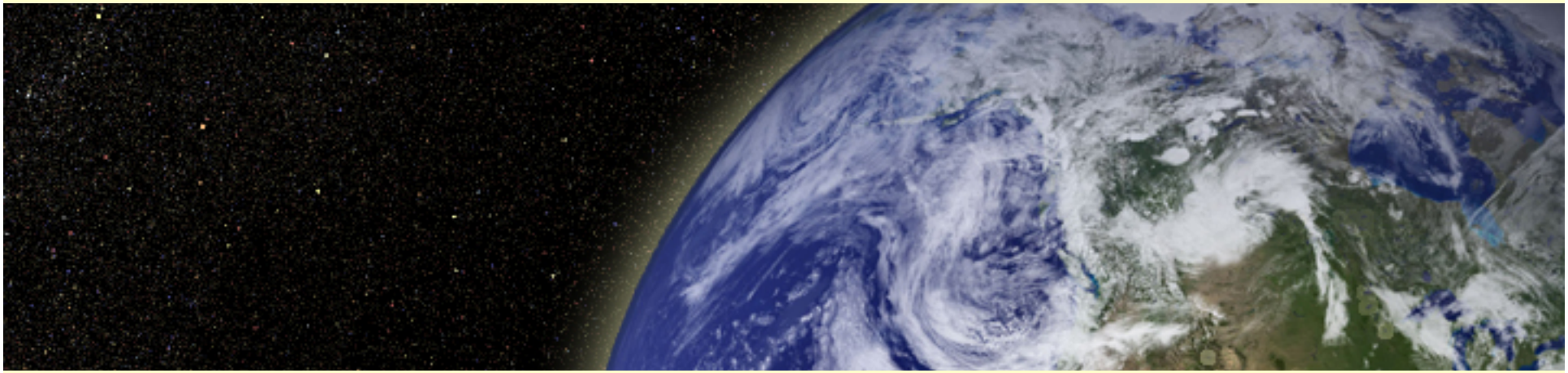
The Use of Climate Science in the Transportation Sector

Asilomar 2005: Conference on Transportation and Energy



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Assistant Secretary of Commerce for Oceans and Atmosphere
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August 24, 2005

US Climate Change Science Program
www.climatescience.gov

NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Challenges to the Transportation Sector and the Climate Science Community

What have we learned from climate science over the past decade?

What do we hope to learn from climate science?

What energy investment strategies should we consider?

How do our current transportation systems affect our climate and vice versa?

What is the direction and focus of climate science now and in the near and long-term future?

U.S. Greenhouse Gas Emissions by Sector for 2003

Electricity Generation	33 (rounded to nearest percent)
Transportation	27
Industry	19
Agriculture	7
Commercial	7
Residential	6
U.S. Territories	1

Total US net emissions in 2003 was 6.07 Tg CO_2 Eq.

Source: Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2003

Climate Scenario Influences on Transportation System Design

Science + Observations ⇨ Systems Design

The transportation sector has modes of flexibility in greenhouse gas emissions:

- CAFÉ Standards
- Total Usage
- Efficient System Design
- Mass Transit
- Regional Planning

Transportation system design should include climate impacts – on multidecade to century-scale time frames. Examples:

- Coastal Road Capacity
- Flash flood Areas

U.S. Government Approach to Climate Change Policy and Programs

Cabinet-Level Engagement

Near-Term Actions

Incentives for Long-Term Investments

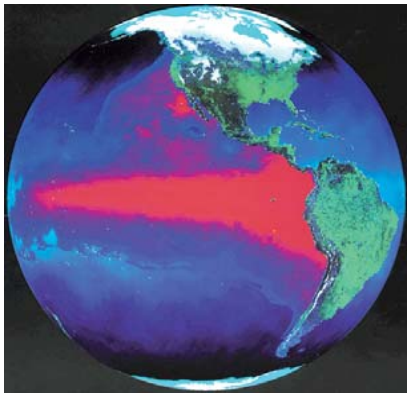
$2 B/Yr in Science to Inform Policy

$3 B/Yr in Technology to Facilitate Action

International Cooperation

Pragmatic, Science-Based Approach

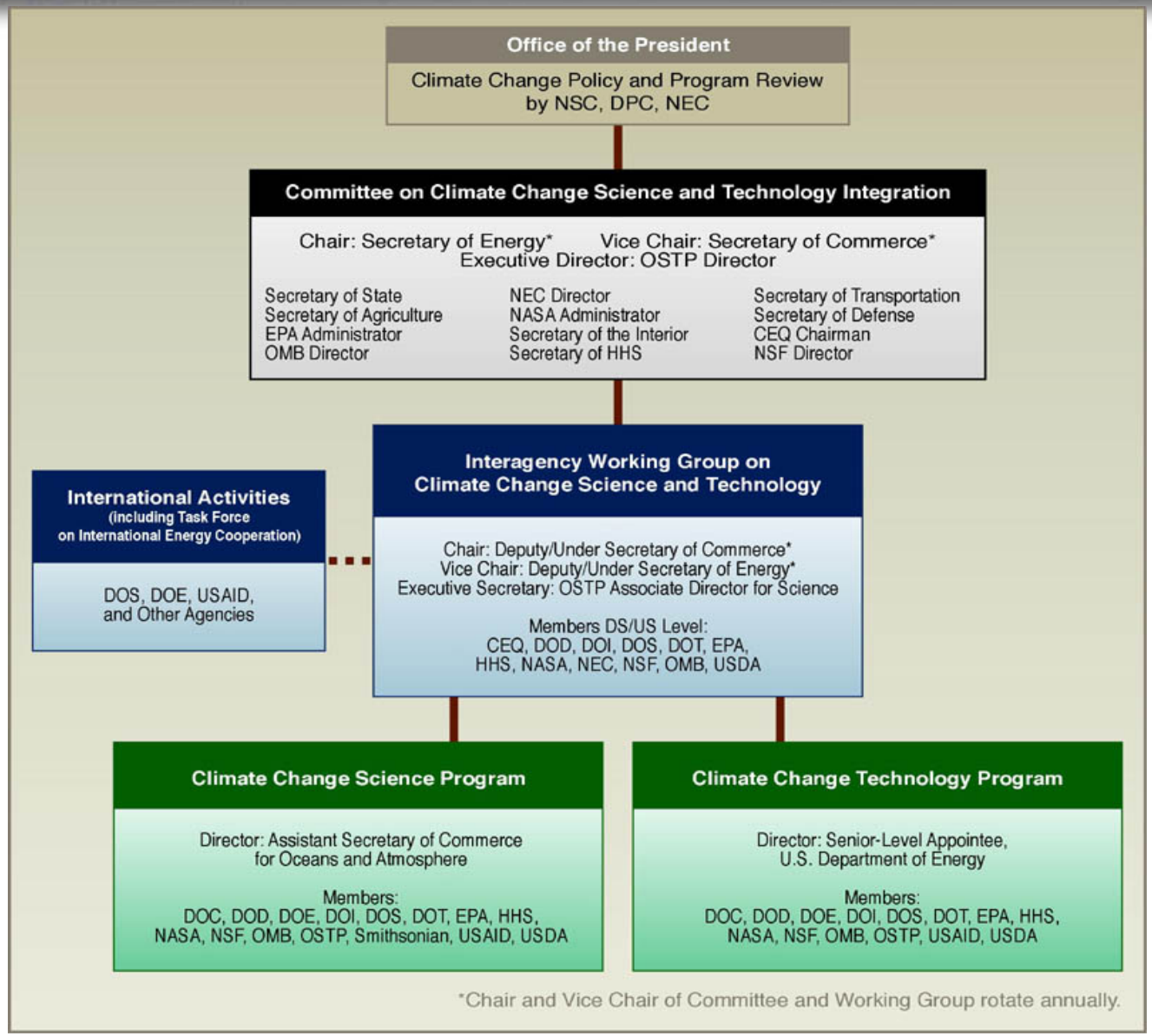
Global Earth Observing Leadership



Climate Variability & Change

Energy Resources

Climate Change Science and Technology Management Structure



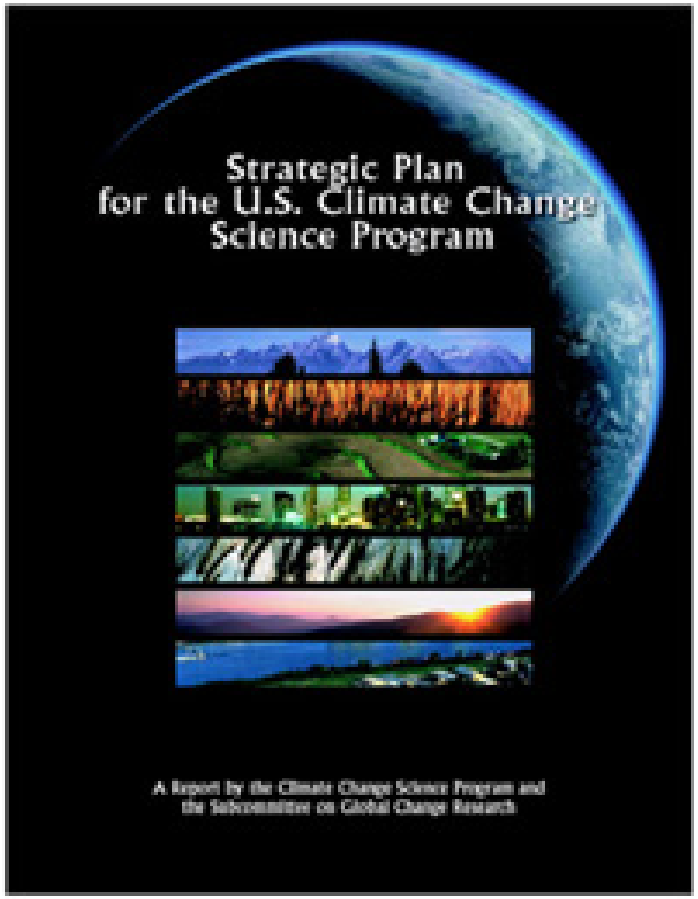
CCSP Strategic Plan

U.S. Climate Change Science Program

- A Comprehensive Scientific Research Program
- $2 Billion / Year

Climate Science Goals

1. Improve Knowledge of Climate and Environment
2. Improve Quantification of Forces Driving Changes to Climate
3. Reduce Uncertainty in Projections of Future Climate Changes
4. Understand Sensitivity and Adaptability of Natural and Manmade Ecosystems
5. Explore Uses and Limits of Managing Risks and Opportunities



www.climatescience.gov

Climate Science Application at U.S. DOT

U.S. DOT utilizes existing climate science to improve decisionmaking tools in three primary areas:

(1) Impact of climate variability and change on transportation research

- Research to examine the effects that climate change and variability may have on transportation infrastructure and services, and to identify potential adaptation strategies for use by transportation decisionmakers, operators, state and local planners, and infrastructure builders;

(2) Increasing energy efficiency and reducing greenhouse gases

- Research on reducing energy use will cover mitigation of transportation's environmental impacts both through conservation and through the application of new technology; and

(3) Modeling

- Research to develop and improve analytical tools for transportation energy use to support decisionmaking throughout government and in the private sector.

CCSP Synthesis and Assessment Product for Transportation

Product 4.7: Within the transportation sector, a summary of climate change and variability sensitivities, potential impacts, and response options and an assessment of the current state of science.

Nature of the Study: Gulf Coast transportation case study.

Significance: Safety and efficiency of transportation infrastructure—much of which has a very long lifetime—may be increased through planning that takes account of sensitivities to climate variability and change.

Scheduled Completion Date: Late 2007

CCSP Strategic Plan Scenario Focus

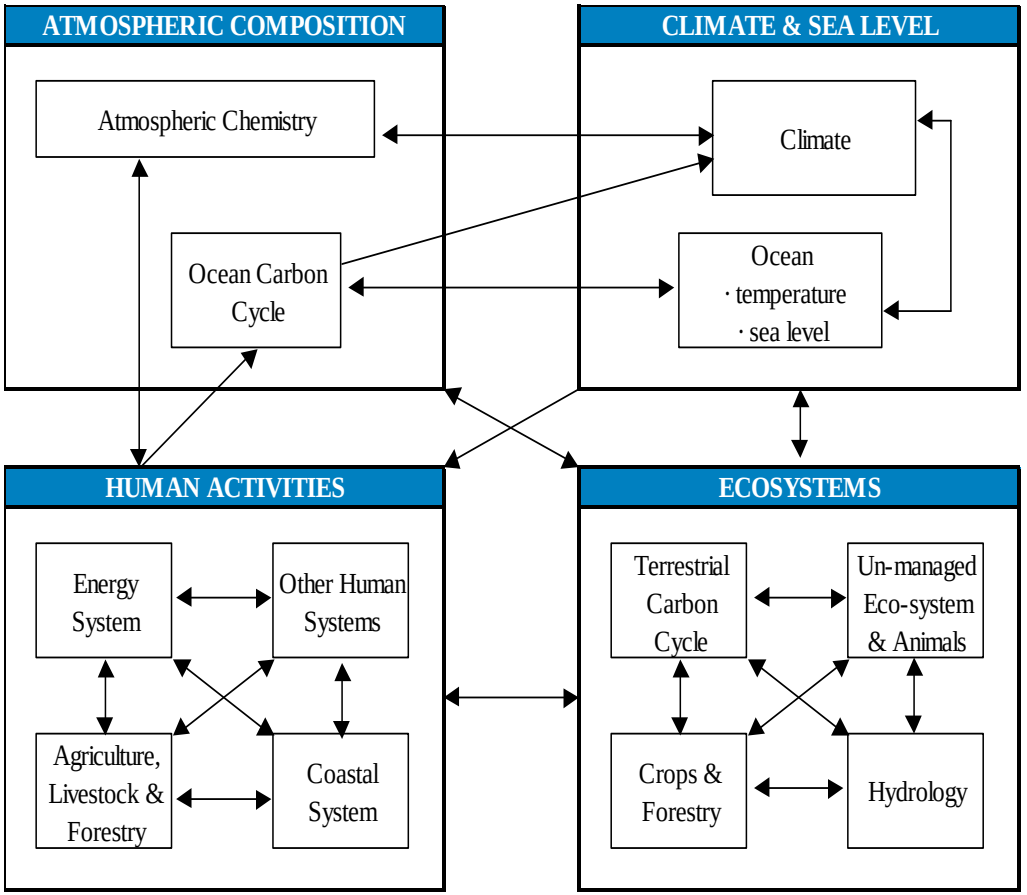
Focus 2.5: Improve capabilities to develop and apply emissions and related scenarios for conducting "If..., then..." analyses in cooperation with CCTP

- Quantify and project possible drivers of land-use change for a range of economic, environmental, and social values and develop regional, national, and global land-use and land-cover change projection models, incorporating advances in our understanding of drivers (Chapter 6.2 and 6.3)
- Linked ecosystem, resource management, and human dimensions models that enable scientific evaluation of a wide range of policy scenarios and assessment of effects on atmospheric CO2 concentration and carbon sources and sinks (Chapters 7.3 and 8.1)
- Scenarios strengthened by an improved understanding of the interdependence among economic growth; population growth, composition, distribution, and dynamics (including migration); energy use in different sectors (e.g., electric power generation, transportation); advancements in technologies; and pollutant emissions (Chapter 9.1)

INTEGRATED ASSESSMENT OF CLIMATE CHANGE

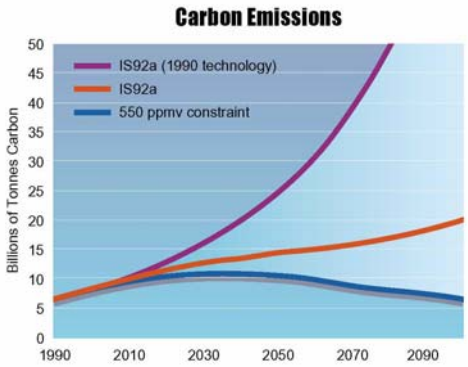
What is integrated assessment?

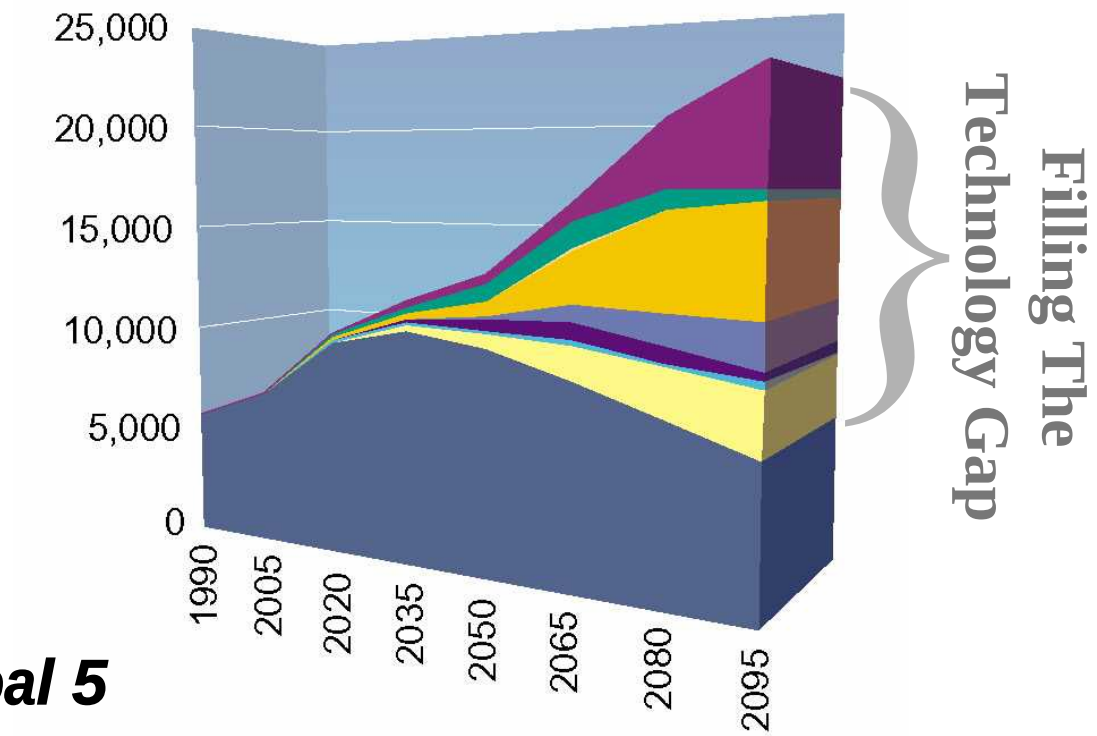
- Integrated assessment for climate change assembles knowledge from a diverse set of sources, relevant to one or more aspects of the climate change issue, for the purpose of gaining insights that would not otherwise be available from traditional, disciplinary research.



TECHNOLOGY

To minimize the cost of stabilizing CO_2 concentrations, economic models deploy a suite of technologies including both familiar and, when available, technologies that are minor components of the present global energy system, such as CO_2 capture and storage, biotechnology, and H_2.





- Conservation
- Soil Carbon Sequestration
- Synfuel-Carbon Capture and Sequestration
- Carbon Capture and Sequestration from Hydrogen Production
- Central Power-Carbon Capture and Sequestration
- Solar and Hydro
- Nuclear
- Biomass
- 550 ppmv Emissions

Goal 5

GEO/GEOSS

EOS I

- July 31, 2003, Washington, D.C.
- 34 Countries and 20 International Organizations

EOS II

- April 25, 2004, Tokyo, Japan
- 47 Countries and 26 International Organizations

EOS III

- February 2005, Brussels
- Nearly 60 Countries and 40 International Organizations
- 10-Year Implementation Plan
- Commerce Secretary Gutierrez led the US delegation

EOS I

EOS II

EOS III

G-8 Meeting – Gleneagles 2005

The G-8 Leaders' Statement and Plan of Action in Gleneagles (July 8) include:

- Endorsing technology as the long-term approach to climate change
- Endorsing the Carbon Sequestration Leadership Forum, the International Partnership for a Hydrogen Economy, the Methane to Markets Partnership, and Group on Earth Observations
- Adopting concrete steps to help:
  - Transform the way we use energy by improving efficiencies in power generation, transportation, buildings and appliances;
  - Promote the use of clean coal technologies, nuclear power, clean diesel and methane, renewable energy, bioenergy and more efficient power grids; and
  - Strengthen hydrogen R&D.

Asia-Pacific Partnership on Clean Development

On July 27, the U.S., Australia, China, Japan, India, and South Korea announced a partnership to accelerate clean development and improve energy security, reduce pollution, and address the long-term challenge of climate change.

The Partnership will focus on voluntary practical measures to create new investment opportunities, build local capacity, and remove barriers to the introduction of clean, more efficient technologies.

The Partnership will be consistent with and contribute to our efforts under the UNFCCC and will complement, but not replace, the Kyoto Protocol.

U.S. Energy Bill

The Energy Bill (signed by President Bush on August 8):

- Encourages conservation and energy efficiency
- Expands the use of alternative and renewable energy
- Authorizes full funding for the President's Hydrogen Fuel Initiative
- Provides a tax credit of up to $3,400 for owners of Hybrid vehicles
- Authorizes $1.3 billion for alternative motor vehicles and fuels (ethanol, methane, liquified natural gas, propane)
- Encourages investment in modernization and reliability of the U.S. energy infrastructure
- Helps reduce the global energy demand