

Science & Technology in the White House: What Did Obama Do? What Is Trump Doing?

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(January 2009 – January 2017)

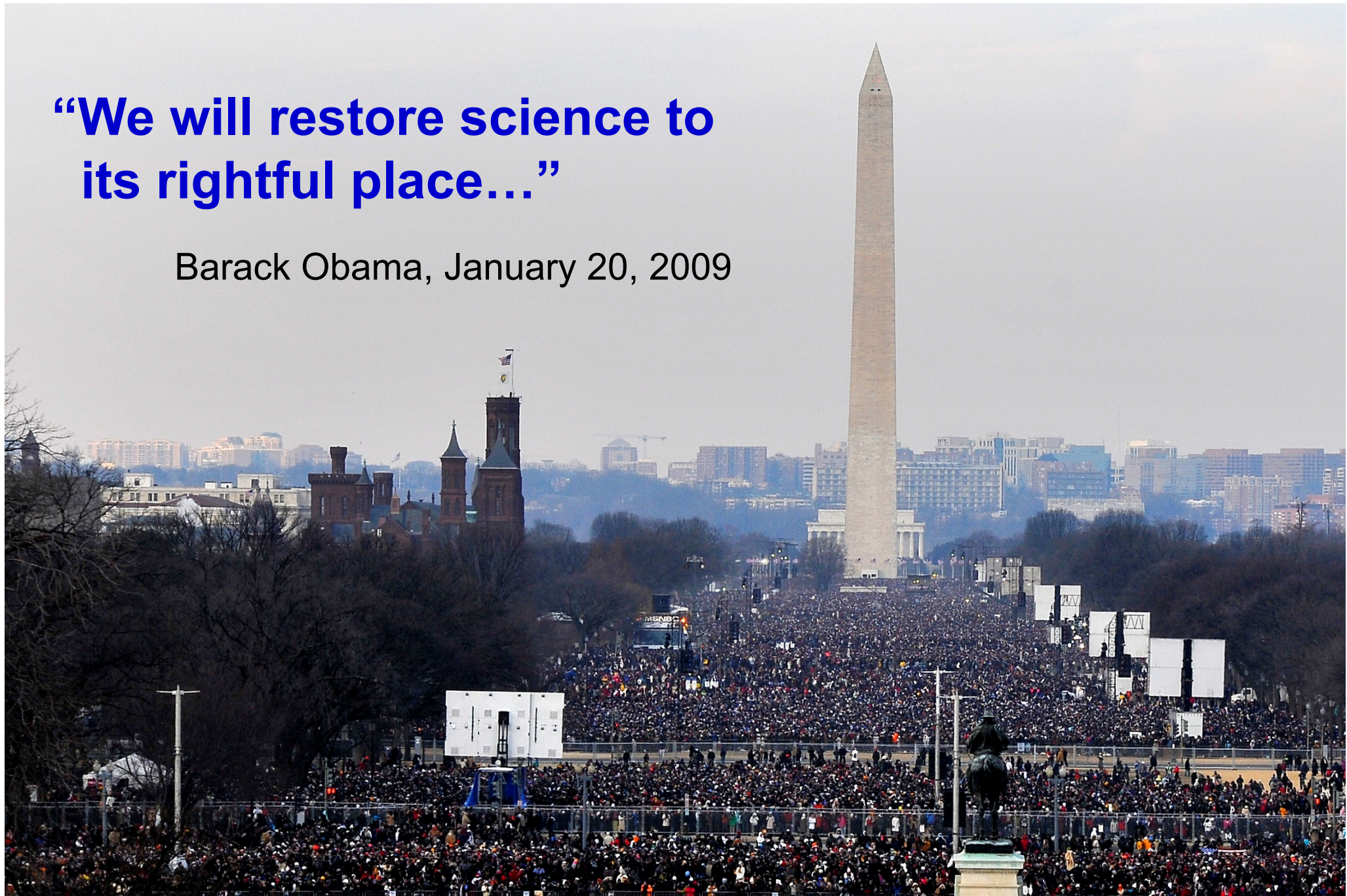
**Remarks for the
Harvard Science Policy Group**

HMS/

Longwood • June 27, 2017

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

Barack Obama, January 20, 2009



The place of S&T on the national 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 government in S&T

- Most basic research in natural & social sciences is done in universities, with funding provided mainly by the Federal gov't.
- Most applied R&D is funded & performed by private firms, but Federal and state & local gov't have important roles in shaping the policies that encourage or discourage private-sector R&D.
- It's also government's role to devise & implement programs to bring S&T to bear on public goods not adequately addressed in the marketplace—security, health, environment, justice ...

The place of government in S&T (continued)

- The crucial task of STEM-education at the K-12 levels is part of the overall education responsibilities that reside mainly with states and local school boards, but
 - Federal programs & incentives play a role, and
 - corporate and philanthropic partnerships with states and school districts are becoming more important.
- Colleges & universities, schools, and corporations are all working ever more closely together to improve STEM education and worker training.

Policy for S&T in the Federal gov't...

- is a shared responsibility of the Congress and the Executive Branch.
- Overarching Congressional S&T authority is in House Science, Space, & Technology; Senate Commerce, Science & Transportation; and relevant appropriations committees & subcommittees.
- But many other committees also have S&T roles...
 - HOUSE: Agriculture; Armed Services; Energy & Commerce; Natural Resources; Transportation & Infrastructure
 - SENATE: Agriculture, Nutrition, & Forestry; Armed Services; Energy & Natural Resources; Environment & Public Works; Health, Education, Labor, & Pensions

Key executive branch S&T actors

- Dept of Defense (DDR&E, DARPA, NSA)
- Dept of HHS (NIH, CDC, FDA)
- Dept of Energy (NNSA, Office of Science, ARPA-E)
- NASA
- National Science Foundation
- Dept of Agriculture (ARS, NIFA)
- Dept of Commerce (NOAA, NIST, PTO)
- Dept of Interior (USGS)
- Environmental Protection Agency
- Dept of Homeland Security
- Dept of State (OES)

History of science advice to the President

- Office of Scientific R&D (OSRD, 1941-47)

Headed by Vannevar Bush, reporting directly to FDR and widely considered the first official “Science Advisor to the President”.

- Ad hoc advisory boards based in DoD (1947-57)

Army & Navy R&D Board; then Science Advisory Committee (SAC) to the Office of Defense Mobilization; the directors were closest thing to science advisors to Truman & Eisenhower in these years.

- President’s Science Advisory Committee (PSAC, 1957-73)

Eisenhower converted SAC to PSAC, moved it to the White House, and in 1959 created a new White House Office of S&T (OST) to support it. The OST Director served as PSAC Chair & was known as “the President’s Science Advisor”. This model persisted through Kennedy, Johnson, & Nixon until 1973.

History of science advice to POTUS (continued)

- OST & PSAC dissolved (1973-76)

Nixon fired his science advisor & dissolved both OST & PSAC in 1973, transferring functions to NSF & the Nat'l Security Council.

- Office of Science & Technology Policy (OSTP, 1976--)

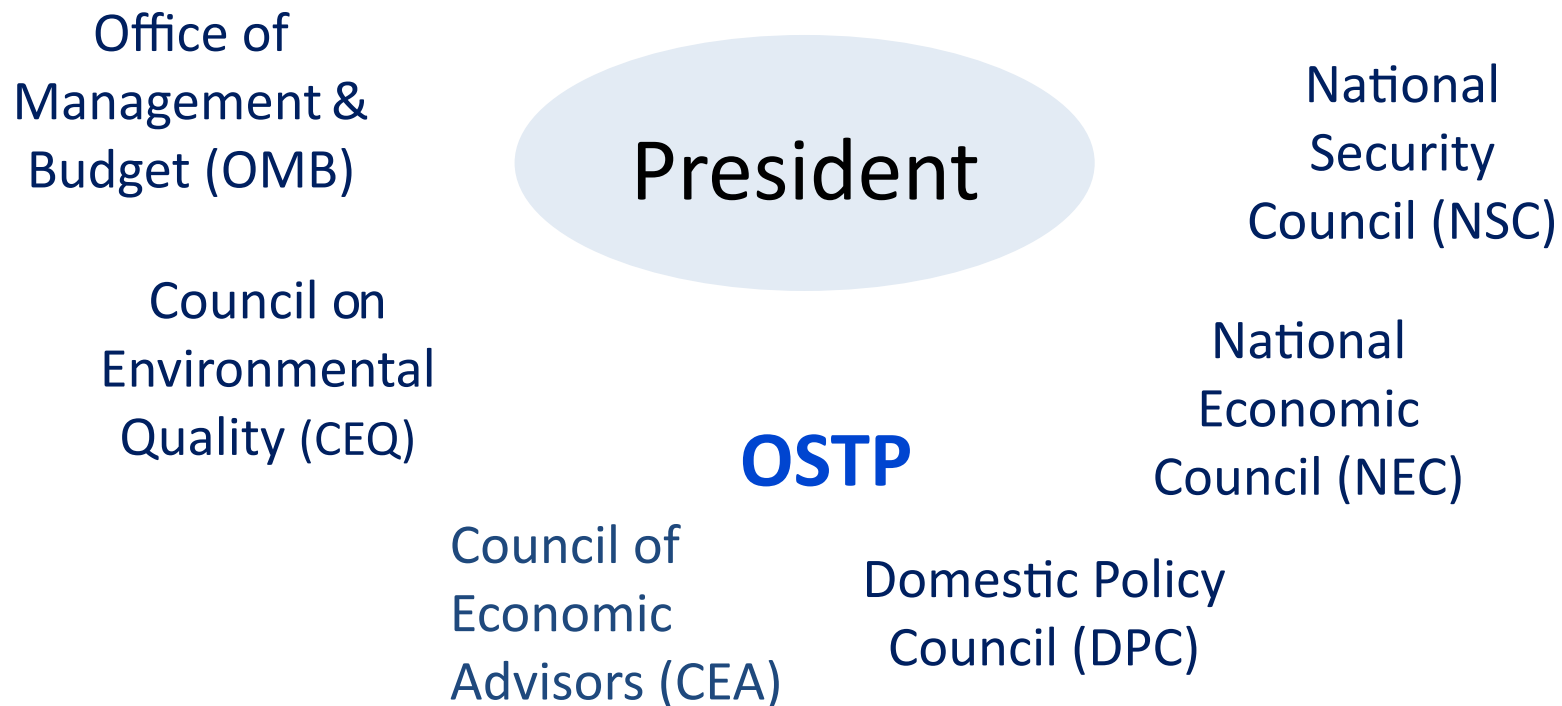
Ford got Congress to create OSTP by statute, gaining stability but entailing Senate confirmation of the Director & Assoc Directors.

- PSAC reinvented as PCAST (1990)

Neither Ford nor Carter appointed a PSAC, relying just on their science advisor and ad hoc panels. Reagan's 1st science advisor created a Science Advisory Council reporting to him, not the President, in 1981. The equivalent of PSAC was not restored until George H. W. Bush created the President's Council of Advisors on S&T (PCAST) in 1990 by Executive Order.

The Place of S&T in the Obama White House

...remained centered in OSTP, with the Director dual-hatted as Assistant to the President for S&T (APS&T).

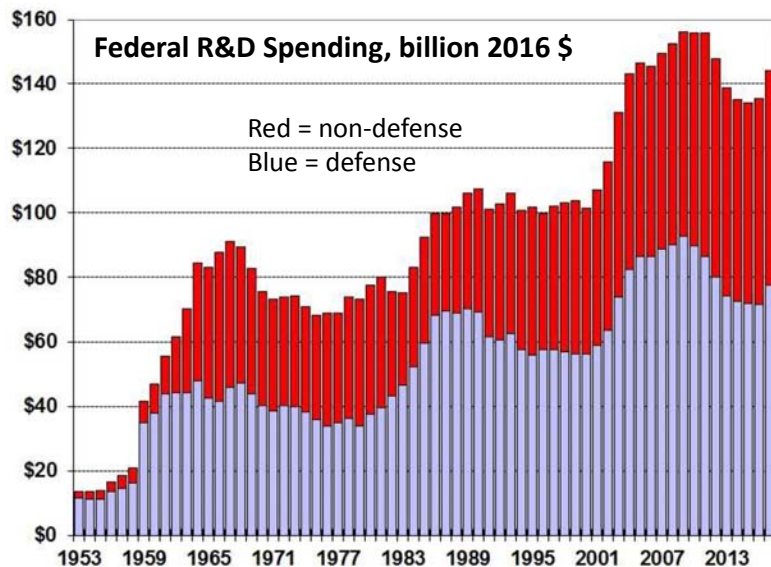


EOP also includes Offices of: Vice President, Chief of Staff, Cabinet Affairs, Communications, Intergovernmental Relations, Public Engagement, Social Secretary, US Trade Representative, and more. The Office of Energy & Climate Change sits in DPC.

The 3 responsibilities of the APS&T and OSTP Director



1. Science and technology for policy
Independent advice for the President & heads of other White House offices, providing whatever facts/insights about S&T may be germane to the policy issues with which they are concerned.



2. 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; scientific integrity & transparency; S&T to improve gov't operations.

Three responsibilities (continued)

3. Serving as the President's S&T emissary

Representing the President on S&T issues with other White House officials, Exec Branch agencies with S&T roles, Congress, the nongovernmental S&T community nationally & internationally, and foreign govt officials.



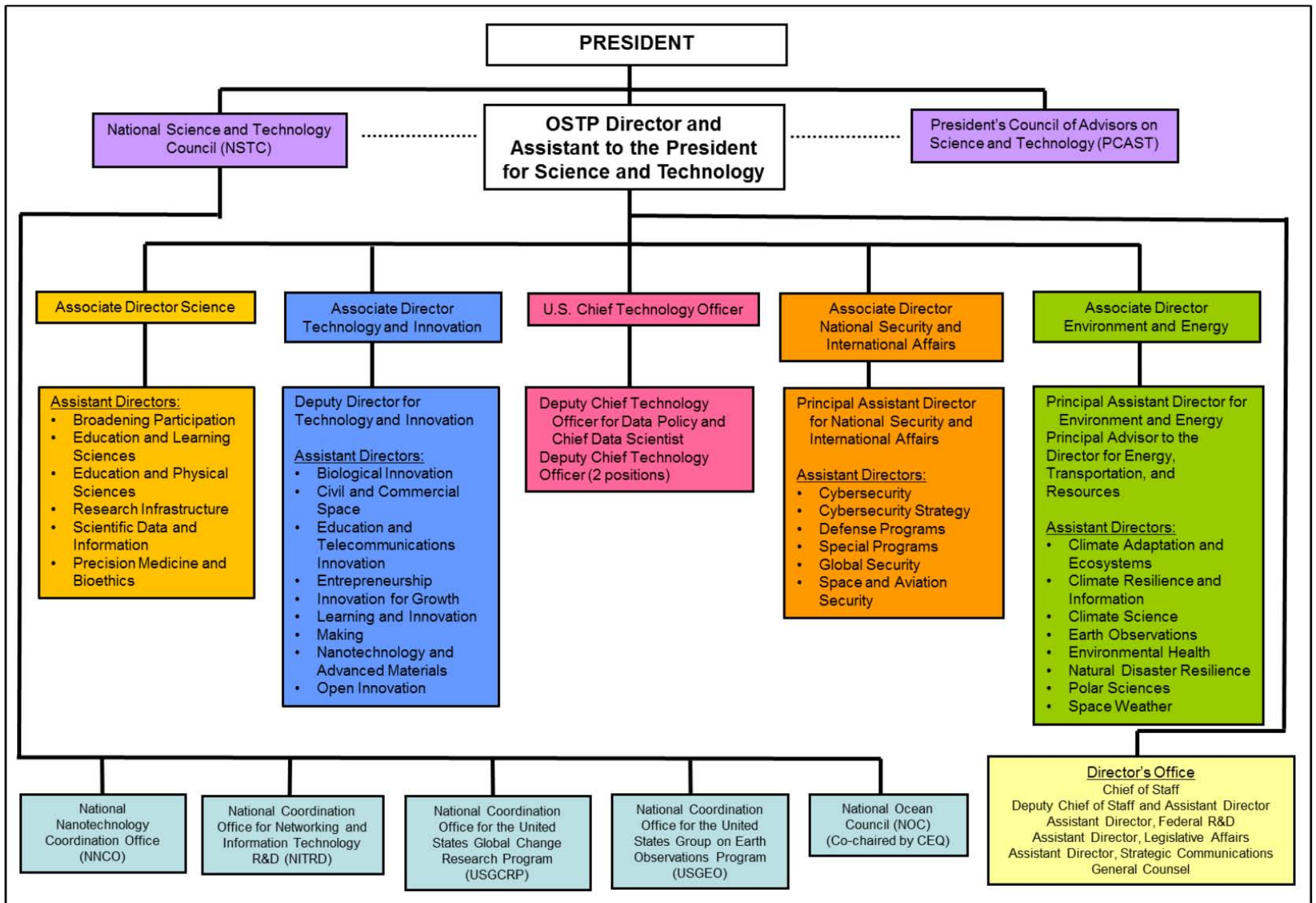
As part of these responsibilities, the OSTP Director and his team...

- provide White House oversight for NSF and NASA
- chair & manage the interagency National S&T Council (NSTC) and oversee its initiatives (e.g. USGCRP, NNI)
- chair & support the Arctic Executive Steering Committee
- co-chair & support the National Ocean Council & the Council on Climate Preparedness & Resilience
- co-chair & support the President's Council of Advisors on Science & Technology (PCAST);
- implement ministerial-level bilateral S&T agreements with Brazil, China, India, Japan, Republic of Korea, and Russia

Putting science “in its rightful place” in the Obama White House entailed...

- appointing the first-ever U.S. CTO, CIO, and CDS
- restoring the Ass't to the President title to the OSTP Director and bestowing it on the CTO
- restoring the full complement of 4 OSTP Assoc Directors
- building up the OSTP staff from 45 to 135
- directing that his S&T officials of appropriate rank be always “at the table” for policy discussions where insights about S&T might be germane
- quickly launching & empowering a new PCAST (with 3 science Nobel Laureates, 2 university presidents, the VPs of the NAS & NAE, the Chairman of Google...)

OSTP Organization Under President Obama



The Role of the President's Council of Advisors on Science and Technology (PCAST)

- PCAST's function is to provide an additional high-caliber source of independent S&T advice for the President, drawing on the expertise of the national S&T community.
- All but one of the ~20 members are leading scientists, engineers, and innovators who are appointed by the President to advise him on a part-time, pro bono basis from their positions in academia, government, and civil society.
- The other member, who serves as one of 2 or 3 co-chairs, is the Assistant to the President for S&T / OSTP Director.
- Administrative support for PCAST is provided by an Executive Director and two deputies housed in OSTP. OSTP also provides technical support for PCAST studies.



POTUS with his Council of Advisors on Science and Technology (PCAST) after announcing the members at the National Academy of Sciences Annual Meeting, 27 April 2009

PCAST studies in the Obama Administration, 2009-2017

- The science and technology of 2009-H1N1 influenza
- Reengineering the influenza vaccine production enterprise
- Assessment of the National Nanotechnology Initiative (4 reports)
- STEM education & workforce training (4 reports)
- Accelerating the pace of change in energy technologies
- Realizing the full potential of health IT to improve healthcare
- Networking and Information Technology R&D (4 reports)
- Advanced manufacturing (3 reports)
- Sustaining biodiversity and other environmental capital
- Managing government-owned spectrum for economic growth
- Accelerating drug development and approval
- The future of the US S&T enterprise
- Near-term options for addressing climate change
- Agricultural preparedness and related R&D

PCAST studies 2009-2017 (continued)

- Bolstering cybersecurity (1 unclassified & 1 classified report)
- Systems engineering for healthcare
- Technological aspects of big data and privacy
- Technology for graceful aging (2 reports)
- Technology and the future of cities
- Private-sector adaptation to climate change
- Forensic science in the criminal courts (1 report + addendum)
- Protecting the Nation against biological attack
- S&T to ensure the safety of the Nation's drinking water
- Ensuring long-term U.S. leadership in semiconductors



POTUS loved meeting with PCAST and translated much of its advice into policy.

What else Obama did to keep his pledge

- Placed early priority on...
 - scientific integrity
 - open data & public access
 - STEM education & inclusion
 - clean energy & climate change
 - advancing biomedicine & public health
 - strengthening international cooperation in S&T
 - tech innovation for economic recovery & growth
 - rebalancing NASA to boost science, advanced tech
 - exploiting modern IT & private-sector innovation talent to improve the responsiveness & effectiveness of gov't

Keeping the pledge (continued)

- Used bully pulpit & WH venue to promote S&T
 - Talked about S&T in both inaugural addresses & every State of the Union, two addresses to NAS annual meetings; multiple S&T-focused major speeches around the country (on space exploration, energy, advanced manufacturing, biomedicine...)
 - Hosted 6 White House Science Fairs; 2 WH Astronomy Nights for Kids; East Wing ceremonies & Oval Office welcomes for Medalists of Science and Technology & Innovation, US Nobelists & Kavli Prize winners, Intel finalists, middle-school mathletes, outstanding teachers...

POTUS events around STEM-ed and ST&I



1st WH Astronomy Night for Kids



Mathletes in the Oval Office



1st WH Science Fair



Honoring outstanding K-12 science teachers



Visiting MIT's Energy Lab

Keeping the pledge (continued)

- Launched unprecedented number of S&T initiatives using public-private-academic partnerships to make progress on national & global challenges, including:
 - S&T for economic recovery & sustainable growth;
 - STEM education;
 - info technology / connectivity, advanced computing;
 - biomedicine & public health;
 - nat'l & homeland security;
 - international S&T cooperation;
 - energy & environment.

S&T initiatives on nat'l & global challenges

INNOVATION FOR THE ECONOMY

- American Innovation Strategy
- Startup America
- Materials Genome Initiative
- Data.gov
- Challenge.gov
- Advanced Mfg Partnership / Nat'l Network for Mfg Innovation

STEM EDUCATION

- Educate to Innovate
- STEM Master Teacher Corps
- 100kin10
- STEM Inclusion Initiative
- Computer Science for All

INFOTECH / COMPUTING

- ConnectED
- Big Data Initiative
- Nat'l Strategic Computing Initiative

BIOMEDICINE & HEALTH

- Neuroscience / BRAIN Initiative
- Combating Antimicrobial Resistance
- Precision Medicine Initiative (PMI)
- Cancer Moonshot

NAT'L SECURITY / INTERNAT'L S&T

- Cybersecurity Initiative
- Space Weather Strategy
- Science Envoys
- Mission Innovation

ENERGY & ENVIRONMENT

- New fuel-economy/CO₂ standards
- ARPA-E, Energy Innovation Hubs
- Climate Action Plan & COP21
- National Ocean Policy
- Arctic Initiative / AESC
- Pollinator Initiative
- Valuation of ecosystem services

The energy-environment nexus: 1st-term

- \$80 billion for clean & efficient energy in the Recovery Act
- \$100s of millions for Advanced Research Projects Agency-Energy (ARPA-E) and six new Energy Innovation Hubs
- first-ever fuel-economy/CO₂ tailpipe standards for light-duty vehicles, plus fuel-economy standards for trucks
- multiple building & appliance energy-efficiency stds
- interagency task force led by OSTP, CEQ, NOAA to coordinate govt's climate-adaptation activities
- re-invigoration of USGCRP; launch of new NCA
- 1st govt calculation & use of Social Cost of Carbon
- 1st National Oceans Policy & National Oceans Council

President Obama signing the National Oceans Policy Executive Order (19 July 2010)



The energy-environment nexus: 2nd-term

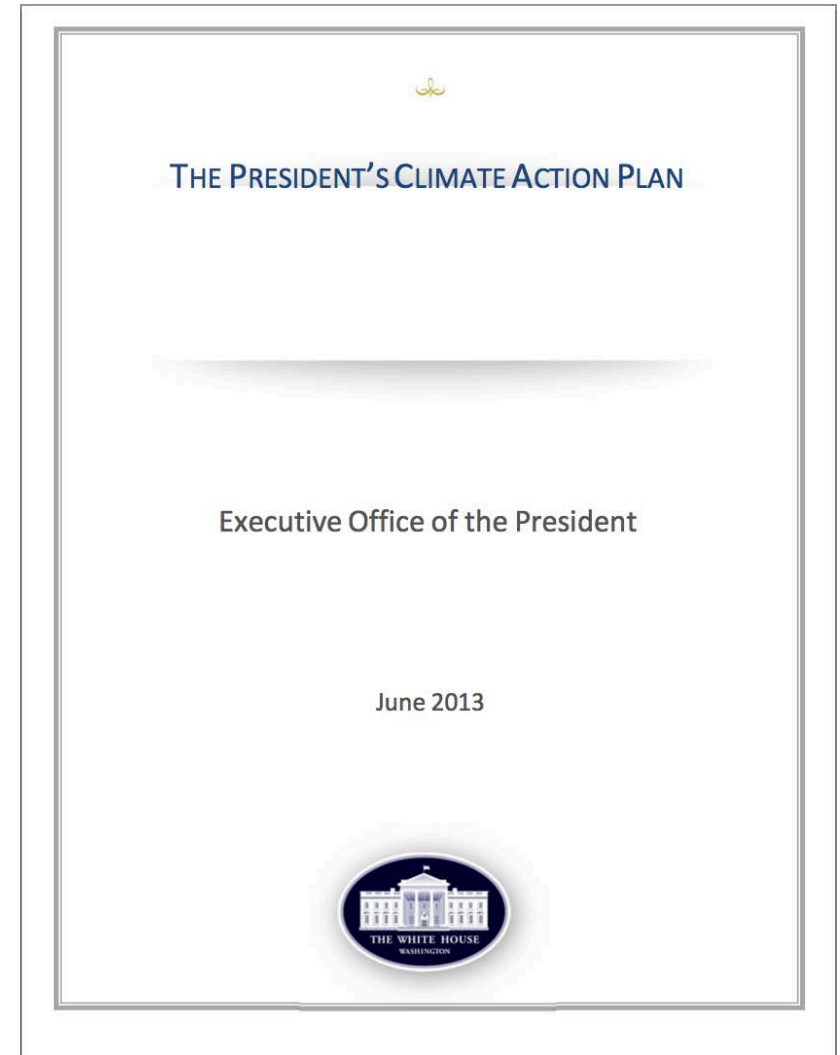
- Unprecedented nat'l & internat'l coordination on Arctic science, conservation, energy, indigenous people's issues
- National Ocean Policy implementation
 - development of 1st two of eight Regional Marine Plans
 - offshore drilling banned in much of U.S. Atlantic coastal waters as well as much of U.S. Arctic waters
 - US marine protected areas (MPAs) hugely expanded in both Atlantic and Pacific
- International “Our Oceans” conferences (3) with progress on illegal fishing, marine pollution, ocean acidification, and marine protected areas
- The Climate Action Plan: launch & implementation

The 2nd term: Obama's Climate Action Plan



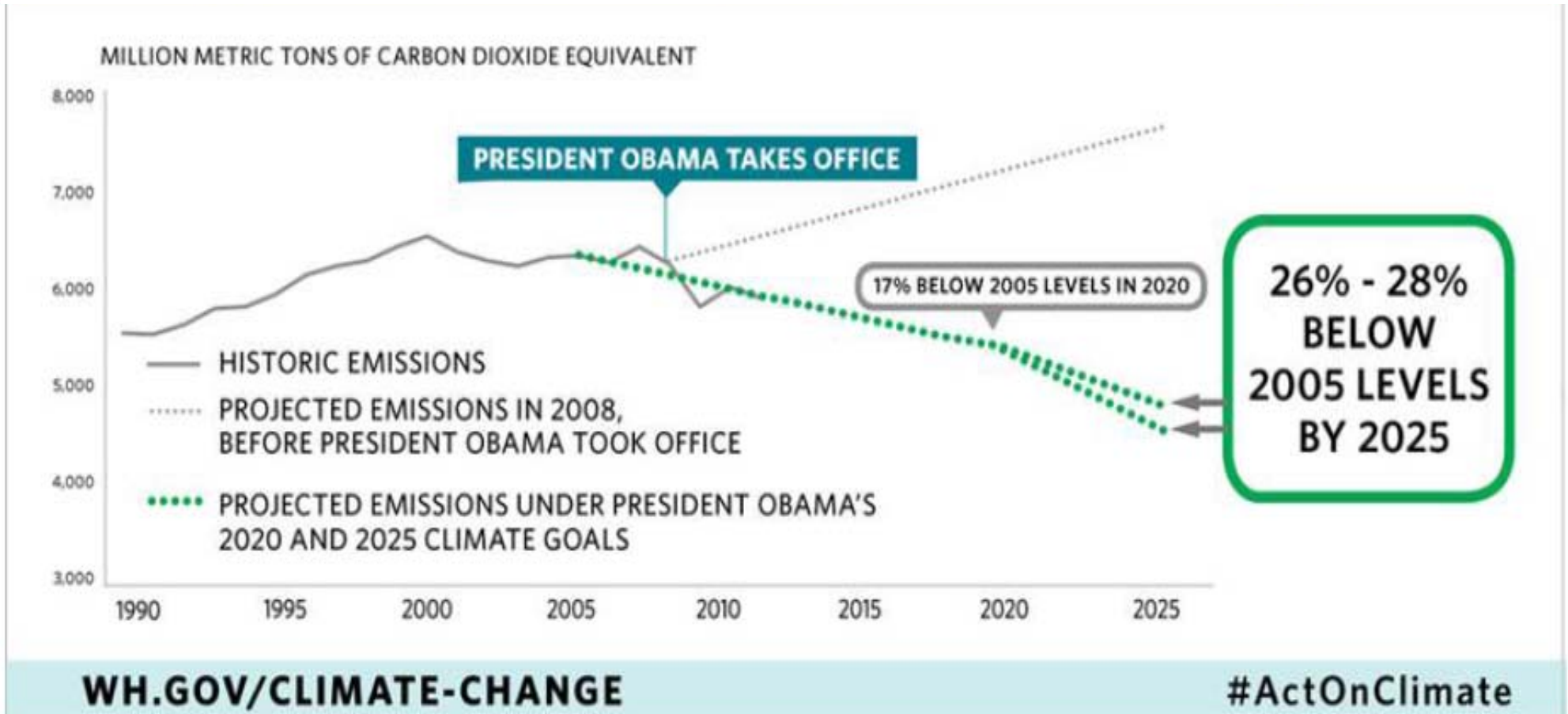
Georgetown University, June 2013

- Cutting carbon pollution in America (mitigation)
- Preparing the United States for the impacts of climate change (adaptation)
- Leading international efforts to address climate change



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

The U.S. emission target for 2025 announced by President Obama in Beijing in Nov 2014



What will Trump do?

Challenges evident from the outset

- Keeping “science in its rightful place” a la Obama
...particularly cultivation & use of STEM talent in gov’t, evidence-based decision-making, scientific integrity & transparency, public access to Federal research, and Federal support for STEM education
- Avoiding reversal of Obama initiatives in the Arctic, the oceans, and public lands
...which are endangered by Trump stances, appointees
- Advancing U.S. & global climate science & policy
...in the face of threats to monitoring from space, in the atmosphere & ocean, on land & ice; Federal climate data, assessments, and tools for preparedness & resilience; climate education: clean-energy RD&D; EPA authority; and U.S. climate-policy leadership globally

Challenges evident from the outset (continued)

- Sustaining support for S&T under likely budget cuts

Particularly difficult will be avoiding deep cuts for...

- NASA (Earth observations, STEM-education...)
- NOAA (climate data, polar-orbiting satellites...)
- DOE (clean energy, energy efficiency, fusion...)
- NSF (basic research, social science)
- EPA & FDA (research in support of regulation)
- USGCRP (climate science, sustainability science)
- international cooperation in S&T

NIH funding is less contentious politically but still will be difficult to sustain if Congress honors Trump's budget pledges (boost defense, \$1T for infrastructure, no cuts for SS or Medicare...)

What Trump has done (or proposed) so far

- Appointment of evidence-averse ideologues to key posts
- Roll-back or “re-examination” of Obama EOs
 - Clean Power Plan, coal-plant NSPS, methane strategy
 - Social Cost of Carbon, consideration of climate change in NEPA
 - Climate-change preparedness EOs: USA and international
 - Expansion of Federally protected lands & waters
- Cuts in non-defense R&D (\$14B≈20%)
 - \$6 billion (20%) at NIH; \$1.6B (11%) at DOE Energy R&D; \$800M (11%) at NSF; \$600M (42%) at USDA Agriculture Research Service; \$200M (47%) at EPA S&T
- Cuts in climate-change monitoring & analysis
 - Zeroing Earth-observation functions of DISCOVER (NASA)
 - Zeroing OCO-3, PACE. and CLARREO missions (NASA)
 - Cutting ocean grants & programs by \$250M (NOAA)

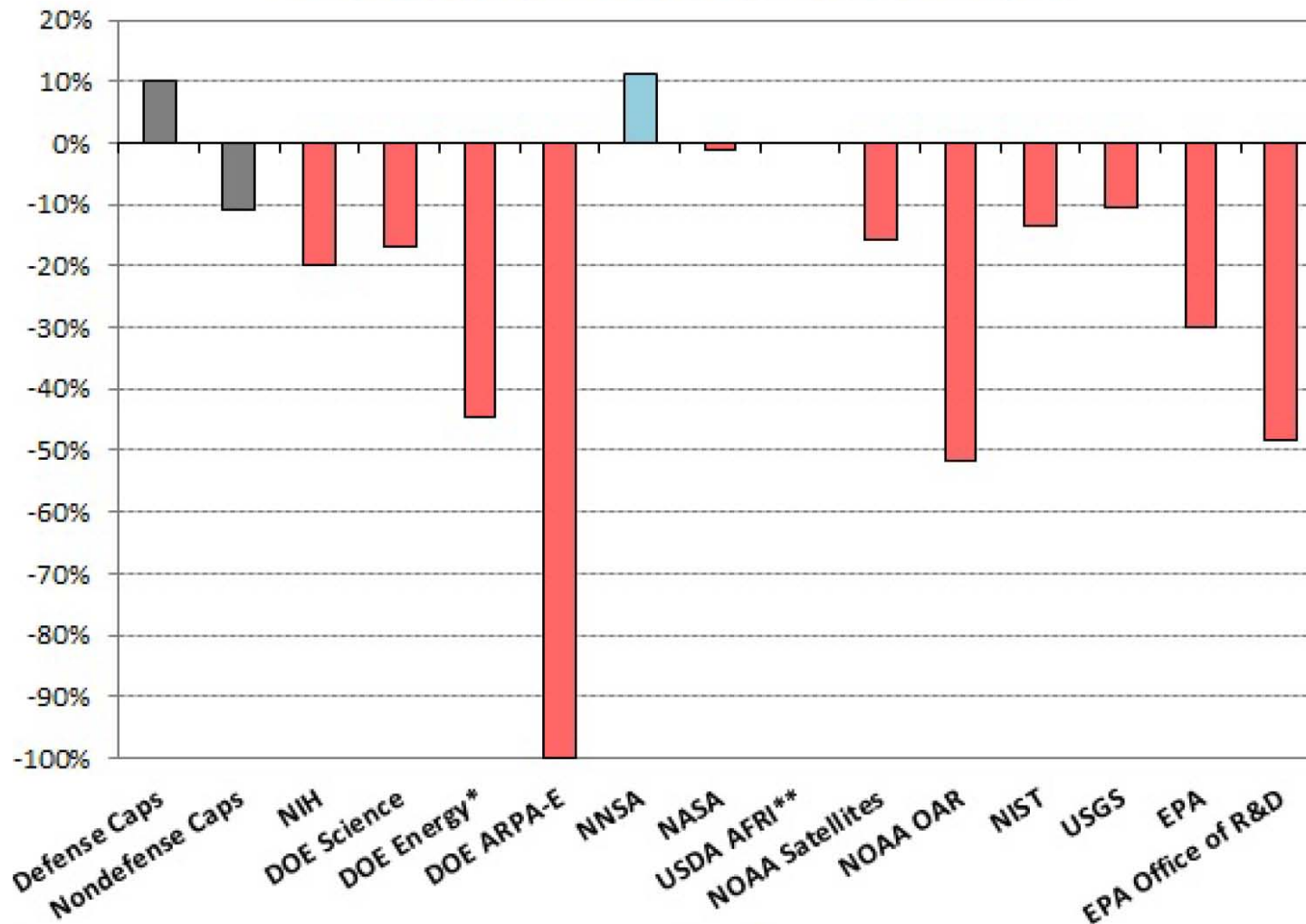


What Trump has done (or proposed) so far

Agency S&T Budgets

Trump

proposed FY18 versus FY16 (% change in nominal dollars)



*Includes renewables and efficiency, nuclear, fossil, grid research. **Flat-funded in FY18 request.

NOTE: FY 2016 is used as a baseline given lack of final FY 2017 appropriations.

Based on initial AAAS assessment of the FY 2018 budget summary and past agency budget data. March 16, 2017 | AAAS

What Trump has done (or proposed) so far

Environment and energy

The Washington Post

Energy and Environment

Trump is poised to issue a sweeping order dismantling Obama's climate plan this week

Energy and Environment

New EPA documents reveal even deeper proposed cuts to staff and programs

Energy and Environment

Trump administration halts Obama-era rule aimed at curbing toxic wastewater from coal plants

By Brady Dennis April 13

The Washington Post

Energy and Environment

Trump aims deep cuts at energy agency that helped make solar power affordable

Scientists Fear Climate Data Gap as Trump Aims at Satellites

By HENRY FOUNTAIN APRIL 10, 2017

SATURDAY, APRIL 15, 2017 • THE WASHINGTON POST

EPA chief calls for 'exit' from Paris climate accord

MONDAY, APRIL 17, 2017 • THE WASHINGTON POST

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Suggestions from industry hold clues to Trump's rollbacks

What Trump has done (or proposed) so far

Transparency & integrity in government

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EZ RE

THE WASHINGTON POST · SATURDAY, APRIL 15, 2017

Trump will keep list of White House visitors secret

With Trump Appointees, a Raft of Potential Conflicts and 'No Transparency'

By ERIC LIPTON, BEN PROTESS and ANDREW W. LEHREN APRIL 15, 2017



Newsweek



U.S.

THE 'SWAMP' DONALD TRUMP PROMISED TO 'DRAIN' IS GROWING AGAIN

BY EMILY CADEI ON 2/8/17 AT 9:00 AM



COVER STORY

The many times Donald Trump said he'd release his tax returns

BY JASON SILVERSTEIN FOLLOW

NEW YORK DAILY NEWS Sunday, April 16, 2017, 12:50 PM

↓

Trump Won't Release His Tax Returns, a Top Aide Says

By JULIE HIRSCHFELD DAVIS JAN. 22, 2017

What President Trump has not done

- Appointed an OSTP Director / Assistant to POTUS for S&T or made clear that he intends to do so
- Appointed a NOAA Administrator, a
NASA Administrator, or a
DOE Chief Scientist, or a
USGS Director, or a
CDC Director, or most
of the Under Secretaries and Assistant Secretaries with
S&T responsibilities
- Given any other indication of awareness of the role of
science in government or the role of government in
science

Looking Forward: What should we do?

What should states, communities, businesses, philanthropists, scientists, & opinion leaders do?

- States, communities, businesses, & philanthropists should do their best to fill gaps in federal gov't support for R&D, evidence-based analysis, and climate-change mitigation & adaptation.
- Scientists should...
 - seek replacement funding for their research as needed from the above sources & international organizations;
 - get better at telling stories to general audiences about how & why investments in S&T contribute to societal well-being.
- Opinion leaders should refine their ability to explain how policies that ignore evidence damage the nation and the world.
- All should let Congress & President Trump know that abdicating U.S. government leadership in S&T and S&T policy (see especially basic research, biomedical research, clean-energy technology, & climate-change policy) is folly.