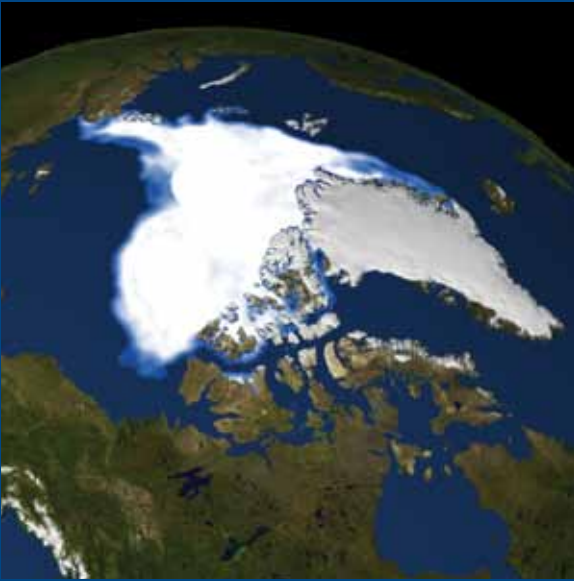


VIRGINIA



U.S. SCIENTISTS AND ECONOMISTS' CALL FOR SWIFT AND DEEP CUTS IN GREENHOUSE GAS EMISSIONS



MARCH 2010

Physicists tend to be supercritical of strong conclusions, but the data on global warming now indicate the conclusions are not nearly strong enough.

LEON M. LEDERMAN

Director Emeritus, Fermi National Accelerator Laboratory, Batavia, IL; Nobel Prize Winner in Physics; National Medal of Science Recipient; Member, National Academy of Sciences

Global warming is one of the most pressing problems of our time. If we fail to address it, the costs to adapt our infrastructure and agricultural systems will be overwhelming. Dealing effectively with the problem of climate change could help keep us fully employed for a generation.

JAMES K. GALBRAITH

Lloyd M. Bentsen Jr. Chair in Government/Business Relations, University of Texas, Austin

Over the last 30 years I've watched many glaciers shrink in South America. It's also happening in Europe, North America, China, and the Himalayas. More than 90 percent of the world's glaciers are receding—they have no political agenda. Science is about what is, not about what any of us believe.

LONNIE G. THOMPSON

Distinguished University Professor, School of Earth Sciences; Research scientist and glaciologist, Byrd Polar Research Center, The Ohio State University; National Medal of Science Recipient; Member, National Academy of Sciences; Tyler Prize for Environmental Achievement

The message from California to federal policy makers is encouraging—we know that a combination of political will and smart policies that promote energy conservation and technological innovation can cost-effectively reduce global warming emissions.

MICHAEL HANEMANN

Chancellor's Professor, Agricultural and Resource Economics Department, Goldman School of Public Policy, University of California, Berkeley; Director, California Climate Change Center

The climate system is telling us a consistent story of human influence. We can read that story in records of temperature, rainfall, ice, snow, sea level, and even in the behavior of extreme events. The message in this story: natural causes alone simply cannot explain all these changes.

BENJAMIN SANTER

Research Scientist, Program for Climate Model Diagnosis and Intercomparison, Lawrence Livermore National Laboratory; MacArthur Fellow; Second and Fourth Assessment Reports of the Intergovernmental Panel on Climate Change

Preventing dangerous climate change is a great investment. It will cost between one and two percent of GDP, and the benefits will be between 10 and 20 percent. That's a return of 10 to 1—attractive even to a venture capitalist.

GEOFFREY HEAL

Paul Garret Professor of Public Policy and Corporate Responsibility, Columbia Business School, New York, NY; Co-organizer, U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions

Only a very few years remain in which drastic reductions in global emissions must begin if warming is to be limited to 2°C or any other reasonable level. The world is squandering valuable time, and time is running out.

RICHARD C.J. SOMERVILLE

Distinguished Professor Emeritus and Research Professor, Scripps Institution of Oceanography, University of California, San Diego; Fourth Assessment Report of the Intergovernmental Panel on Climate Change

Adaptation for both human and natural ecosystems will likely be more difficult and costly for a faster rate of warming than for slower rates. Delaying action is an extremely risky path to continue on.

STEPHEN H. SCHNEIDER

Professor, Department of Biological Sciences, Stanford University, CA; Co-Director, Center for Environmental Science and Policy; Co-director, Interdisciplinary Program in Environmental Resources; Member, National Academy of Sciences; MacArthur Fellow; Lead Author, Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC); Coordinating Lead Author of the Third and Fourth Assessment Reports of the IPCC; Co-organizer, U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions

U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions

We call on our nation's leaders to swiftly establish and implement policies to bring about deep reductions in heat-trapping emissions. The strength of the science on climate change compels us to warn the nation about the growing risk of irreversible consequences as global average temperatures continue to increase over pre-industrial levels (i.e., prior to 1860).^{1,2} As temperatures rise further, the scope and severity of global warming impacts will continue to accelerate.

The 2007 report of the Intergovernmental Panel on Climate Change² unequivocally concluded that our climate is warming, stating with at least 90 percent certainty that the warming of the last several decades is primarily due to human activities. Global average temperatures have already risen ~ 0.7°C (1.3°F) over the last 100 years, and impacts are now being observed worldwide.^{1,2} Human-caused emissions to date have locked in further changes including sea-level rise that will intensify coastal flooding, and dramatic reductions in snowpack that will disrupt water supplies in the western United States.^{1,3} If emissions continue unabated, our nation and the world will face more sea level rise, heat waves, droughts, wildfires, snowmelt, flood risk, and public health threats, as well as increased rates of plant and animal species extinctions.^{1,4}

The longer we wait, the harder and more costly it will be to limit climate change and to adapt to those impacts that will not be avoided. Many emissions reduction strategies can be adopted today that would save consumers and industry money while providing benefits for air quality, energy security, public health, balance of trade, and employment.^{5,6}

All nations must commit to a goal designed to limit further harm. The United States, the European Union, and a number of other countries have recognized the need for limiting global warming to no more than 2°C (3.6°F) above pre-industrial levels.⁷ Emerging science must be regularly evaluated to assess whether this goal is sufficient.

The UN Framework Convention on Climate Change recognizes that all nations have a responsibility to curb global warming, consistent with their respective contribution to emissions and capacity to act. Recent analyses indicate the United States—even with aggressive action by other nations—would need to reduce its emissions on the order of 80 percent below 2000 levels by 2050 to have a reasonable chance of limiting warming to 2°C.⁸

A strong U.S. commitment to reduce emissions is essential to drive international climate progress. Voluntary initiatives to date have proven insufficient. **We urge U.S. policy makers to put our nation onto a path today to reduce emissions on the order of 80 percent below 2000 levels by 2050. The first step on this path should be reductions on the order of 15-20 percent below 2000 levels by 2020, which is achievable and consistent with sound economic policy.**^{5,6}

There is no time to waste. The most risky thing we can do is nothing.

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- and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden, and C.E. Hanson, eds. Cambridge University Press, 617-652. For additional reasons for concern see section 5.2 of Intergovernmental Panel on Climate Change Fourth Assessment Report Climate Change 2007: Synthesis Report.
- 2 Solomon, S., D. Qin, M. Manning, R.B. Alley, T. Berntsen, N.L. Bindoff, Z. Chen, A. Chidthaisong, J.M. Gregory, G.C. Hegerl, M. Heimann, B. Hewitson, B.J. Hoskins, F. Joos, J. Jouzel, V. Kattsov, U. Lohmann, T. Matsuno, M. Molina, N. Nicholls, J. Overpeck, G. Raga, V. Ramaswamy, J. Ren, M. Rusticucci, R. Somerville, T.F. Stocker, P. Whetton, R.A. Wood, and D. Wratt. 2007. Technical Summary. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor, and H.L. Miller, eds. Cambridge University Press.
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 - 4 Frumhoff, P.C., J.J. McCarthy, J.M. Melillo, S.C. Moser, and D.J. Wuebbles. 2007. Confronting Climate Change in the U.S. Northeast: Science, Impacts, and Solutions. Synthesis report of the Northeast Climate Impacts Assessment (NECIA). Cambridge, MA: Union of Concerned Scientists.
 - 5 Barker T., I. Bashmakov, L. Bernstein, J.E. Bogner, P.R. Bosch, R. Dave, O.R. Davidson, B.S. Fisher, S. Gupta, K. Halsnæs, G.J. Heij, S. Kahn Ribeiro, S. Kobayashi, M.D. Levine, D.L. Martino, O. Masera, B. Metz, L.A. Meyer, G.-J. Nabuurs, A. Najam, N. Nakicenovic, H.-H. Rogner, J. Roy, J. Sathaye, R. Schock, P. Shukla, R.E.H. Sims, P. Smith, D.A. Tirpak, D. Urge-Vorsatz, and D. Zhou. 2007. Technical Summary. In: Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. B. Metz, O.R. Davidson, P.R. Bosch, R. Dave, L.A. Meyer, eds. Cambridge University Press.
 - 6 Creyts, J., A. Derkach, S. Nyquist, K. Ostrowski, and J Stephenson. 2007. Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost? McKinsey & Company. And Stern, N. 2007. The Economics of Climate Change: The Stern Review. Cambridge University Press.
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 - 8 Luers, A.L., M.D. Mastrandrea, K. Hayhoe, and P.C. Frumhoff. 2007. How to Avoid Dangerous Climate Change: A Target for U.S. Emissions Reductions. Cambridge, MA: Union of Concerned Scientists (www.ucsusa.org/global_warming/science/emissionstarget.html). This report assesses the U.S. contribution needed to stabilize atmospheric concentrations of greenhouse gases at a level <450 CO₂ equivalent (CO₂eq, the concentration of all greenhouse gases expressed in terms of CO₂), under conservative assumptions. These include developing nations' average annual emissions peak between 2020 and 2025 –10 to 15 years after those of industrialized nations. Developing nations follow the Energy Information Agency (EIA) "low-growth" emissions trajectory up to their peak followed by average annual reductions rates that match those of industrialized nations. Report assumptions also include allowing atmospheric concentrations to briefly go above (i.e. "overshoot") the target before returning to it by the end of the century. Stabilizing atmospheric concentrations at 450 ppm CO₂eq provides a roughly 50-50 chance of limiting global average temperatures from rising more than 2°C above pre-industrial temperatures (M. Meinshausen, W.L. Hare, T.M.L. Wigley, D.P. van Vuuren, M.G.J. den Elzen, and R. Swart. 2006. Multi-gas emission pathways to meet climate targets. *Climatic Change* 75: 151-194). Literature estimates for global emissions reductions required to achieve a specific temperature or stabilized atmospheric concentration goal may vary as a result of whether or not concentrations are allowed to overshoot and return to the stabilization target and to representation of results in terms of different reference base years (e.g., 1990, 2000, 2005). See footnote 2 above with references therein and the 2007 Bali Climate Declaration by Scientists (online at <http://www.climate.unsw.edu.au/bali>; accessed December 2007).

Virginia Institutional Affiliations of Endorsers

The endorsers of the U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions are based at a wide variety of institutions, including universities and colleges, government agencies, businesses, and nonprofit organizations. The endorsers have included their institutional affiliation for identification purposes only, and the listing below should not be construed to imply any institutional endorsement.

Bridgewater College
College of William and Mary
George Mason University

Hollins University
National Wildlife Federation
Northern Virginia Community
College

Old Dominion University
Roanoke College
Sweet Briar College
University of Virginia

Virginia Institute of Marine Science
Virginia Polytechnic Institute and
State University
Washington and Lee University

The 43 Virginia Endorsers of the U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions

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The consequences of global climate change constitute one of the most serious threats facing humanity. While the poor and the impoverished will suffer the most, the potential for catastrophic climate change that can adversely affect the habitability of the entire planet is quite real.

JAGADISH SHUKLA

Distinguished University Professor of Earth Sciences and Global Change, and Chair, Climate Dynamics Program, George Mason University; President, Institute of Global Environment and Society; Lead Author, Fourth Assessment Report of the Intergovernmental Panel on Climate Change

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Our recent research shows that the majority of Americans strongly favor federal legislation to dramatically reduce carbon emissions and promote clean fuels, including over 70 percent who want to see CO₂ regulated as a pollutant. Congress can act with the full support of the American people.

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*Communities worldwide
who are presently most affected
by the impacts of global climate
change are increasingly unable
to adapt. It's our global respon-
sibility to transition to clean,
renewable energy resources
both at home and abroad.*

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*Climate scientists have done their
job. Economists have done their
job. Now it's time for the policy
makers to do theirs. Now is the
time to implement climate policy
in order to ensure our children a
future with a clean, diverse port-
folio of energy options—a future
in which they are the leaders
of the global energy revolution.*

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The market has proven to be an effective mechanism for mitigating fossil fuel emissions. Successful cap and trade programs have been implemented in both the United States and Europe. Reducing green-house gas emissions requires carbon to be priced, and cap and trade is a proven market mechanism for achieving that.

BRUCE MIZRACH

Associate Professor of Economics, Rutgers University, New Brunswick, NJ

The future of our society depends on effectively managing and reducing greenhouse gas emissions. Public and private research and development support for these efforts will allow us to transition to a carbon-neutral energy system that improves both environmental quality and economic growth.

GORDON RAUSSER

Robert Gordon Sproul Distinguished Professor, Agricultural and Resource Economics Department, University of California, Berkeley; Co-founder and former Director, LECG, a global expert services company; Former chief economist of the U.S. Agency for International Development

The climate system is sufficiently complex that no one can say with certainty what is going to happen. We can say—with certainty—that without action to reduce emissions, enormous risks are being run.

CARL WUNSCH

Cecil and Ida Green Professor of Physical Oceanography, Department of Earth, Atmospheric, and Planetary Sciences, Massachusetts Institute of Technology; Member, National Academy of Sciences

One plausible climate change scenario projects that Washington County, ME, may have a late century temperature range similar to Washington, DC, today—with a likely loss of our spruce-fir forest. That is why Maine and our folks in Washington need to lead the way in major emissions cuts.

ROBERT W. KATES

Independent Scholar; Presidential Professor of Sustainability Science at the University of Maine; Recipient, National Medal of Science; Member, National Academy of Sciences; MacArthur Fellow; Fourth Assessment Report of the Intergovernmental Panel on Climate Change

Sea ice is rapidly receding; permafrost is thawing; and areas of formerly treeless, windswept tundra are being taken over by shrubs. The Arctic is on the fast track of climate change.

MARK C. SERREZE

Research Professor of Geography, Senior Research Scientist, National Snow and Ice Data Center, Boulder, CO; Fellow, Cooperative Institute for Research in Environmental Studies

Evidence is mounting from many different scientific disciplines that Earth's natural systems are already undergoing rapid change. We need to act now to reduce heat-trapping gas emissions, for the sake of our children and the other species with whom we share this planet.

PAMELA A. MATSON

Dean, School of Earth Sciences and Goldman Professor of Environmental Studies, Stanford University, CA; Member, National Academy of Sciences; MacArthur Fellow; Past President, Ecological Society of America

Endorser Criteria: Ph.D. or doctoral candidate professionals with expertise relevant to our understanding of the scientific and economic dimensions of climate change, its impacts, and solutions.

Key to Awards and Honors

- 1 Nobel Laureate: Nobel Prize winner in Chemistry, Economics, or Physics (<http://nobelprize.org>)
- 2 NAS: Member of the United States National Academy of Sciences of the National Academies (<http://www.nasonline.org>)
- 3 NAE: Member of the United States National Academy of Engineering of the National Academies (<http://www.nae.edu>)
- 4 NMS: Recipient of the United States National Medal of Science (<http://www.nsf.gov/od/nms/medal.jsp>)
- 5 MacArthur: Recipient of the MacArthur Fellowship Award (<http://www.macfound.org>)
- 6 IPCC: Intergovernmental Panel on Climate Change. Lead author, contributing author, or review editor on an assessment or special report. The IPCC shares the 2007 Nobel Peace Prize. (<http://www.ipcc.ch>)

The United States worked with other nations to take on the ozone threat; so, too, must we lead the international effort to reduce heat-trapping emissions that cause climate change.

MARIO J. MOLINA

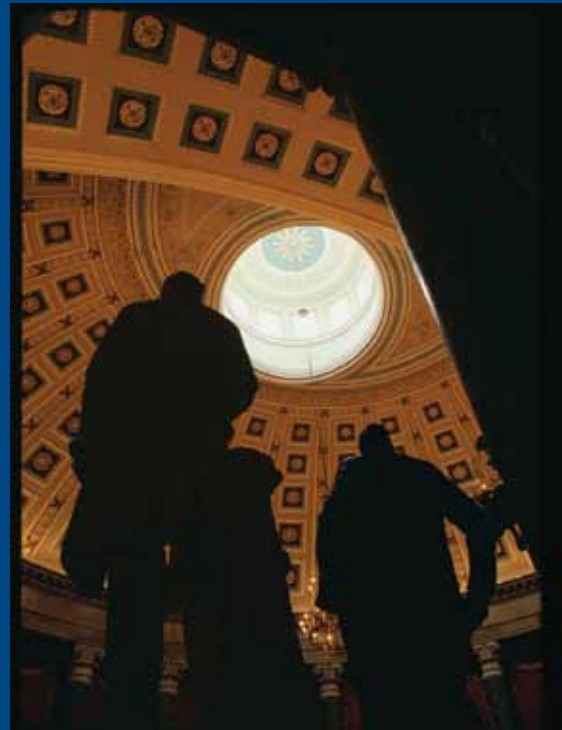
Professor of Chemistry and Biochemistry, Center for Atmospheric Sciences, Scripps Institution of Oceanography, University of California, San Diego; Nobel Prize Winner in Chemistry; Member, National Academy of Sciences; Co-organizer, U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions



In the economic emergency we are experiencing, some people think that we cannot afford to address the problem of climate change. It's the other way around: If we don't act now we will run into even greater economic problems in the future.

ELINOR OSTROM

Professor, Indiana University, Bloomington; Nobel Prize Winner in Economics; Member, National Academy of Sciences



The economic and social costs of global warming could be huge. We need to act now to limit them.

ERIC MASKIN

Albert O. Hirschman Professor of Social Science, Institute for Advanced Study, Princeton, NJ; Nobel Prize Winner in Economics; Member, National Academy of Sciences; Kempe Award in Environmental Economics

Economists now join climate scientists in a unified call for action to address the causes of climate change. Failure to act now is the most risky and most expensive thing we could do.

JAMES J. MCCARTHY

Alexander Agassiz Professor of Biological Oceanography, Department of Organismic and Evolutionary Biology and Department of Earth and Planetary Sciences, Harvard University, MA; Co-chair, Third Assessment Report of the Intergovernmental Panel on Climate Change; Lead Author, Arctic Climate Impact Assessment; Past President, American Association for the Advancement of Science; Co-organizer, U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions