. They note:

The current, slow pace in climate policy and the steady increase in global emissions, make it almost unfeasible to reach relatively low global emission levels in 2020 needed to meet 450 ppm CO<sub>2</sub>-eq, as was first assumed feasible by some studies, 5 years ago.

In other words, lack of action, especially by the United States, together with soaring CO<sub>2</sub> emissions, especially by China, means the world needs stronger targets—not weaker.

---

## Timing

On the one hand, by failing to ratify the Kyoto Protocol, the United States took itself off of an emissions path that would have made a 2020 target of 25 to 40 percent below 1990 levels far more attainable. Our Kyoto target was a 7 percent reduction below 1990 levels by 2008-2012.

On the other hand, a central argument against Kyoto offered by opponents in the 1990s was that more time was needed to develop advanced technologies to achieve the necessary cuts. The nation (and the world) has had more than a decade to develop such technologies. And while some industries, like the coal industry, have chosen not to aggressively pursue low-carbon technologies (such as carbon capture and storage), many others have commercialized—or are on the verge of commercializing—crucial climate solutions, such as concentrated solar power (i.e. solar thermal base load) and plug-in hybrid electric vehicles.

Therefore, arguments by polluting industries against stronger 2020 targets should be viewed skeptically. Yes, there are some limits to the speed with which the United States can reach 2020 targets. But as I have previously written:

If all Americans had the same per capita electricity demand as Californians currently do, we would cut electricity consumption 40 percent. If the entire nation had California’s much cleaner electric grid, we would cut total U.S. global-warming pollution by more than a quarter without raising American electric bills.

And that wouldn’t require using any new technology whatsoever. Nor does it consider technologies in sectors beyond electricity. So the United States is certainly capable of reducing its greenhouse gas emissions substantially below 1990 levels by 2020.

---

## Offsets

Every major recent U.S. climate bill allows emitters to purchase a substantial amount of both domestic and international “offsets” in place of reducing their own emissions. Yet a major 2008 [analysis](#) from Stanford University found:

... “between a third and two thirds” of emission offsets under the Clean Development Mechanism (CDM)—set up under the Kyoto treaty to encourage emissions reductions in developing nations—do not represent actual emission cuts.

Furthermore, a November [report](#) by the Government Accountability Office found, “the use of carbon offsets in a cap-and-trade system can undermine the system’s integrity.”

Significantly, in their 2008 explanation of the 2020 and 2050 targets in the IPCC’s “Fourth Assessment,” Elzen and Hohne conclude:

The ranges given in the box [13.7] and in this paper are assumed to be achieved domestically by both groups of countries. If Annex I countries plan to achieve a part of their emission targets outside of their territory, through credit transfer mechanisms such as the CDM, then first the ranges presented in the box and in this paper would have to be achieved and the credit transfers would have to occur in addition.

In short, international offsets like CDM should not be used to weaken the effective domestic emissions target by an Annex I country. That, however, is precisely how international offsets appear to be used in recent U.S. climate bills.

---

## Recent science

Scientific observations and analyses beyond that included in the 2007 IPCC reports should, if anything, lead to even stronger near-term and long-term targets. As previously noted, the rate of growth in global carbon dioxide emissions this decade exceeds the most pessimistic emissions scenario used by the IPCC.

Also, many aspects of the climate system are changing faster than projected by the IPCC ensemble of climate models—and some, such as Arctic summer ice cover, are changing faster than every single model.

Many leading climate scientists believe the long-term sensitivity of the climate to the doubling of carbon dioxide concentrations is considerably higher than 3°C. In one recent paper, the director of NASA’s Goddard Institute for Space Studies, James Hansen, along with eight other climate scientists, argued that the effective climate sensitivity is closer to 6°C, and that a target of 350 ppm CO<sub>2</sub> may be required. While this is only one study, it does suggest that the nation and the world should pursue the most aggressive emissions targets possible to keep open the option of much lower concentration targets than previously thought.

Recent research suggests we may be closer than expected to thresholds in the carbon cycle. A study by the National Center for Atmospheric Research found that attempts to stabilize at 550 ppm CO<sub>2</sub> could defrost the entire top 11 feet of permafrost around most of the globe by the end of this century. The permafrost contains more carbon than the atmosphere currently does, much of it in the form of methane, a considerably more potent greenhouse gas than carbon dioxide. A recent study in *Nature Geoscience* projects that “a warming of 4°C causes a 40 percent loss of soil organic carbon from the shallow peat and 86 percent from the deep peat” of Northern peatlands. The Northern peatlands contain about half the carbon that the atmosphere does, and again, much of it could be released in the form of methane.

The 2007 IPCC report did make an initial attempt to incorporate the impact of carbon cycle feedbacks in their emissions targets:

Climate-carbon cycle coupling is expected to add carbon dioxide to the atmosphere as the climate system warms, but the magnitude of this feedback is uncertain. This increases the uncertainty in the trajectory of carbon dioxide emissions required to achieve a particular stabilisation level of atmospheric carbon dioxide concentration. Based on current understanding of climate carbon cycle feedback, model studies suggest that to stabilise at 450 ppm carbon dioxide, could require that cumulative emissions over the 21st century be reduced from an average of approximately 670 [630 to 710] GtC [gigatons of carbon] to approximately 490 [375 to 600] GtC.

In short, carbon cycle feedbacks are currently expected to reduce the acceptable levels of carbon emissions this century by more than 25 percent. None of the studies that Elzen and Hohne used in their analysis of required 2020 and 2050 targets for the IPCC report factored in this conclusion. Since emissions are cumulative, both long-term and near-term targets would need to be reconsidered in light of this new research.

---

## Conclusion

If the United States is going to be part of an international effort to avoid dangerous human-caused global warming, then it needs a 2020 CO<sub>2</sub> emissions target appropriate for that task. Simply returning to 1990 levels by 2020 is insufficient.

America's greenhouse gas emissions in 2007 were about 16 percent higher than 1990 levels. We need to cut emissions by more than 16 percent in the next dozen years if we are going to have a serious chance of cutting emissions another 80 percent in the 30 years after 2020. This country has lost much of its credibility in the international community by failing to act already. We simply cannot keep using the same excuse over and over again—that we can't do more in the future because we didn't do enough in the past.

At the international climate talks in Poland at the end of last year, both the Chinese and Indian delegations told Reuters that the goal of merely returning to 1990 levels in 2020 is "inadequate to fight global warming." In 2007, the European Union agreed to "slash greenhouse gas emissions by 20 percent within 13 years unilaterally and pledged to push for an agreement with the US and other industrialized countries to cut them by 30 percent by the same deadline."

In its domestic climate legislation, the United States should agree to a similar level of GHG reductions—20 to 30 percent below 1990 levels by 2020. Such legislation should limit the use of both international and domestic offsets in achieving those goals. If we are going to have a chance of keeping total planetary warming as close to the 2°C limit as possible, we must immediately begin to transform the nation's energy system over the next few decades. Climate legislation needs to focus on real changes in fossil fuel consumption and emission.

*Dr. Joseph Romm is a physicist and Senior Fellow at the Center for American Progress, where he oversees the blog [ClimateProgress.org](http://ClimateProgress.org). He is a former acting assistant secretary of energy, who helped develop the Clinton administration's climate technology strategy. He is the author of numerous books and articles on clean energy and global warming, including *Hell and High Water: Global Warming and The Solution* and *The Politics*.*

*Holmes Hummel, Ph.D., of the UC-Berkeley Energy Resources Group provided invaluable assistance in researching this paper.*