Humanity's Target for Atmospheric CO2

Target Atmospheric CO2

Where Should Humanity Aim?

"If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO2 will need to be reduced from its current 385 ppm to at most 350 ppm."

The International Panel on Climate Change (IPCC) and Al Gore have been telling us that rising levels of atmospheric CO2 is at the heart of the global warming problem. Now, a group of leading climatologists and scientists are pointing us toward the key to the solution: do what is needed to get atmospheric CO2 concentrations back down to 350 parts per million (ppm) or less.

This simple, yet powerful conclusion is taken from a 2008 paper by ten scientists from the United States, the United Kingdom and France. The authors include James Hansen, top climatologist at the NASA Goddard Institute for Space Studies in New York.

The conclusions in this paper stand out because they provide humanity with a science-based distinction between safe CO2 levels and dangerous CO2 levels. clarity what must be achieved to preserve the Earth's capacity to function and support life as it has for many thousands of years. For anyone seeking to understand what must be done to end global warming and normalize climate change, this scientific paper is arguably one of the best places to start.

The paper is featured here at SafeCO2.org to make the paper itself easier to find. Also, background information and key sections are highlighted so that non-scientists can extract the many conclusions that are contained in this technical, scientific paper.

The Paper

Download Locations:

NASA Goddard Institute of Space Studies | Target Atmospheric CO2: Where should humanity aim? | Hansen et al

Columbia University | Target Atmospheric CO2: Where should humanity aim? | Hansen et al

arXiv.org (Extract) | Target Atmospheric CO2: Where should humanity aim? | Hansen et al

arXiv.org (Paper) | Target Atmospheric CO2: Where should humanity aim? | Hansen et al

Open Atmosphere Science Journal | Target Atmospheric CO2: Where should humanity aim? | Hansen et al

Supporting Material

arXiv.org | Supporting Material | Hansen et al

Excerpts

The need for emissions to approach zero

A probabilistic analysis concluded that the long-term CO2 limit is in the range 300-500 ppm for 25 percent risk tolerance, depending on climate sensitivity and non-CO2 forcings. Stabilizing atmospheric CO2 and climate requires that net CO2 emissions approach zero, because of the long lifetime of CO2. We use paleoclimate data to show that long-term climate has high sensitivity to climate forcings and that the present global mean CO2, 385 ppm, is already in the dangerous zone. Despite rapid current CO2 growth, ~2 ppm/year, we show that it is conceivable to reduce CO2 this century to less than the current amount, but only via prompt policy changes.

Dawn of an Anthropocene Era and Dangerous Climate Impacts

Human-made global climate forcings now prevail over natural forcings. Earth may have entered the Anthropocene era 6-8 [thousand years] ago, but the net human-made forcing was small, perhaps slightly negative, prior to the industrial era. GHG forcing overwhelmed natural and negative human-made forcings only in the past quarter century. Human-made climate change is delayed by ocean and ice sheet response times. Warming ‘in the pipeline’, mostly attributable to slow feedbacks, is now about 2°C. No additional forcing is required to raise global temperature to at least the level of the Pliocene, 2-3 million years ago, a degree of warming that would surely yield ‘dangerous’ climate impacts.

More Excerpts

Danger of Current CO2 Levels

Science Suggests "350" as Target for CO2

Tipping Points for Climate Change

Science Supports Global Phase Out of Coal in 20-25 Years

Authors

James Hansen
Profile | NASA/Goddard Institute

Profile | The Earth Institute

Profile | Columbia University

NASA/Goddard Institute for Space Studies New York, USA

Columbia University Earth Institute New York, USA

Makiko Sato

Profile | NASA/Goddard Institute

Profile | The Earth Institute

NASA/Goddard Institute for Space Studies New York, USA

Columbia University Earth Institute New York, USA

Pushker Kharecha

Profiles | NASA/Goddard Institute | The Earth Institute

NASA/Goddard Institute for Space Studies, New York, NY 10025, USA

Columbia University Earth Institute, New York, NY 10027, USA

David Beerling

Department of Animal and Plant Sciences

University of Sheffield

Sheffield

S10 2TN

UK

Personal Web

Robert Berner

Deptartment of Geology and Geophysics

Yale University

New Haven, CT

06520-8109

USA

Valerie Masson-Delmotte

Lab. Des Sciences du Climat et l’Environnement

Institut Pierre Simon Laplace

CEA-CNRS

Universite de Versailles

Saint-Quentin en Yvelines, CE Saclay

91191

Gif-sur-Yvette

France

Mark Pagani

Deptartment of Geology and Geophysics

Yale University

New Haven, CT

06520-8109

USA

Maureen Raymo

Department of Earth Sciences

Boston University

Boston, MA

02215

USA

Dana L. Royer

Deptartment of Earth and Environmental Sciences

Wesleyan University

Middletown, CT

06459-0139

USA

James C. Zachos

Earth & Planetary Sciences Department,

University of California, Santa Cruz

Santa Cruz, CA

95064

USA

Media & Commentary

Nature News @ SafeCO2 | 500 - 450 - 350: What CO2 target is safe? | April 2009

Climate Progress | Stabilize at 350 ppm or risk ice-free planet | November 2008

Solve Climate | At 385, current CO2 already in "Dangerous zone" | November 2008

Science Daily | Carbon Dioxide Levels Already In Danger Zone | November 2008

physorg.com | Carbon Dioxide Levels Already in Danger Zone | November 2008

Yale Press Release | Carbon Dioxide Levels Already in Danger Zone | November 2008

TomDispatch.com and LA Times | The World at 350: Civilization's Last Chance | May 2008

Guardian | Climate Target is Not Radical Enough - Study | April 2008

Climate Progress | Hansen (et al) must read: Get back to 350... | March 2008

Washington Post | Remember This: 350 Parts Per Million | December 2007