



- August 15-18, 2010 • Dallas, Texas •
- Dallas Convention Center •



Climate Change and National Policies

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Outline

- Physical Evidence of Climate Change
- International GHG Programs
- EO 13514 and Greenhouse Gases
- Draft Federal Guidance



Nation's primary EE/RE R&D Laboratory



Mission: Advancing DOE and National Energy Goals

Renewable Energy Research

Renewable Fuels & Transportation

Strategic Energy Analysis

Integrated Systems Engineering

Climate Change

“Climate Change” refers to a change in state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or variability of its **properties**, and that persists for an extended period, typically decades or longer.¹

Three important things to know:

1. Climate *is not* weather.
2. Climate is the *average* of weather.
3. One weather event *is not* indicative of anything.



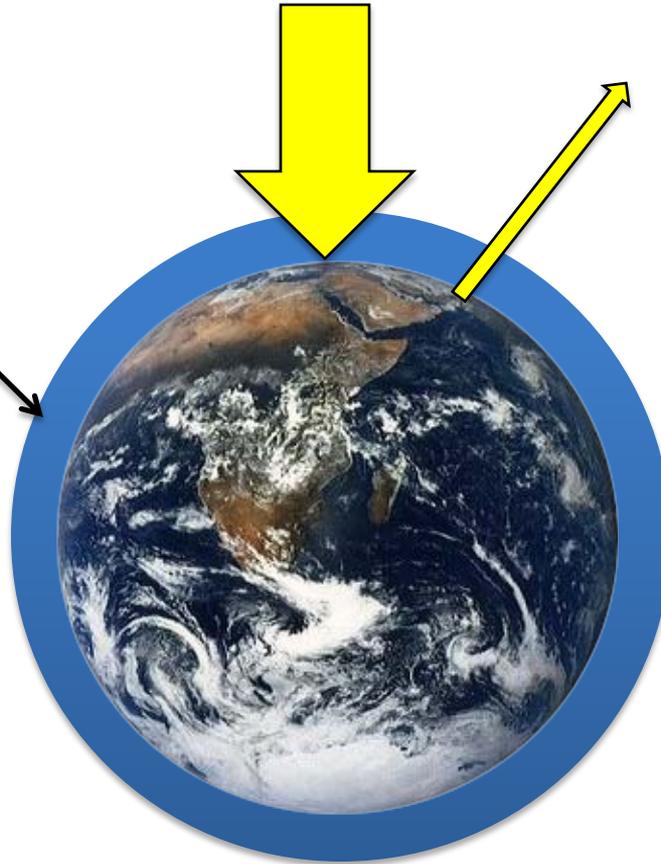
Photo credit: <http://abc.net.au>

¹Hegerl, G.C., F. W. Zwiers, P. Braconnot, N.P. Gillett, Y. Luo, J.A. Marengo Orsini, N. Nicholls, J.E. Penner and P.A. Stott, 2007: Understanding and Attributing Climate Change. 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* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Climate Change

Troposphere (10 mi)

- 75% of atmosphere
- 99% of water vapor and aerosols
- Well mixed



Radiative Forcing

Radiative forcing (RF) is a way of measuring the effect of greenhouse gases.

RF = Radiation in – Radiation out [W/m²]

Positive RF means more:

- Less radiation radiated back into space
- More radiation trapped in the atmosphere
- Heating of the atmosphere

Negative RF means more:

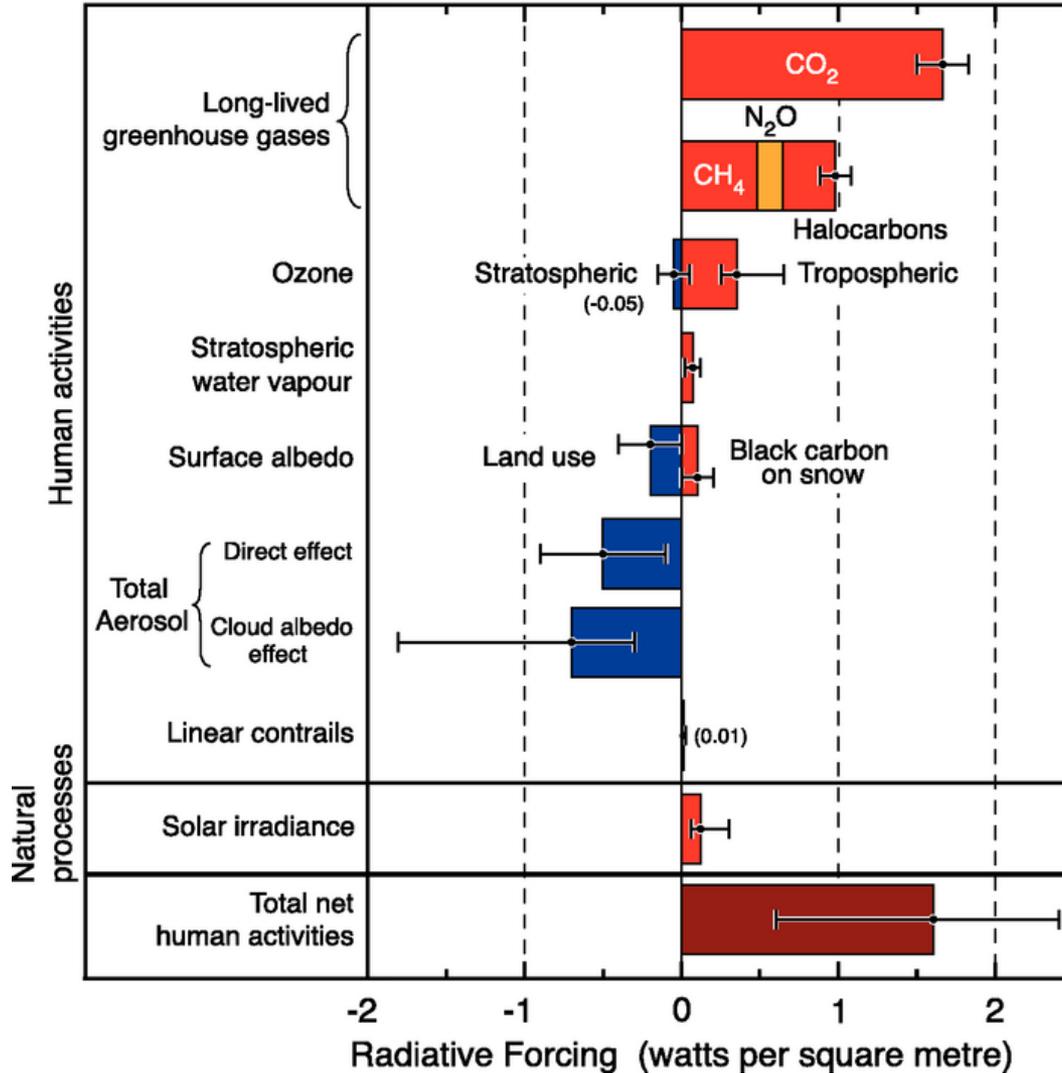
- More radiation radiated back into space
- Less radiation trapped in the atmosphere
- Cooling of the atmosphere

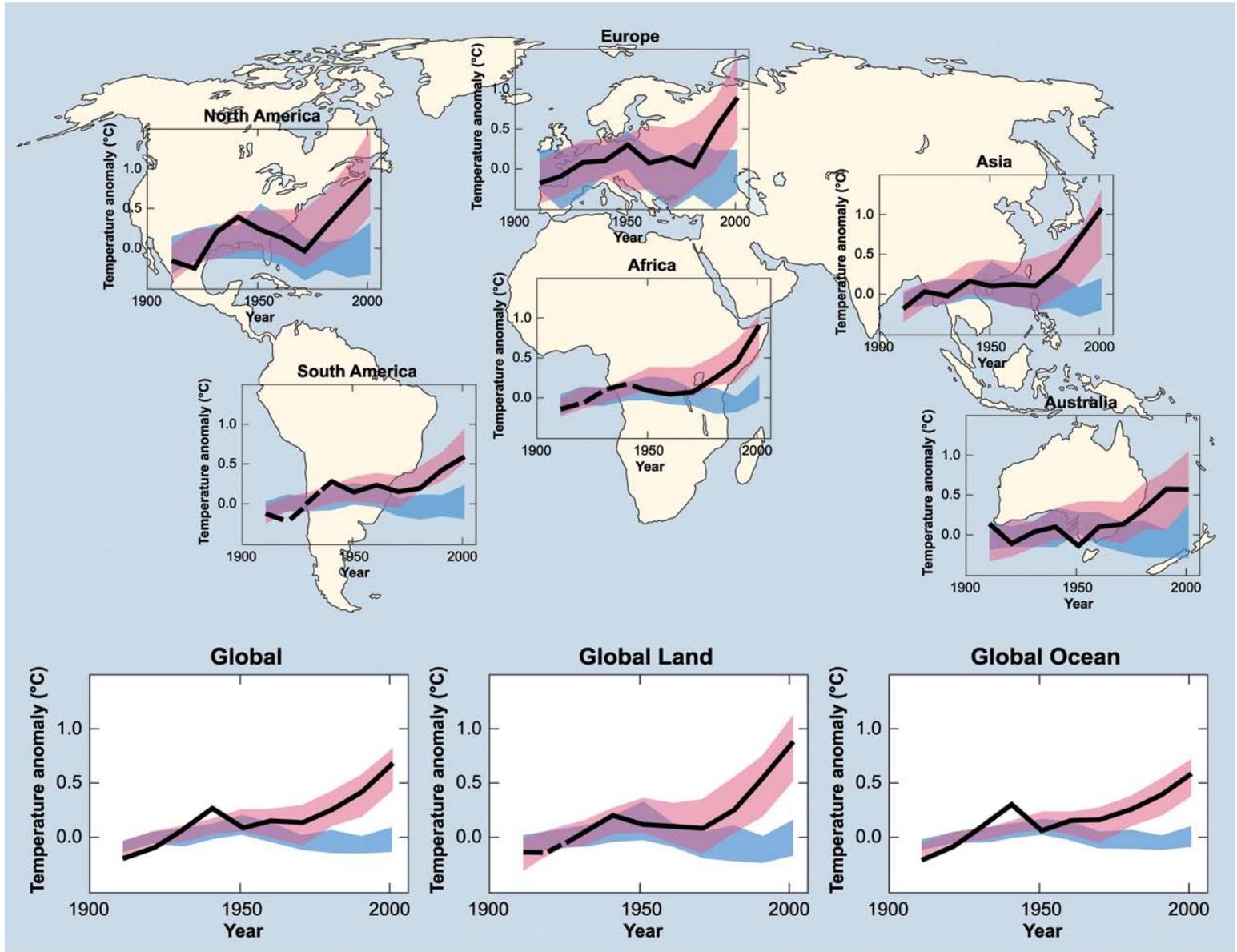


Radiative Forcing

Radiative forcing of climate between 1750 and 2005

Radiative Forcing Terms





models using only natural forcings
 models using both natural and anthropogenic forcings

observations

source: IPCC AR4 Synthesis Report

Physical Evidence

Global Surface Temp

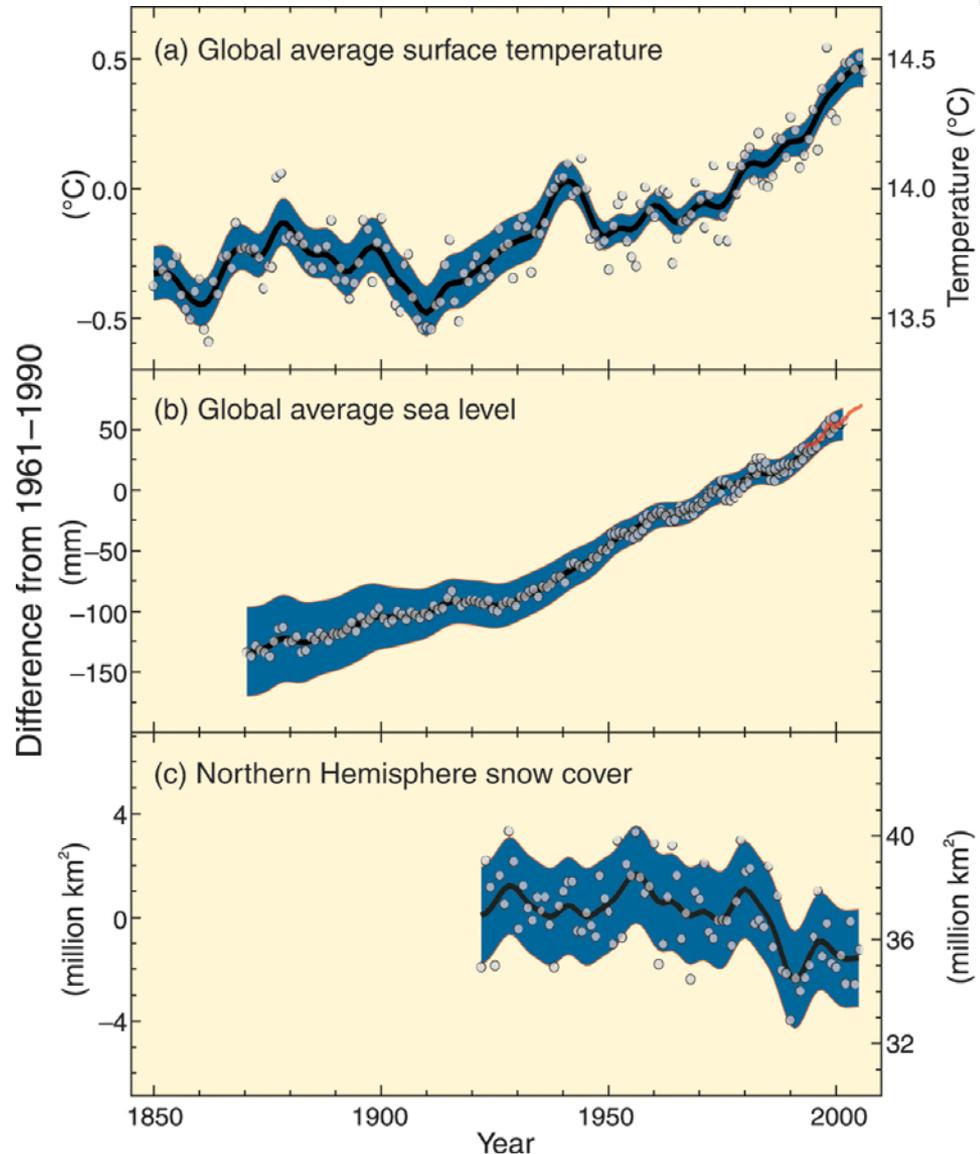
- More/longer droughts
- More pronounced in higher latitudes
- Shifting vegetation

Increased Global Sea Level

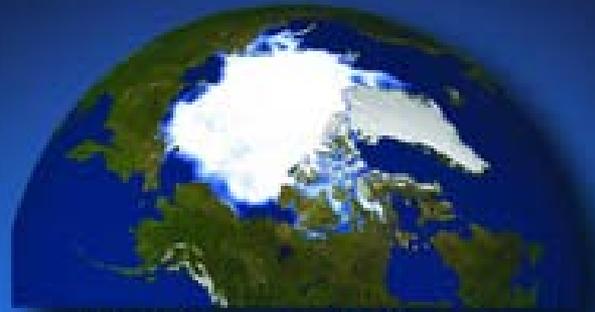
- Increased heat content causes water to expand
- Ocean can hold 1000x more heat than the atmosphere

Diminished Snow Cover

- Major source of fresh water
- Contribute to water shortages



Arctic Sea Ice Retreats



1980 Summer Minimum

Satellite observations show the Arctic has been losing sea-ice for the past 30 years.



2007 Summer Minimum



2008 Summer Minimum



Credit: NOAA http://www.arctic.noaa.gov/future/sea_ice.html

International GHG Programs

Intergovernmental Panel on Climate Change (IPCC)

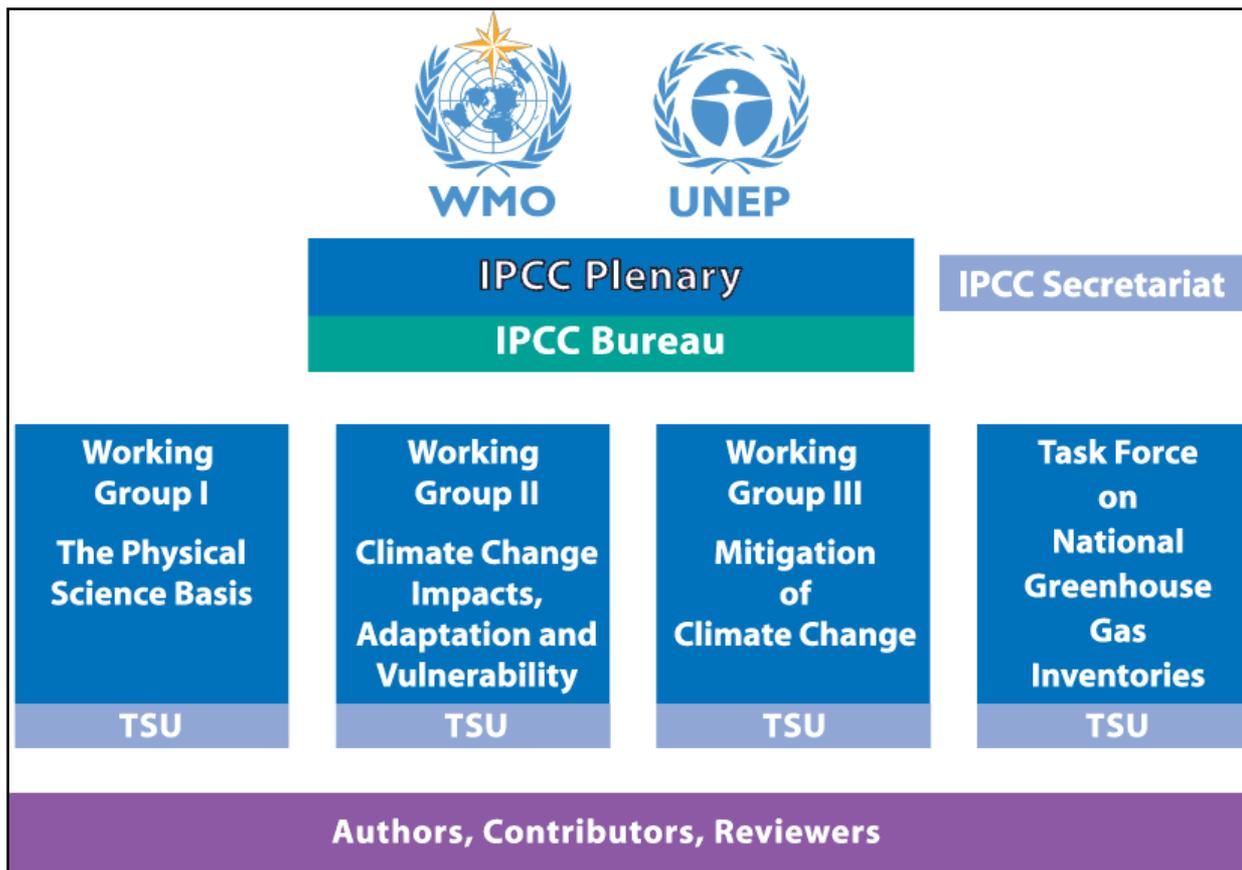
- Established in 1988 by UNEP and WMO to:
“...provide the world with a clear scientific view on the current state of climate change and its potential environmental and socio-economic consequences.”
- Intergovernmental scientific body
- Does not carry out original research or monitor climate phenomena directly
- Publishes special reports relevant to United Nations Framework Convention on Climate Change (UNFCCC)

IPCC

INTERGOVERNMENTAL
PANEL ON
CLIMATE CHANGE



Intergovernmental Panel on Climate Change (IPCC)





European Commission

- European Climate Change Programme (ECCP)
 - Launched in Jun. 2000, ECCP II launched Oct. 2005
- Goals
 - 8% below 1990 by 2012
 - Renewable electricity generation
 - Voluntary commitments by car makers
 - Taxation of various energy products
- Manages the EU Emissions Trading System (ETS)



International Carbon Action Partnership (ICAP)

- Made up of countries and regions that have implemented or are actively pursuing the implementation of carbon markets through mandatory cap and trade systems
- Provides a forum to share knowledge, experience and best practices
- 15 Founding Members
- Holds a summer school for emerging and developing developing countries
- China
 - http://www.chinadaily.com.cn/china/2010-07/22/content_11033249.htm

Australian Department of Climate Change and Energy Efficiency



Australian Government
Department of Climate Change
and Energy Efficiency

Established on Dec. 3, 2007 as part of the Prime Minister and Cabinet Portfolio

Corporate Plan

Provides a high level view on the Department's roles and priorities in delivering the Australian Government's climate change framework.

- Reducing Australia's greenhouse emissions
- Adapting to climate change impacts
- Helping to shape a global solution

Goals

- Greenhouse Gas reduction goal: 60% below 2000 levels by 2050
- Implement Carbon Pollution Reduction (carbon trading) Scheme by 2010
- Achieve target of 20% renewable penetration on the grid by 2020



EPA Mandatory Reporting Rule

Operations that emit 25,000 metric tons CO₂e or more per year are required to submit annual reports to EPA:

- Suppliers of fossil fuels (except coal) or industrial GHGs
- Manufacturers of vehicles and engines
- Facilities that inject or store CO₂ for sequestration or enhanced oil and gas recovery
- Magnesium production
- Underground coal mines
- Industrial wastewater and landfills
- Ethanol and food processing currently excluded

Provide a better understanding of GHG sources, guide development of sound policies to reduce emissions.

EXECUTIVE ORDER 13514

Federal Leadership in Environmental, Energy, and Economic Performance

Signed on 5 Oct, 2009 by President Obama



“...to establish an integrated strategy towards sustainability in the Federal government and to make reduction of Greenhouse gas emissions (GHG) a priority for Federal agencies.”

GovEnergy 2010

EXECUTIVE ORDER 13514

- E.O. 13514 sets goals for improvements in the following areas:
 - greenhouse gas emissions
 - energy efficiency
 - water use efficiency and management
 - pollution prevention and waste elimination
 - regional and local integrated planning
 - sustainable Federal buildings
 - sustainable acquisition
 - electronics stewardship
 - environmental management

EXECUTIVE ORDER 13514

- **Section 2 – Greenhouse Gas Goals**
- **GHG Reduction Goals**
 - Reported to Chair of CEQ and Director of OMB
- **FY2020 reduction target, FY2008***
 - Scope 1 & 2 reduction target: 4 Jan 2010
 - Scope 3 reduction target: 2 Jun 2010
- **Create Annual Inventory Starting FY 2010**
 - Scope 1,2 & 3 Emissions starting FY2010
 - First submission due 5 Jan 2011
- **Section 8 – Sustainability Plan**
- Develop, implement, and update an integrated Sustainability Plan
- Subject to approval by OMB Director
- Prioritize agency actions based on lifecycle return on investment

*Excluded vehicles, equipment, and electric power produced and sold commercially in the course of regular business.

Federal GHG Accounting Guidance

The **Guidance recommendations** provide information on:

- Emissions sources to include in the comprehensive GHG inventory
- Treatment of sequestration and emissions from land use, agriculture and biogenic sources
- Use of renewable energy purchases, including RECs, and carbon offsets
- Reporting process, including procedure for inventory recalculations
- Validation and verification of emissions inventory

The **Technical Support Document** provides information on:

- Reporting content, including minimum data required for input into the *GHG Reporting Portal*
- Methodologies and emission factors used to calculate Scope 1/2/3 and other emissions

<http://www.whitehouse.gov/administration/eop/ceq/sustainability>

Links and References

- FEMP GHG Program website
 - <http://www1.eere.energy.gov/femp/program/greenhousegases.html>
- FedCenter
 - <http://www.fedcenter.gov>
- EPA Mandatory Reporting Rule
 - <http://www.epa.gov/climatechange/emissions/ghgrulemaking.html>
- Council on Environmental Quality (CEQ)
 - <http://www.whitehouse.gov/administration/eop/ceq>
- Intergovernmental Panel on Climate Change (IPCC)
 - <http://www.ipcc.ch>
- ICAP
 - <http://www.icapcarbonaction.com/>
- European Climate Change Programme
 - <http://ec.europa.eu/environment/climat/eccp.htm>
- RealClimate.org
 - <http://www.realclimate.org>
- Australian Government
 - <http://www.climatechange.gov.au/about.aspx>

Questions?

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