

Earth Science and Policy in the Obama Administration

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Coverage of these remarks

- Why the Obama Administration loves geosciences and the Geological Society of America
- Aims and architecture of science and technology policy in this Administration
- Geosciences in Obama Administration priorities and policies

This Administration loves geosciences because...

- Geosciences teach us all about the workings of the only home that humans currently have.
- Geosciences provide critical information to inform policy decisions in crucial domains...
 - Climate-change understanding & adaptation
 - Energy, water, other resources, soils
 - Ocean science, polar science
 - Natural hazards: quakes, slides, tsunamis, eruptions...
- Geoscientists take the long view...
 - Which all too many people don't.
- Geoscientists rock!

What have geosciences done for us lately?

- The new NSF Geosciences Report on Promoting Innovation, Economic Growth, & Human Health highlights many recent achievements.
 - New instruments for electromagnetic surveys enhance ability to detect resource deposits in the oceans.
 - Improved capabilities for 3D earthquake detectors also have other uses (material testing, mineral detection, medical applications)
 - New weather sensors enable improved understanding of hurricanes and improved forecasts
 - New insights about the pace and impact of climate change are adding urgency to policy development & implementation

And what is the GSA doing for us?

- Leadership on integrating geology and public policy
 - Coordinating position statements on issues ranging from water and critical mineral resources to natural-hazards policy and climate change
 - Leading the scientific community by providing open access to all of GSA publications
 - Providing GSA members with opportunities to get involved in decision-making at the national level
 - Together with USGS, sponsoring a Congressional Science Fellow to work in a Congressional office
 - Some stay on: For example, one former GSA-USGS Fellow is now on the OSTP staff.
 - GSA Geosciences Congressional Visits Day connects scientists with Congressional representatives

Aims and Architecture of President Obama's Science and Technology Policy

“We will restore science to its rightful place...”

Barack Obama, January 20, 2009



The place of science on the agenda

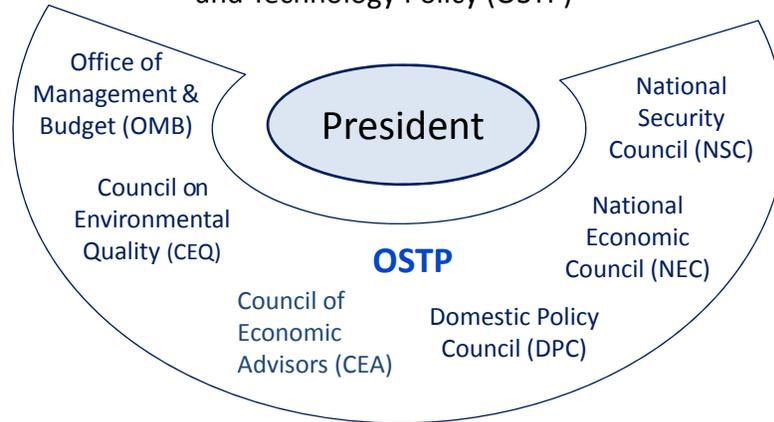
S&T are central to meeting key challenges of

- economic development & sustainable growth
- biomedicine & health-care delivery
- clean, safe, reliable, & affordable energy
- climate-change mitigation & adaptation
- competing uses of land & water
- the health & productivity of the oceans
- national & homeland security

as well as lifting the human spirit through discovery, invention, & expanded understanding.

The place of S&T in the White House...

...is centered in the Office of Science and Technology Policy (OSTP)



EOP also includes Offices of: Vice President, Chief of Staff, Cabinet Affairs, Communications, Intergovernmental Relations, Public Engagement, Social Secretary, US Trade Representative, and more. The Office of Energy & Climate Change sits in DPC.

OSTP: two major responsibilities

- Policy for science and technology

Analysis, recommendations, and coordination with OMB and other White House offices on R&D budgets & related policies, S&T education and workforce issues, interagency S&T initiatives, broadband, open government, scientific integrity...



- Science and technology for policy

Independent advice for the President about S&T germane to all policy issues with which he is concerned



OSTP's specific responsibilities also include...

- providing White House liaison with NSF and NASA;
- providing administrative and analytical support for the President's Council of Advisors on Science & Technology (PCAST);
- chairing and managing the interagency National Science & Technology Council (NSTC);
- providing S&T support for National Security and Emergency Preparedness Communications;
- chairing the Arctic Executive Steering Committee
- co-chairing the National Ocean Council and the Council on Climate Preparedness and Resilience; and
- coordinating & overseeing US cooperation in S&T with other countries.

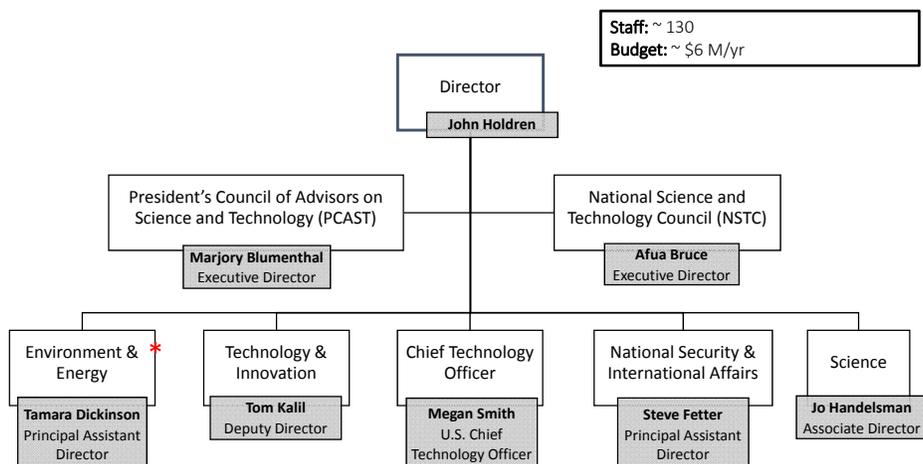
Presidential priorities with OSTP engagement

- S&T for job creation, economic competitiveness, public health, and national & homeland security
 - Federal support for basic and high-risk applied research
 - STEM education & workforce training (w inclusion emphasis)
 - S&T infrastructure: IT, connectivity, high-capability computing
 - The innovation ecosystem: IPR, regulation, partnerships
 - Biomedicine: initiatives in precision medicine, neuroscience, antibiotic resistance, epidemic diseases
 - Security: cyber, encryption & privacy, bio & nuclear capability tracking, detection, preparedness, response
- Technology policy for efficient, open, responsive gov't
 - Data.gov, public access, open-gov't National Action Plan
 - Infotech talent recruiting, retention, utilization

POTUS priorities w OSTP engagement (continued)

- S&T for energy, resources, and environment
 - S&T in the Climate Action Plan: monitoring for mitigation, data & tools for adaptation/preparedness/resilience, EOP coordination of the Quadrennial Energy Review, science support for COP21
 - Arctic science in support of the National Strategy for the Arctic Region
 - Marine & coastal science in support of Nat'l Ocean Policy
 - Earth observation strategy, action plan, budgets
- U.S. leadership in space S&T, exploration
 - Human spaceflight: ISS extension, commercial crew, advanced technology for deep-space missions
 - Planetary probes, JWST, asteroid detection & characterization

OSTP Organization



* GSA Fellow

Q: How can 130 people cover all this terrain?

A: With the help of the Nation's S&T community.

- OSTP's divisions maintain close relationships with the corresponding S&T components of Departments and Agencies across the government.
 - They're assisted in this by the work of the NSTC and its standing committees on Science, Technology, Environment, National & Homeland Security, and STEM Education.
- Analytical support on selected problems is provided by the Science & Technology Policy Institute (STPI).
- We also call on the National Academies and the professional societies for advice.
- Individual scientists & engineers across the country take our calls!

The Geosciences in Obama Administration Policies

Focuses in OSTP's Environment and Energy Division

That bright blue ball rising over the moon's surface, containing everything we hold dear – the laughter of children, a quiet sunrise, all the hopes and dreams of posterity – that's what's at stake. That's what we're fighting for. And if we remember that, I'm absolutely sure we'll succeed.

- Barack Obama, June 25, 2013

- **Major focuses:**
 - **The USGCRP and climate science, data, and tools**
 - **The Quadrennial Energy Review**
 - **Arctic Policy and the Arctic Executive Steering Committee**
 - **The National Ocean Policy and the National Ocean Council**
 - **Natural-hazards science and information**
 - **Earth observations**

U.S. Global Change Research Program

- Created by Congress through the Global Change Research Act of 1990 (25th Anniversary – November 16)
- Mission is to advance knowledge of global change and mobilize knowledge into action
- Major responsibilities include:
 - Coordination of priorities & research across 13 Federal agencies
 - National Climate Assessment (2000, 2009, 2014, continuing)
 - International partnerships in global-change science
 - Making global-change science & data accessible and usable

Landing page of the
USGCRP website.

www.globalchange.gov

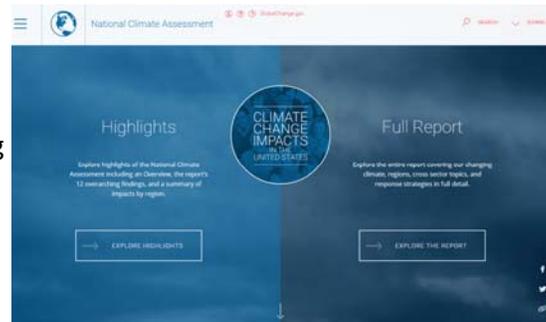


Climate science, data, & tools for policy & action

The National Climate Assessment (NCA)

- Congressionally mandated quadrennial report to the President and Congress summarizing current and projected impacts of climate change on the United States
- Produced by USGCRP, with the help of outside experts, under leadership of OSTP and NOAA
- The Third NCA (2014) engaged more than 300 experts
- Content is online in a dynamic format
- New "sustained assessment" process is updating it on a continuing basis

nca2014.globalchange.gov

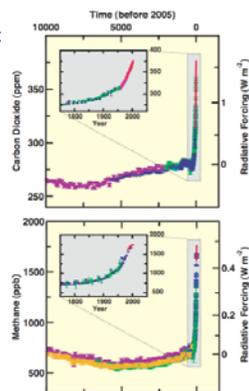


The 6 key science findings that underpin President Obama's Climate Action Plan

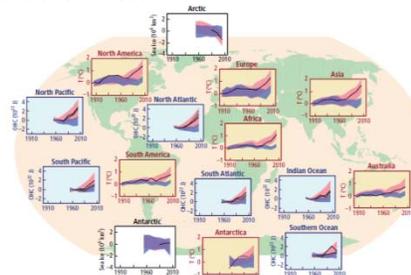
1. Earth's climate is changing at a pace and in a pattern not explainable by natural influences.
2. The dominant driver is the human-caused buildup of CO₂ and other heat-trapping substances in the atmosphere.

Atmospheric CO₂ & CH₄ over the past 10,000 years

IPCC 2007 WGI



Observed & modeled temperature and ocean heat



Black = observations; purple = models without and pink = models with human influences

Key science findings underpinning the CAP (continued)

3. These changes are already causing harm to life, health, property, economies, & ecosystems with more heat-waves, downpours, droughts, and wildfires; more of the most powerful storms; worse smog; and major impacts on species.



Flooding in New Orleans after Hurricane Katrina, 2005.
Source: FEMA/Jocelyn Augustino



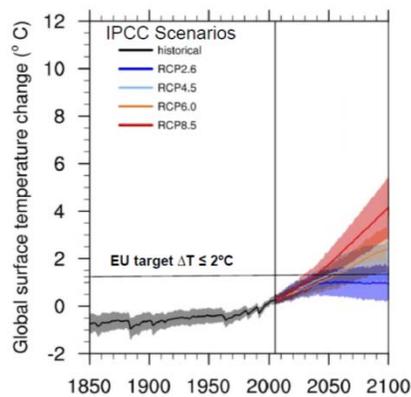
Wildfires in Colorado, 2012.
Source: AP Photo/The Gazette, Christian Murdoch



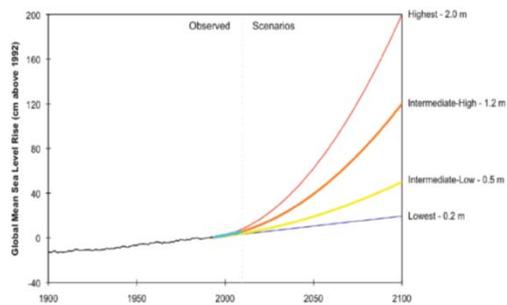
Drought in Texas' Fisher Lake, 2011. Source: AP Photo/Tony Gutierrez.

Key science findings underpinning the CAP (continued)

4. Harm from climate change will continue to grow for decades to come—in the case of sea-level rise, for centuries—due to time lags in the climate system.



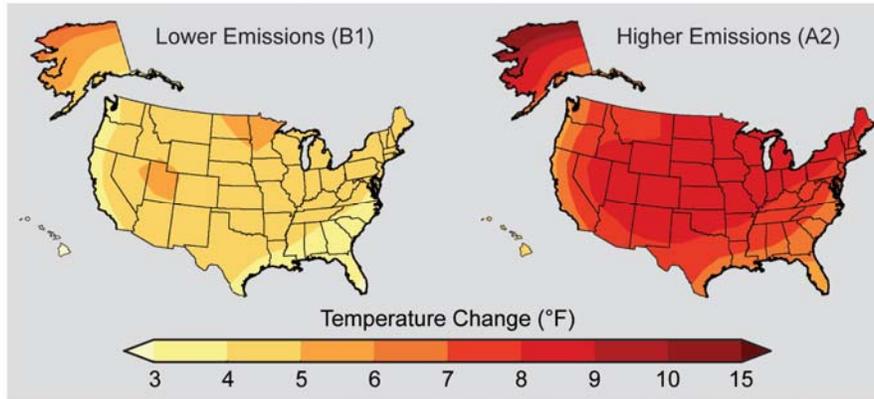
Projected T increases, IPCC 2013



Projected sea-level rise, NOAA 2012

Key science findings underpinning the CAP (continued)

5. But far less harm is expected if the world takes prompt, aggressive, remedial action than if it does not.



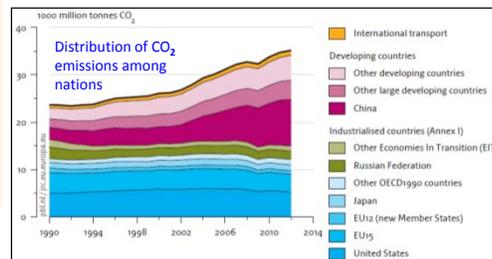
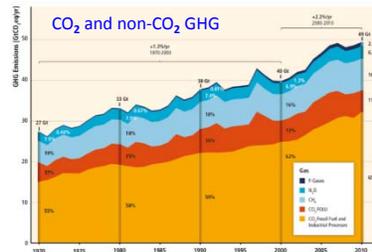
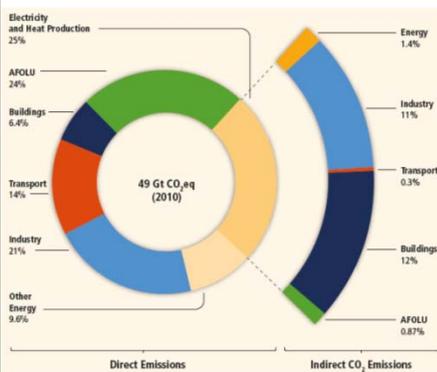
Change in average surface air temperature between 1970-1999 and 2070-2099

NCA 2014

Key science findings underpinning the CAP (continued)

6. Adequate mitigation will require addressing most heat-trapping substances across most emitting sectors in most countries.

Sectoral sources of global GHG emissions



How these insights shaped the CAP

The key understandings from climate science provided:

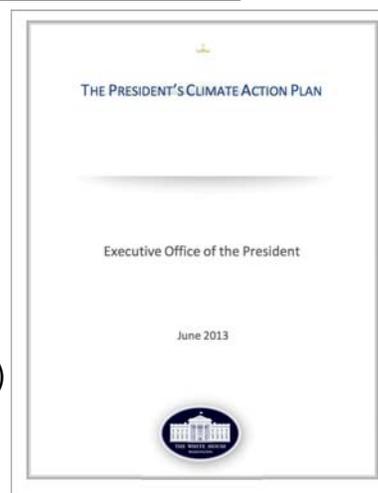
- the motivation for seeking to develop a cost-effective plan to reduce those impacts;
- the sense of urgency for doing so now rather than waiting;
- the awareness that such a plan must include both mitigation and adaptation;
- the knowledge of the sources of the offending emissions and the character of society's vulnerabilities that allows appropriate specificity in designing a plan; and
- the recognition that any U.S. plan must include a component designed to bring other countries along.

Shaped by science: the Climate Action Plan



Georgetown University, June 25, 2013

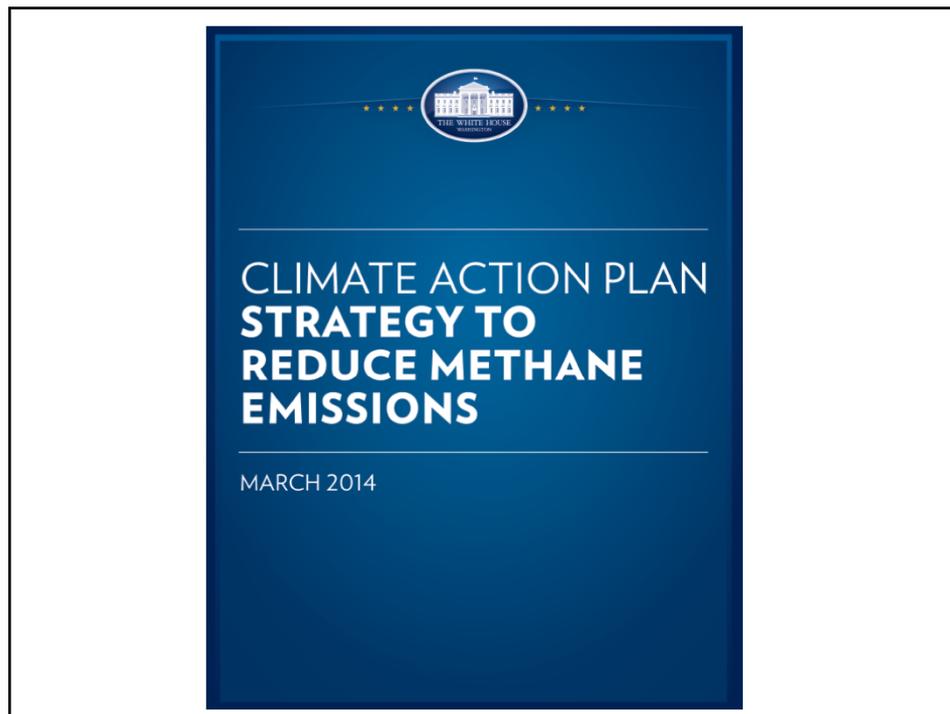
- Cutting heat-trapping pollution in America (mitigation)
- Preparing the United States for the impacts of climate change (adaptation)
- Leading efforts on mitigation and adaptation globally



<http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf>

Progress: Climate-Change Mitigation

- Reducing carbon pollution from power plants
 - standards for cutting CO₂ from new power plants (Sept 2013)
 - and from existing power plants (June 2014)
- Reducing other greenhouse gases
 - interagency strategy to reduce methane emissions (March 2014)
 - EPA proposal on hydrofluorocarbons (July 2014)
 - 2025 target to reduce methane emissions from the oil and gas sector by 40-45% from 2012 levels along with various actions to reduce methane emissions going forward, including EPA regulation (January 2015)



Progress: Preparing for the Impacts of Climate Change

- Directing agencies to support climate preparedness/resilience
 - All agencies required to develop & implement plans for integrating climate preparedness/resilience into their missions, policies, programs, investments, and grants.
 - Agency plans were released in 10-14.
- Establishing internal & external task forces on resilience
 - Interagency Council on Climate-Change Preparedness & Resilience (~30 Federal agencies) and Working Groups established (11-13)
 - State, Local, & Tribal Leaders Task Force on Climate Preparedness & Resilience, comprising 26 elected officials from across the country; delivered recommendations to the Administration (11-14)

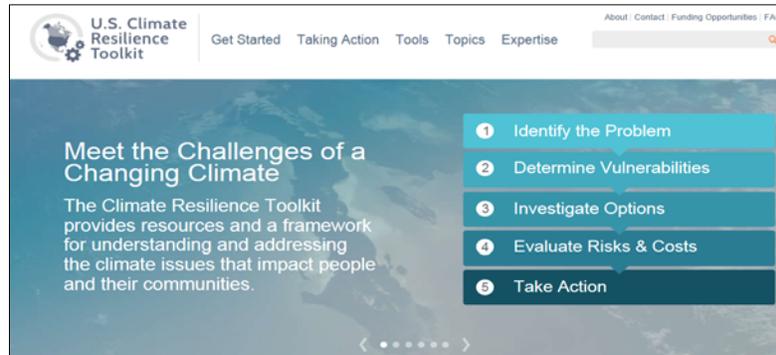
Progress: Preparing for the Impacts (continued)

- Managing flood, drought, & wildfire risks
 - National Drought Resilience Partnership (11-13)
 - 7 USDA Regional Agricultural Hubs for Climate-Change Mitigation & Adaptation (02-14)
 - USDA/ DOI National Cohesive Wildland Fire Management Strategy (04-14)
 - HUD \$1B National Disaster Resilience Competition (06-14)
 - Federal Flood Risk Management Standard (01-15)

Progress: Preparing for the Impacts of Climate Change

Mobilizing science and data for climate resilience

- Climate Data Initiative (03-14)
- 3rd U.S. National Climate Assessment (05-14)
- U.S. Climate Resilience Toolkit (11-14)



toolkit.climate.gov

Progress: International efforts

ENHANCING BILATERAL ENGAGEMENT

- **U.S.-China**

Joint Announcement in Nov. 2014:

BIG NEWS: THE UNITED STATES AND CHINA JUST ANNOUNCED NEW TARGETS TO REDUCE CARBON POLLUTION

- President Obama is setting a new target to cut U.S. carbon pollution by 26-28% below 2005 levels by 2025.
- China is committing to peak its CO2 emissions around 2030 while striving to peak early, and boost its share of non-fossil fuel energy to around 20%.

WH.GOV/CLIMATE-CHANGE #ActOnClimate

Also in announcement: Carbon storage demo, new Clean Energy Research Center track on energy-water nexus, new initiative on cities.

- **U.S. engagement with India, Mexico, Brazil, Indonesia**

Facilitated Intended Nationally Determined Contributions (INDCs)

Progress: International efforts (continued)

- Enhancing multilateral engagement

G-20: Agreement to phase out fossil-fuel subsidies and to develop a methodology for a voluntary peer-review process (09-13).

UN: Extensive engagement w/ UNFCCC process toward a new global agreement in Paris in December 2015; President Obama speech at UN Climate Summit launched major new U.S. commitments on international assistance for preparedness/resilience (09-14).

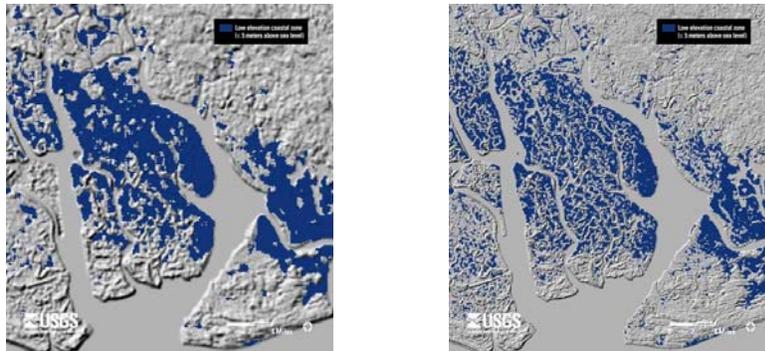
- Mobilizing clean-energy and preparedness finance

USA: \$3 billion pledge to the Green Climate Fund at G20 (11-14).

USA/UK/Germany: Global Innovation Lab for Climate Finance - public-private platform to advance next generation of climate finance instruments (06-14).

Progress: International efforts (continued)

- Increasing access to data to help countries and communities anticipate and ameliorate the impacts of climate change:
 - Downscaled climate model outputs;
 - High-resolution elevation data.



Images of the Niger River Delta based on (left) previously-available elevation data, and (right) new high-resolution data made publicly available by the U.S. in September 2014.

Progress: International efforts (continued)

- Public-Private Partnership on Climate Services for Resilient Development
 - Launched June 2015
 - Will deliver needed climate data, tools, training, and other services to help boost the resilience of developing nations.
 - Launched with \$34+ million in initial commitments from the USG and 7 other founding partners.
 - First 3 focus countries: Bangladesh, Colombia, and Ethiopia.
 - U.S.-U.K collaboration

Representatives of founding partner organizations and initial focus countries at the Climate Services for Resilient Development partnership launch event in June 2015.



Progress: Building Public Understanding & Support

- Climate Education and Literacy Initiative
 - Connect American students and citizens with best-available, science-based information about climate change
 - Increase learning opportunities
 - Enhance professional development and training
 - Provide educators with information resources

Recognizing “White House Champions of Change for Climate Education and Literacy” in February 2015.

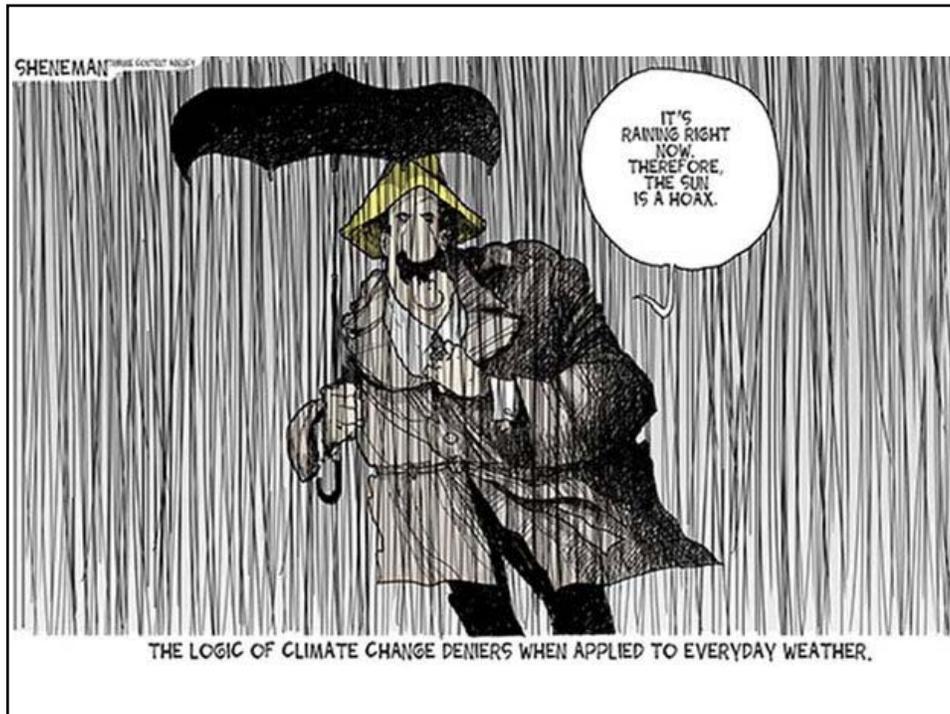


Growing understandings that will drive action

- Impacts of climate change on human health: heat stress, smog intensity, allergies, pathogens & vectors...
- Growing extremes of wet and dry: downpours/floods, droughts, wildfires (T, dryness, pests, lightning)
- Impacts outside the Arctic of accelerated climate change in the Arctic: N Hemisphere extreme weather; methane releases from tundra, permafrost, seabed
- Intersection of sea-level rise and increased storm intensity / storm surges
- Impacts of ocean heating & acidification on marine food webs and commercial & subsistence fisheries
- Other impacts on ecosystem dynamics: tropical forests, coral reefs, biodiversity/extinctions

Essential next steps for progress on climate

- Secure funding in FY16-17 Federal budgets for climate science, Earth observations, and energy technology
- Implement EPA's Clean Power Plan
- Secure a robust climate agreement in Paris
- Expand access to and usability of data and tools needed for climate adaptation, preparedness, and resilience, both domestically and internationally
- Continue to push back against contrarian claims intended to undermine public support for action



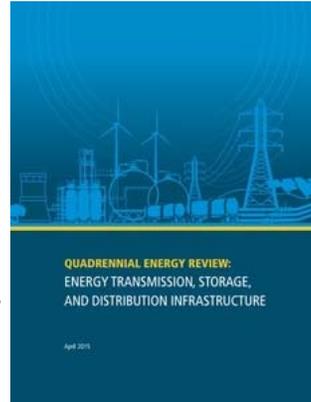
Other E&E priorities: Quadrennial Energy Review

- First proposed by PCAST in November 2010
- Now part of the President's Climate Action Plan
- Four-year cycle of assessments to provide a multi-year roadmap for U.S. energy policy
- Drawing on quadrennial DOE energy-technology assessments, QER is an interagency effort overseen by OSTP & DPC and supported by secretariat at DOE.
- "Moving spotlight": annual installments have different focuses, leading up to quadrennial synthesis
- First report focused on energy infrastructure for transmission, storage, and distribution (TS&D)

Quadrennial Energy Review (continued)

Key findings of the April 2015 installment

- Current energy infrastructure challenged by:
 - Changes in energy supply, markets, and end-use patterns
 - Problems of aging and capacity
 - Effects of climate change
 - Cyber and physical threats
- Infrastructure vulnerabilities may be exacerbated by increasing interdependencies of energy and other systems (e.g., water, telecommunications, transportation, emergency response)



Quadrennial Energy Review (continued)

Focuses of recommendations in the April 2015 installment

- Ensuring the resilience, reliability, safety, and asset security of TS&D infrastructure
- Modernizing the electric grid
- Modernizing U.S. energy security infrastructures in a changing global marketplace
- Improving shared transport infrastructures
- Integrating North American energy markets
- Addressing environmental aspects of TS&D infrastructure
- Enhancing employment and workforce training
- Siting and permitting of TS&D infrastructure

Other E&E priorities: National Ocean Policy

- E.O. 13547 (July 2010) established the first National Ocean Policy and created the interagency National Ocean Council (NOC) to implement it.
 - Intended to ensure a comprehensive, collaborative framework for ocean stewardship and to facilitate Federal collaboration with State, Tribal, and local authorities and stakeholders.
 - Co-chaired by OSTP & CEO.
 - Supports regional marine planning.
 - Provides a mechanism for public input.
 - Leverages interactions with climate initiatives.



President Obama signs the 2010 Executive Order establishing the National Ocean Council.

National Ocean Policy (continued)

- Science-based marine planning aims to:
 - Address specific ocean management challenges
 - Advance goals for economic development & conservation
 - Improve planning/regulatory efficiencies and decrease
 - Engage affected communities and stakeholders
 - Preserve ecosystem functions and services
 - Provide participation opportunity for states, tribes, and other stakeholders



Map of regional planning areas

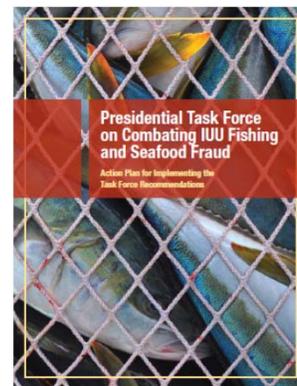
National Ocean Policy (continued)

- In 2013 the NOC released the National Ocean Policy Implementation Plan, outlining 214 actions for achieving goals.
- In March 2015 the NOC issued its first report on progress implementing the National Ocean Policy.
- Of the 214 actions:
 - About 1/3 are complete
 - Another 40+ percent are making excellent progress
 - 4% are yet to be started
- Mid-Atlantic & Northeast Regional Planning Bodies to deliver a Marine Plans by the end of 2016.



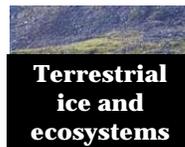
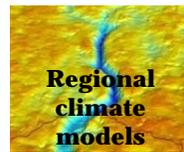
National Ocean Policy (continued)

- In May 2015 the NOC agreed on near-term Administration priorities in ocean policy (to result in tangible deliverables by December 2016):
 - Illegal, unreported, unregulated (IUU) fishing and seafood fraud
 - Harmful algal blooms (HABs) and hypoxia
 - Ocean acidification
 - Further progress on marine planning



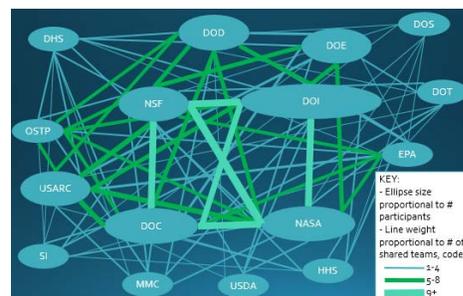
Other E&E priorities: Arctic science

- Interagency Arctic Research Policy Committee (IARPC)
 - Sits under environment committee of NSTC and is co-chaired by NSF and OSTP
 - Works to enhance scientific monitoring of and research into Arctic environmental issues
 - In 2013, IARPC released 5-year Arctic research plan, including seven key research areas:



Arctic science: Arctic Executive Steering Committee

- AESC created by EO ("Enhancing Coordination of National efforts in the Arctic") in January 2015.
- OSTP chairs, NSC has vice chair.
- Members are the 20+ departments, agencies, and offices with responsibilities in the Arctic.
- AESC aims under the EO are to:
 - Help shape & reconcile priorities
 - Promote coordinated implementation & evaluation
 - Improve coherence of engagement with the State of Alaska and Alaska Native communities
 - Support U.S. Chairmanship of the Arctic Council



Interagency interactions in Arctic research

US Chairmanship of the Arctic Council 2015-2017



Working Groups of the Arctic Council

Arctic Monitoring and Assessment Program



Conservation of the Arctic Flora and Fauna



Protection of the Arctic Marine Environment



Emergency Prevention, Preparedness and Response



Arctic Economic Council



Sustainable Development Working Group



Arctic Science (continued)

- August/September 2015: POTUS trip to Anchorage and the Alaskan Arctic
 - GLACIER Conference (Global Leadership in the Arctic: Cooperation, Innovation, Engagement and Resilience) drew representatives from 22 nations.
 - The President underscored the role of the Arctic in climate change with a major speech visits to:
 - Exit and Bear Glaciers in Seward
 - Communities of Dillingham and Kotzebue



President Obama speaking at the GLACIER Conference

Other E&E priorities: water science and technology

- Interagency coordination of RD&D of S&T to support:
 - Sensors and other tools for monitoring and data collection
 - Modeling and forecasting
 - Treatment and distribution
- Water-Energy-Food Nexus – S&T to support:
 - Integrated decision making at Federal, state and local levels to enable responsible stewardship of our natural resources
 - Ongoing and proposed Nexus initiatives within the Federal agencies



Other E&E priorities: space weather

- Space Weather Operations, Research, and Mitigation Task Force (NSTC)
 - National Space Weather Strategy (released last week)
 - [Articulates strategic goals for enhancing preparedness for a severe space weather event](#)
 - Space Weather Action Plan (also released last week)
 - [Establishes a process to implement the Strategy](#)
- Effort also include bilateral U.S.-U.K. workshops on aviation, electric infrastructure, communications, etc.

Space weather illustrated

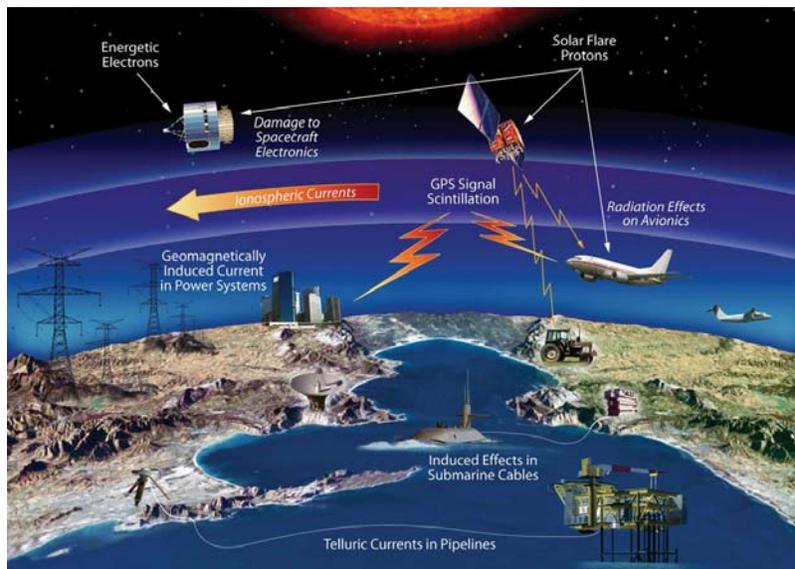


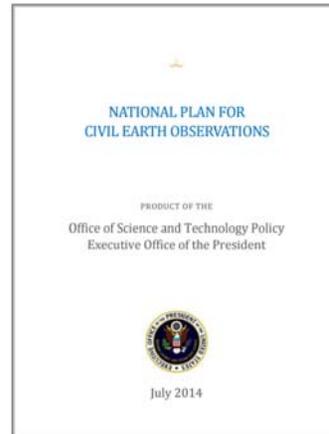
Illustration of technological infrastructure affected by space weather events. Source: NASA.

Other E&E priorities: S&T for natural hazards

- Policy makers and planners need geoscience to enhance resilience.
- They need, for example:
 - Ice core studies to contextualize climate trends
 - Geomorphology to anticipate human impacts
 - Geology to understand where earthquake and volcanic risks lie
 - Critical Zone studies to help with soil ecosystems
 - Sediment studies for landslide risks

Other E&E priorities: Earth observations

- OSTP's E&E Division works through U.S. Group on Earth Observations to:
 - Coordinate Federal Earth observations with domestic stakeholders
 - Improve Federal data management and interoperability
 - Coordinate U.S. participation in the International Group on Earth Observations



Research Funding for the Geosciences

- Appropriations bills to date reflect the apparent view of some in Congress that support for Earth observations and geosciences equates to support for the President's climate-change policies.
- This stance is misguided: we need robust Earth observations and geosciences research irrespective of whether climate is changing and irrespective of policy preferences around energy and environment.
- This Administration will continue to oppose meat-axe cuts to Earth observations and geosciences, as well as inappropriate Congressional intrusion into our science agencies' gold-standard peer-review processes.
- The geosciences community can help by telling policy-makers and the public about how and why investments in these domains matter to the well-being of the Nation, with concrete examples.



<http://www.ostp.gov>