



## Geoengineering Options to Respond to Climate Change: Steps to Establish a Research Agenda

*A workshop to provide input to the America's Climate Choices  
suite of activities*

June 15-16, 2009

**Objective:** The workshop will inform the work of the America's Climate Choices (<http://americasclimatechoices.org>) panels and steering committee by examining a number of proposed "geoengineering" approaches, or interventions in the climate system designed to diminish the amount of climate change occurring after greenhouse gases or radiatively active aerosols are released to the atmosphere, with an emphasis on the research needed to better understand the potential efficacy and consequences of the various approaches.

**Scope:** The workshop will draw on a growing body of studies and previous workshops that have examined a broad range of geoengineering issues—from the international governance of deliberate climate interventions to the feasibility of specific approaches. The particular focus of this workshop will be approaches (i) to reduce concentrations of greenhouse gases after they have been emitted to the atmosphere (e.g., CO<sub>2</sub> capture approaches), or (ii) to limit or offset physical effects of increased greenhouse gas concentrations (e.g., albedo increase approaches). Note: Other parts of the America's Climate Choices process are addressing approaches to reduce greenhouse gas emissions and adapt to climate change. Furthermore, there is already a developed research effort in CO<sub>2</sub> capture by conventional land-management approaches (e.g., conventional afforestation). Thus, these topics will be outside the scope of this workshop.

The workshop will be structured to bring multiple perspectives to the table—engineering, physical and environmental science, social science, policy, legal and ethical—to encourage an interdisciplinary dialogue and exchange of ideas, with an emphasis on the research needed to better understand the potential efficacy and consequences of various geoengineering approaches.

During the workshop, we expect participants to:

- Survey plausible geoengineering approaches and their potential effects on climate change and potential to increase or decrease risk (what is known?) taking into consideration key uncertainties (what is unknown?);

- Discuss possible intended and unintended consequences and practical, legal, and ethical issues associated with the proposed approaches (what surprises might be in store?); and
- Sketch out avenues for future research and identify near-term actions that may be required to support informed decisions (what can be done to learn more?).

#### RSVP Requests:

Space at the workshop is limited, so participants must register in advance. RSVP requests must be received by Tuesday, June 2nd, and notification of space availability will be sent on Wednesday, June 3rd. The plenary sessions on the first day of the workshop will be audiocast for those who cannot be accommodated or who wish to simply observe the proceedings.

To RSVP, please e-mail Amanda Purcell [apurcell@nas.edu](mailto:apurcell@nas.edu) and include:

- Name and affiliation
- Your expertise/interest among the following topic areas, which will be used to assign breakout groups (please rank, i.e., 1, 2, 3, in your RSVP email):
  - \_\_\_ Engineering
  - \_\_\_ Physical and environmental science
  - \_\_\_ Governance, ethics, and/or social science
- Your interest/expertise with respect to the following general categories of geoengineering approaches:
  - \_\_\_ Approaches to reduce concentrations of greenhouse gases after they have been emitted to the atmosphere
  - \_\_\_ Approaches to limit or offset physical effects of higher atmospheric greenhouse gas concentrations
  - \_\_\_ Other (please specify)

Priority will be given to those who bring diverse, interdisciplinary perspectives and who agree to be active participants throughout both days of the meeting. Plenary sessions of the workshop will be audiocast for those who wish to simply observe the proceedings.

Finally, please note that the workshop planning team has issued an open call for short “white papers” on all aspects of geoengineering. Web links to these materials will be made available to all participants in advance of the workshop, and also included in the public access file for the study. Instructions for providing this input can be found at: <http://americasclimatechoices.org/geoinput.shtml>

# Draft Agenda

WASHINGTON COURT HOTEL  
525 New Jersey Avenue, NW, Washington, DC 20001

## Monday, June 15

- 8:30 Welcome
- 8:45 Meeting Overview - Day 1: "Getting the Issues on the Table"  
*Pam Matson, Stanford Univ.*
- 9:00 Survey of Geoengineering Options (including estimates of effectiveness, risk, and cost)  
*Ken Caldeira, Carnegie Institution*
- 9:40 Engineering: Important questions, state of knowledge, and major uncertainties related to selected geoengineering options  
*David Keith, Univ. of Calgary*
- 10:20 Break
- 10:50 Physical Science: Important questions, state of knowledge, and major uncertainties related to selected geoengineering options  
*Dan Schrag, Harvard Univ.*
- 11:30 Terrestrial Ecosystems, Complexity, and Geoengineering  
*Tony Janetos, Univ. of Maryland*
- 12:00 Informal Discussions over Lunch
- 12:45 From Research to Field Testing and Deployment: Ethical Issues Raised By Geoengineering  
Panel Discussion Moderated by *Martin Bunzl, Rutgers Univ.*  
Panelists: *Stephen Gardiner, Univ. of Washington; Dale Jamieson, NYU; and William Travis, Univ. of Colorado*
- 14:00 Governance and Geoengineering: Who Decides and How  
Panel Discussion Moderated by *Granger Morgan, Carnegie Mellon Univ.*  
Panelists: *John Steinbruner, Univ. of Maryland (inv.) Jason Blackstock, IIASA; Jay Apt, Carnegie Mellon Univ.*
- 15:00 Assignments/Instructions to breakout groups and 20 min Break
- 15:30 Breakout session 1.  
Breakouts will consider critical questions about a geo-engineering research agenda. Detailed instructions will be provided at the meeting.
- 17:30 Reconvene in plenary: Emerging issues and questions to be addressed tomorrow
- 17:45 Adjourn for the day

**Tuesday, June 16 (Same Location as Day 1)**

8:30 Summary of Day 1 / Plan for Day 2 "The way forward"  
*Pam Matson, Stanford Univ.*

8:45 Report back from breakout groups (5-10 minutes each)

9:45 Reactions / Perspectives on Geoengineering  
*Rob Socolow, Princeton Univ., moderator*

- *Michael Oppenheimer, Princeton Univ.*
- *Alan Robock, Rutgers Univ.*
- *Brian Toon, Univ. of Colorado*
- *Tom Schelling, Univ. of Maryland*

10:45 **Instructions for Breakout Session 2 and 15 min Break**

11:15 Breakout session 2. Return to discussion groups; each group addresses a new set of questions, informed by the feedback from the first set of breakouts and morning discussion. Detailed instructions will be provided at the meeting.

12:15 **Working Buffet Lunch - Breakout groups continue discussions**

13:30 Report back from breakout groups (5-10 minutes each)

14:30 Open discussion

15:15 Conclusions and next steps

15:30 **Workshop Adjourns**

*(Note: ACC committee and panel members will continue to meet in closed session from 15:30 - 17:30)*