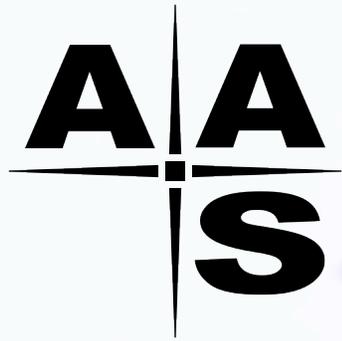


Austerity In the Age Of Innovation

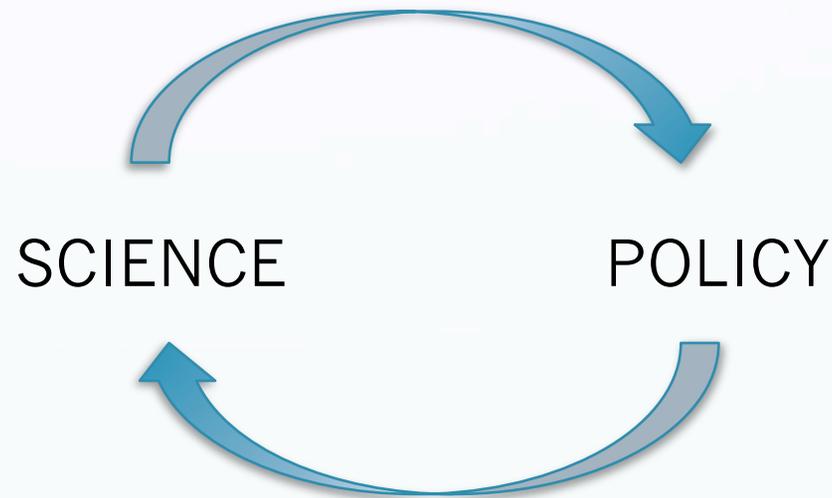
Bethany Johns
John Bahcall Public Policy Fellow
American Astronomical Society
June 10, 2011
IPPW-8



American Astronomical Society

- Enhance and share humanity's scientific understanding of the Universe
- Largest professional membership organization for astronomy and closely related fields
- More than 7600 members with 1500 international members.
- 5 specialized divisions, including Division for Planetary Science (DPS)

What is Science Policy?



- Examples: Climate Change and Energy, Stem Cell Research, Innovation, and STEM Education

Policy on Capitol Hill

Authorization Committees

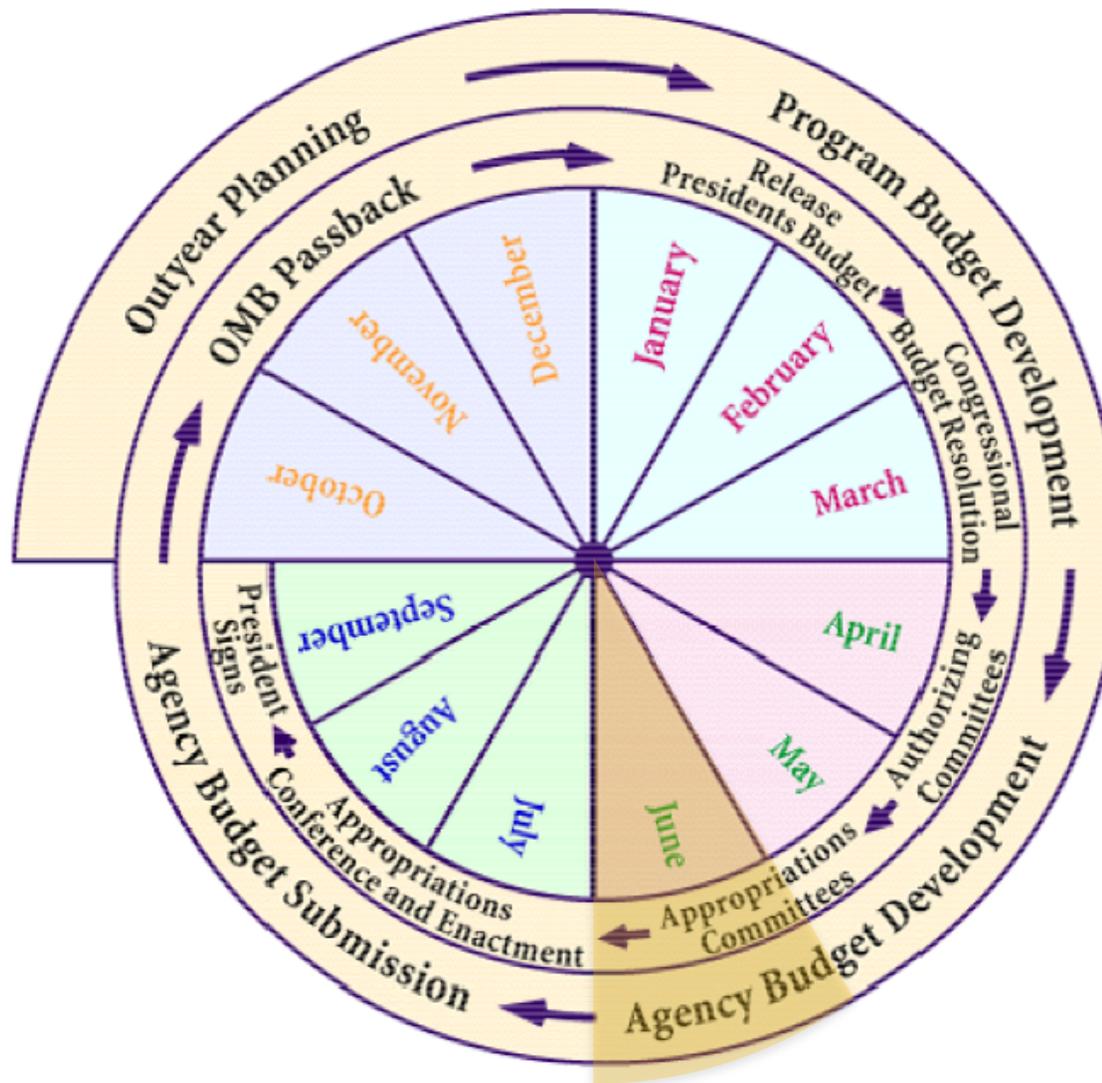
vs

Appropriation Committees

- Oversight of Depts. & Agencies: provide policy direction, permit new programs, recommend funding
- Provide the actual funding for government programs and agencies on an annual basis

| | Authorizing Committee | Appropriations Subcommittee(s) |
|-------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------|
| Dept. of Defense | House and Senate Armed Services | Defense Military Constructions-VA |
| Intelligence Community | House and Senate Special Committees on Intelligence | Defense |
| NASA, NOAA, NSF | House Science, Space & Technology Senate Commerce, Science, & Transportation | Commerce, Justice, & Science |
| Dept. of Transportation Office of Commercial Space Transportation | House Science, Space & Technology Senate Commerce, Science, & Transportation | Transportation, Housing and Urban Development |

The Budget Cycle



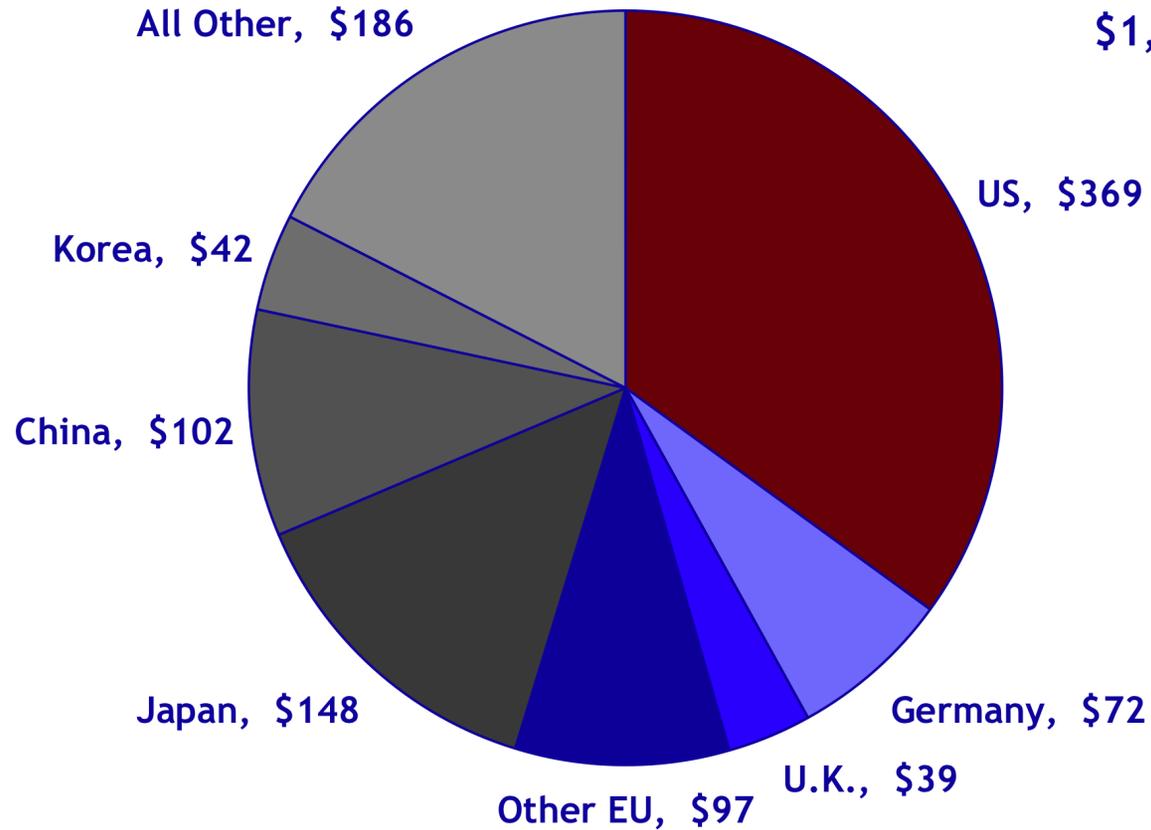
International R&D Spending

- The United States leads the world in R&D investment
\$369b PPP, 35.7% of world R&D investment
- But, others are quickly increasing their investment
Over 1997 - 2007,
 - South Korea, +0.99% of GDP to 3.47%
 - China, +0.85% of GDP to 1.49%
 - Taiwan, +0.81% of GDP to 2.63%
 - Japan, +0.57% of GDP to 3.44%
 - United States, +0.10% of GDP to 2.68%
- President Obama set goal of 3.0% of GDP investment in R&D

Total World R&D, 2007

in billions of PPP \$

Total World R&D =
\$1,054 billion



Source: OECD, Main Science and Technology Indicators, May 2009.

World = OECD members plus Argentina, China, Israel, Romania,

Russian Federation, Singapore, Slovenia, South Africa, Taiwan.

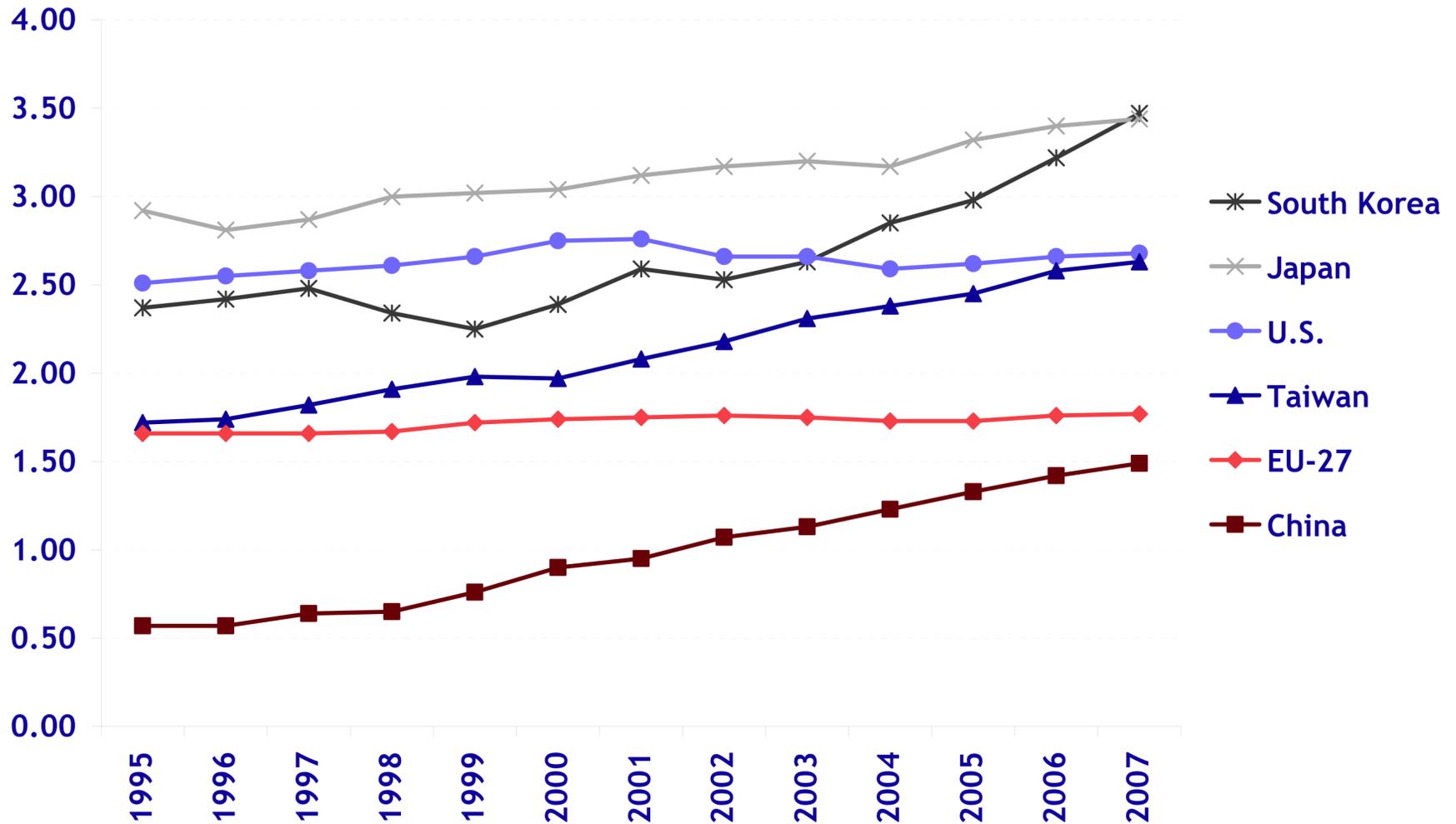
Calculated using purchasing power parities.

© 2010 AAAS



National R&D Investment

percent of GDP



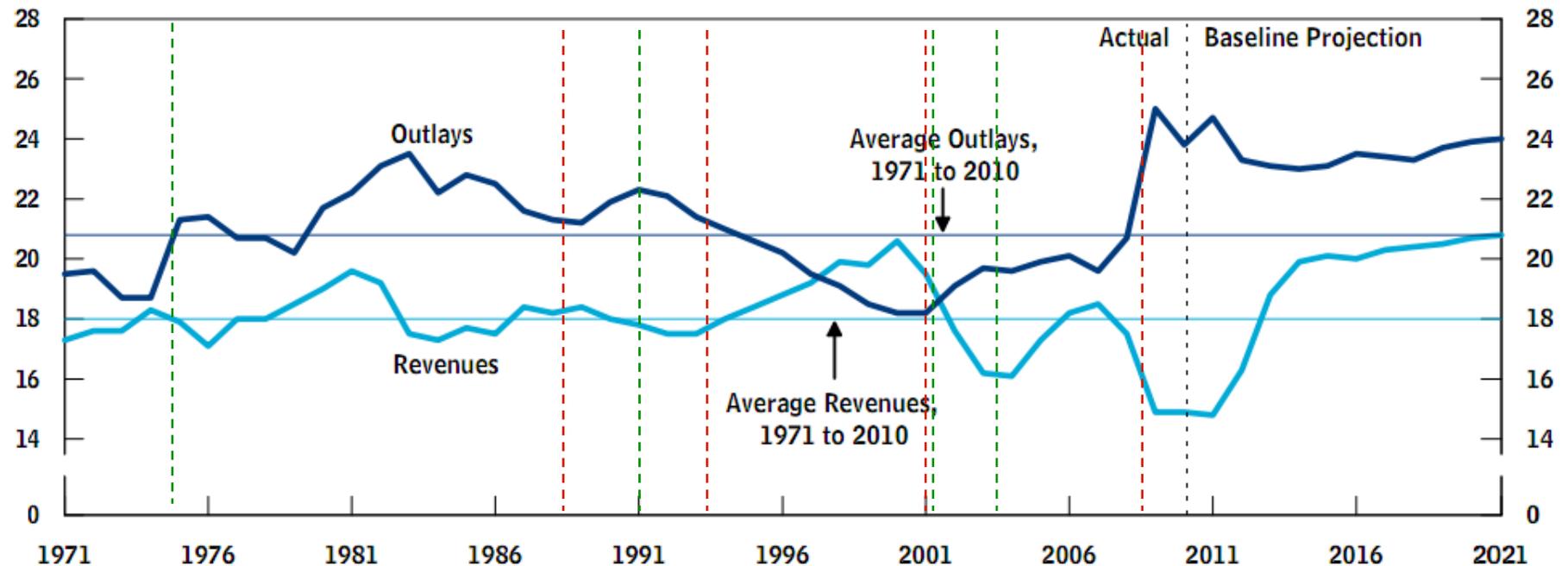
Source: OECD, Main Science and Technology Indicators, May 2009.
© 2010 AAAS



Federal Spending & Revenue

Total Revenues and Outlays, 1971 to 2021

(Percentage of gross domestic product)

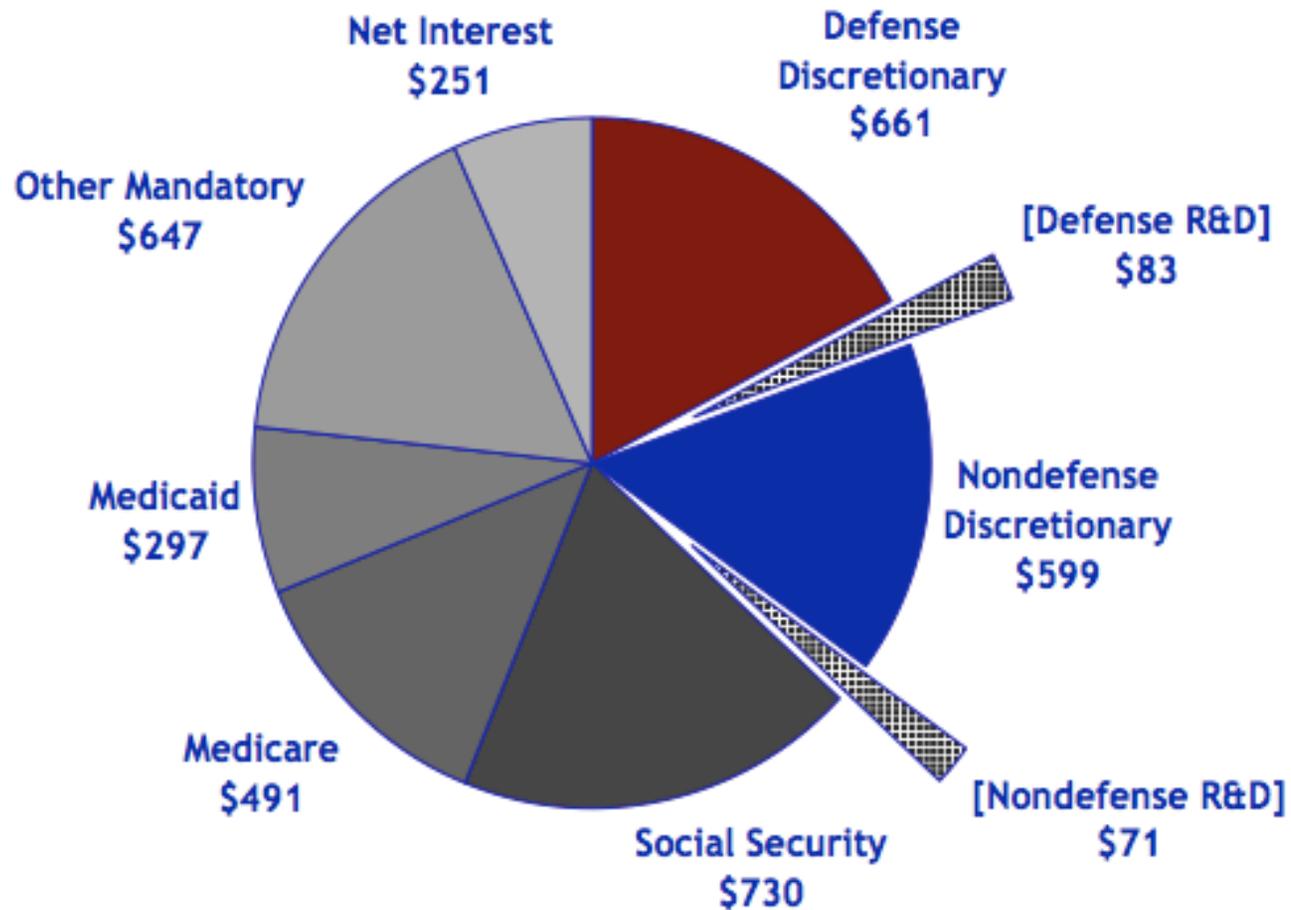


Source: Congressional Budget Office (as of January 2011).

Composition of the Proposed FY 2011 Budget

Total Outlays = \$3.8 trillion

outlays in billions of dollars



Source: *Budget of the United States Government FY 2011*.

Projected unified deficit is \$1.3 trillion.

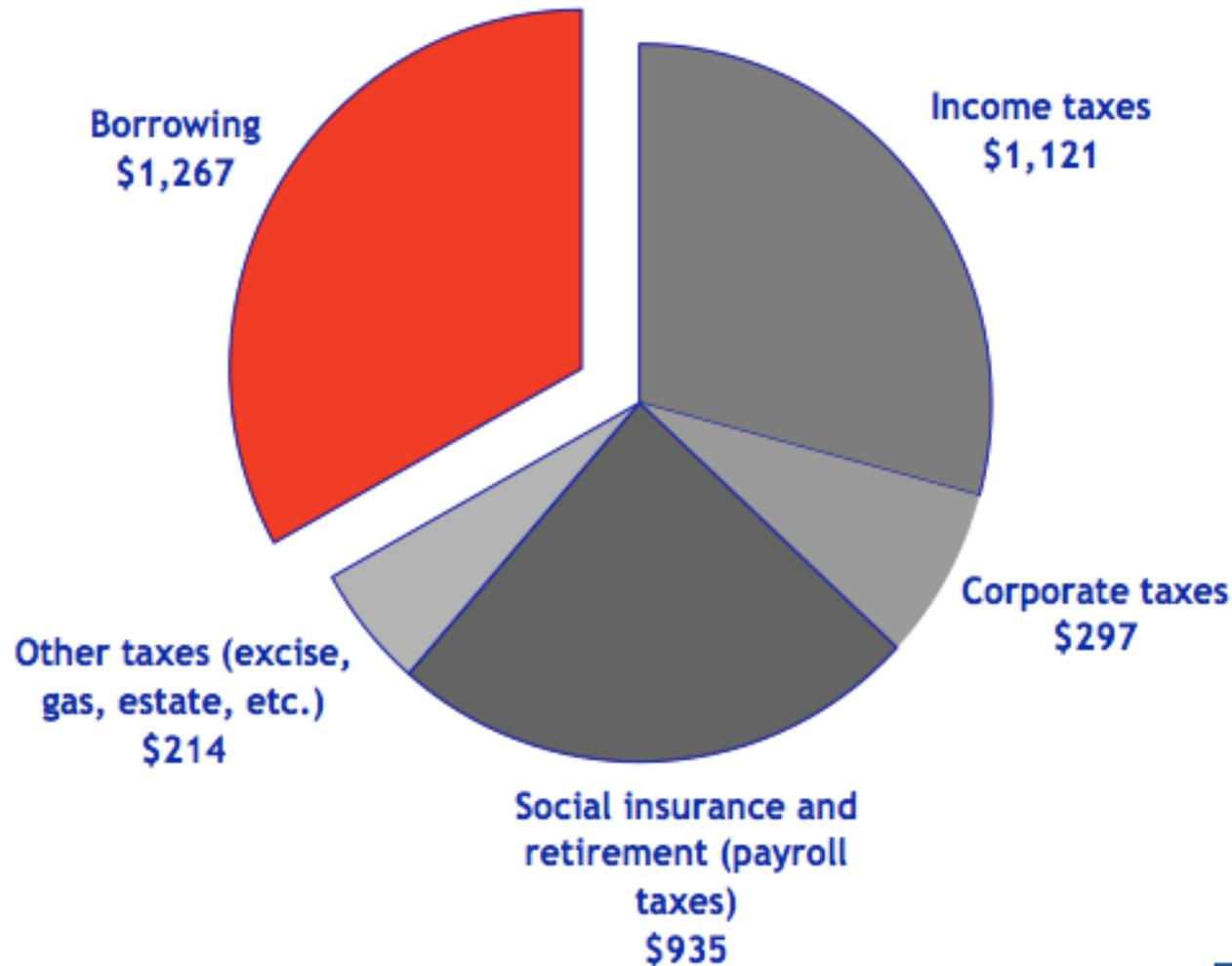
© 2010 AAAS



FY 2011 Budget by Source of Funds

Total Outlays = \$3.8 trillion

Total Receipts (without borrowing) = \$2.6 trillion

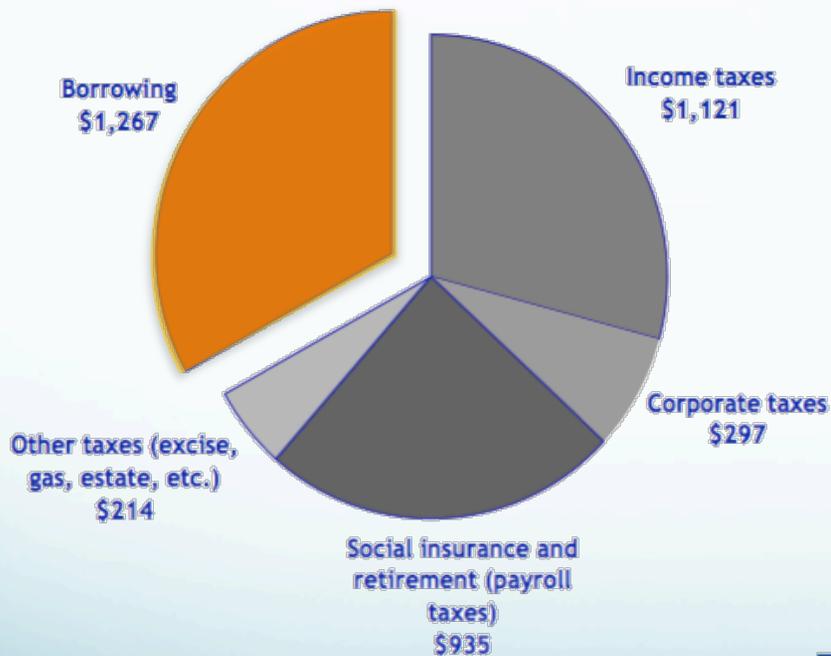


Source: *Budget of the United States Government FY 2011.*
© 2010 AAAS

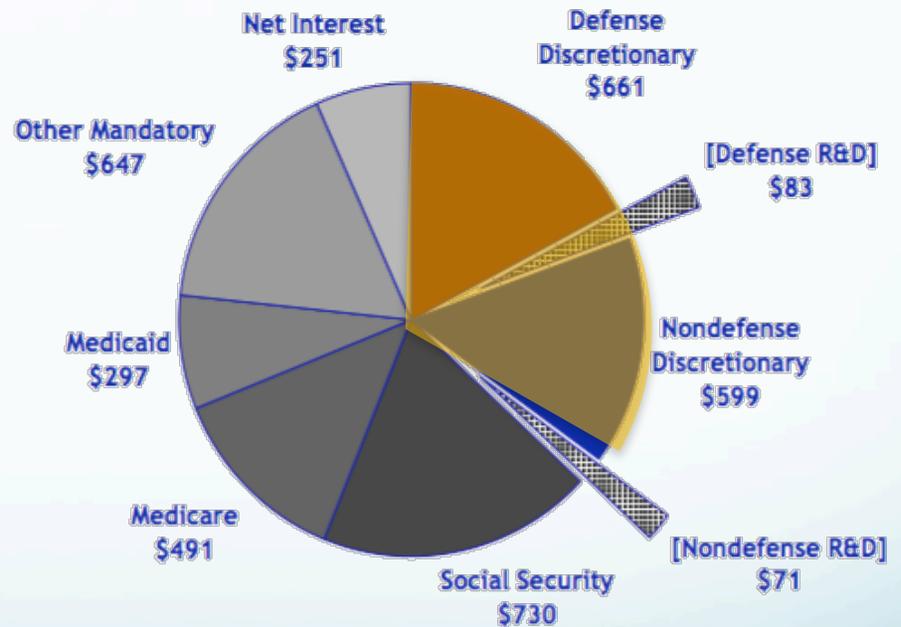


Federal Revenue and Spending

Revenue

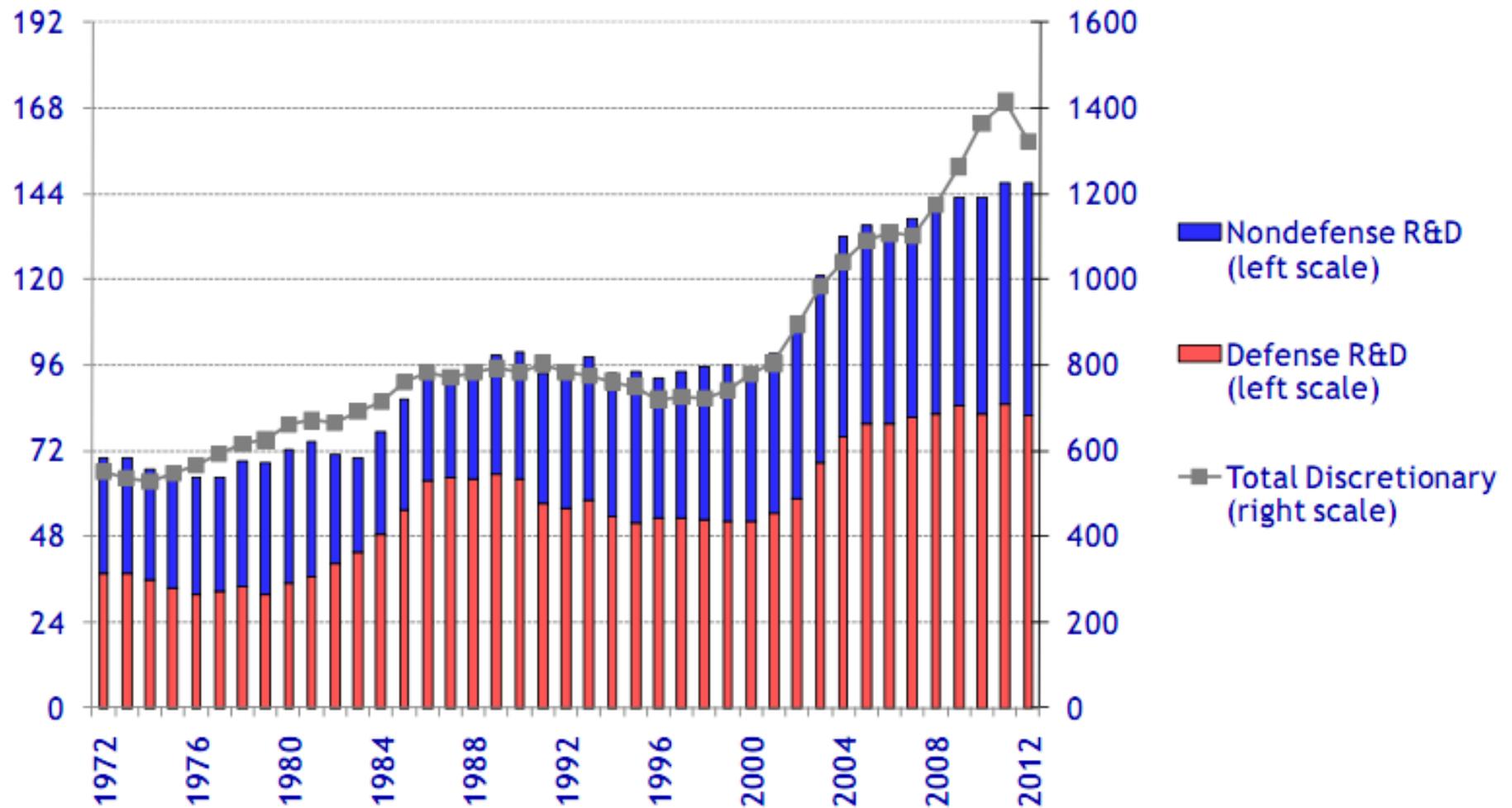


Spending



Trends in R&D and Discretionary Spending

outlays in billions of constant FY 2011 dollars



Source: *Budget of the United States Government, FY 2012*.
 R&D totals do not include construction of facilities and equipment.
 FY 2011-2012 data are budget projections.
 © 2011 AAAS



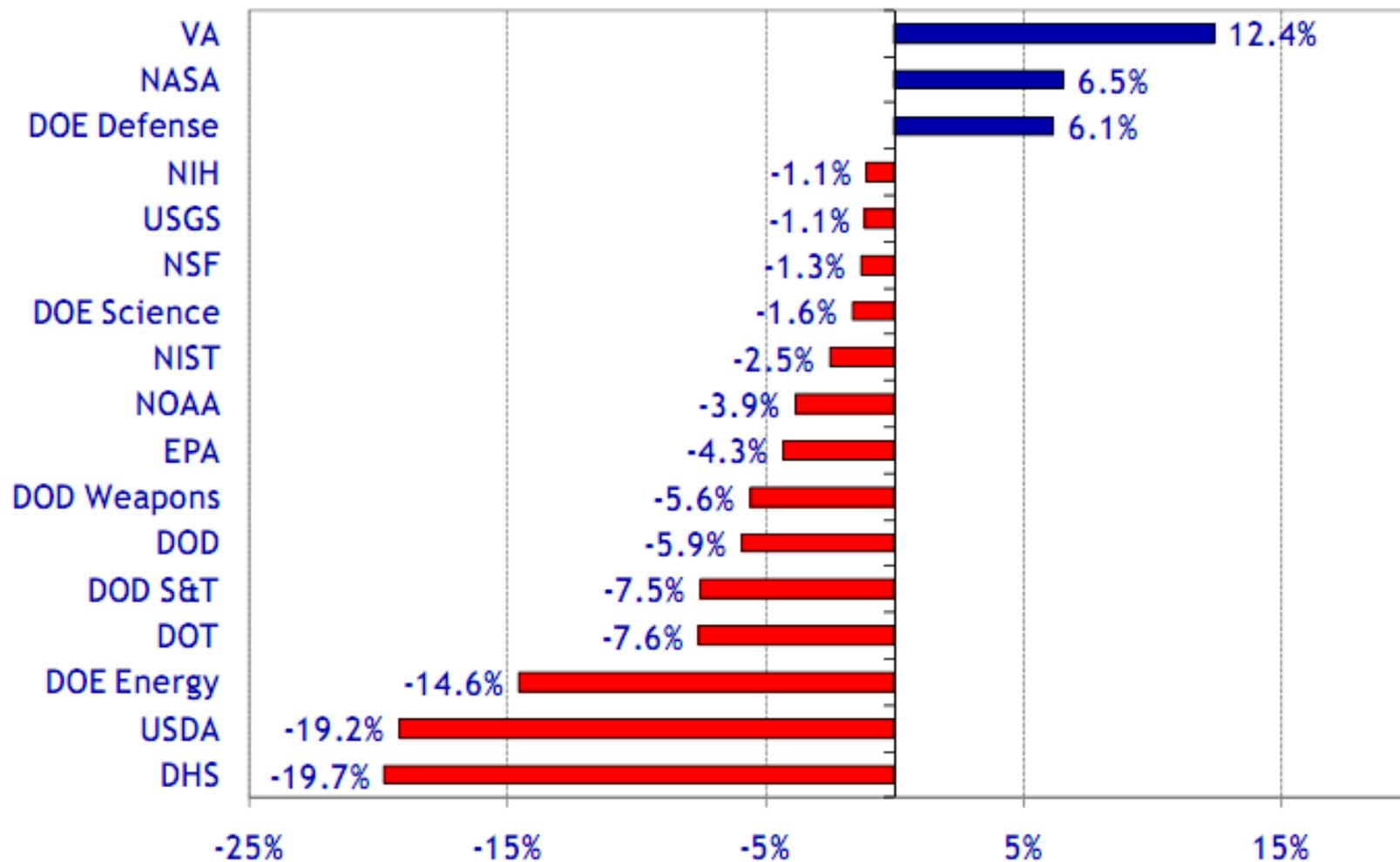


“Even though we will no longer double the funding of key research and development agencies, you will still see strong investments” in the NSF and other science agencies.

The White House

R&D in the FY 2011 Budget

percent change from FY 2010

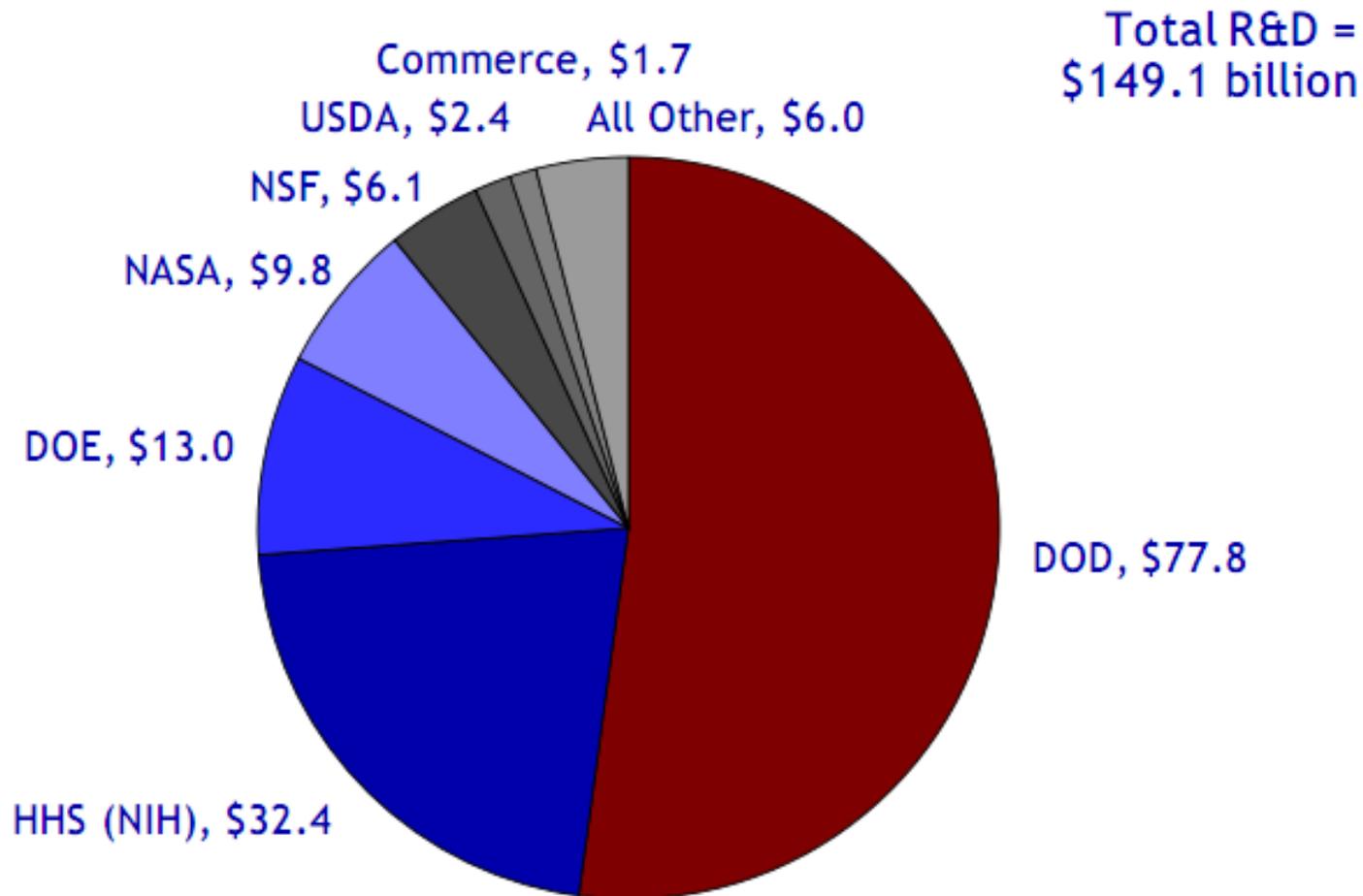


Source: OMB R&D data, agency budget justifications, and other agency documents.
© 2011 AAAS



Total R&D by Agency, FY 2012

budget authority in billions of dollars



Source: OMB R&D data, agency budget justifications, and other agency documents.

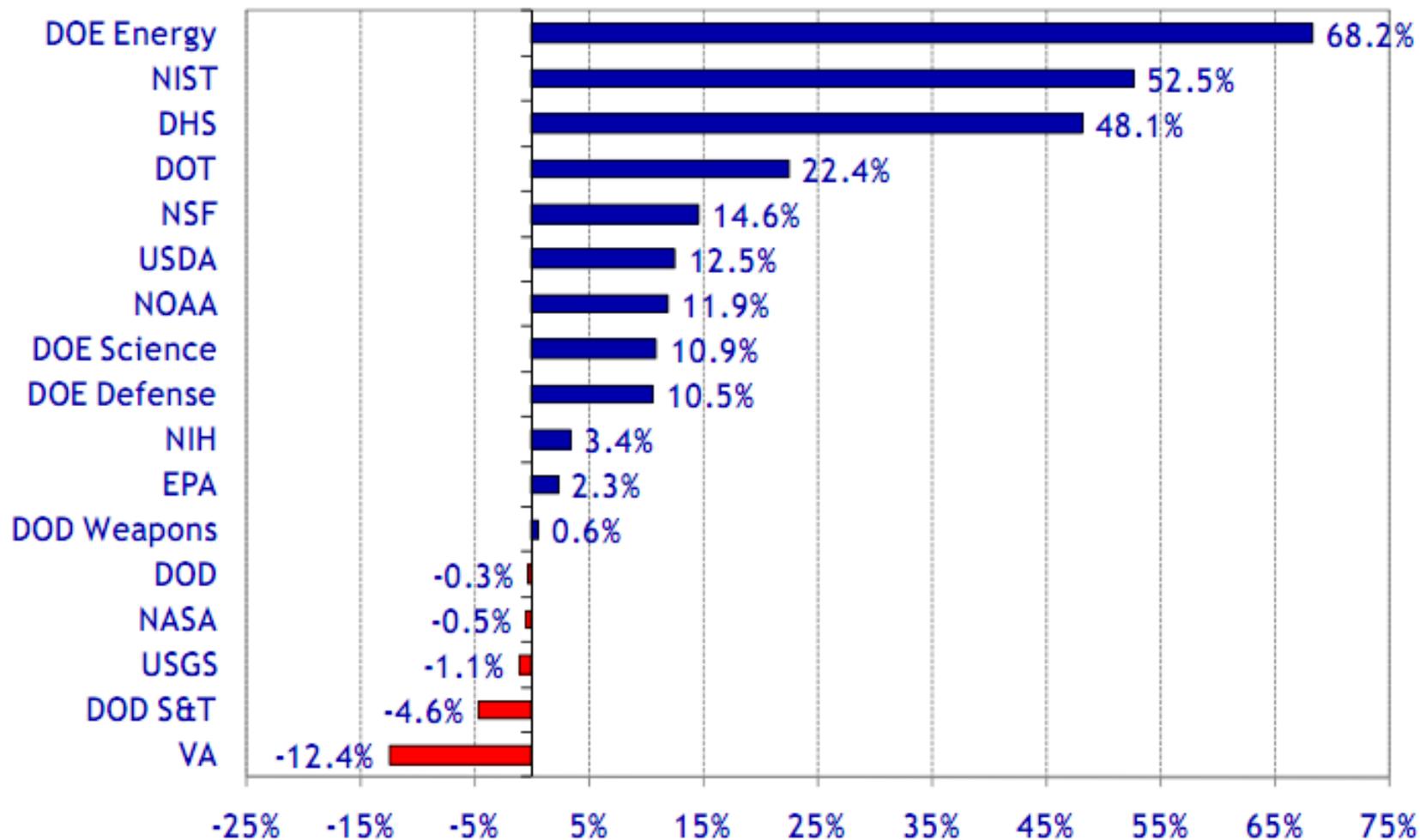
R&D includes conduct of R&D and R&D facilities.

© 2011 AAAS



R&D in the FY 2012 Budget Request

percent change from FY 2011



Source: OMB R&D data, agency budget justifications, and other agency documents.
© 2011 AAAS



Astronomy and Astrophysics in Federal Budget

Table 1. Astronomy in the Federal R&D Budget
(budget authority in millions of dollars)

| | FY 2010 | FY 2012 | Change FY 10-12 | | FY 2011 Actual | |
|-----------------------------------|---------|---------------|-----------------|---------|-------------------|-----------------------------------------|
| | Actual | Budget | Amount | Percent | | |
| Natl Aero and Space Admin | 18,724 | 18,724 | 0 | 0.0% | 18,500 | |
| <i>Science</i> | 4,498 | 5,017 | 519 | 11.5% | 4,945 | -\$61M FY11 Req +\$447M FY10 |
| <i>Heliophysics</i> | 608 | 622 | 14 | 2.3% | | |
| <i>Planetary Science</i> | 1,364 | 1,541 | 176 | 12.9% | | |
| <i>Astrophysics</i> | 647 | 683 | 35 | 5.5% | | |
| <i>James Webb Space Telescope</i> | 439 | 374 | -65 | -14.8% | | |
| National Science Foundation | 6,926 | 7,767 | 841 | 12.1% | 6,873 | -\$511M FY11 Req -\$53M FY10 |
| <i>Astronomical Sciences</i> | 247 | 249 | 3 | 1.1% | | |
| <i>Research</i> | 71 | 81 | 10 | 14.4% | | |
| <i>Education</i> | 7 | 5 | -2 | -28.8% | | |
| <i>Infrastructure</i> | 169 | 163 | -5 | -3.2% | | |
| Department of Energy | | | | | | |
| <i>Office of Science</i> | 4,964 | 5,416 | 452 | 9.1% | 4,929 | -\$252M FY11 Req -\$35M FY10 |
| <i>High Energy Physics</i> | 791 | 797 | 6 | 0.8% | | |
| Interagency Programs | | | | | | |
| <i>Pu-238 Restart</i> | 0 | 20 | 20 | -- | | |

Source: Agency budget justifications.

All figures rounded to the nearest million. Changes calculated from unrounded figures.

Innovation In Astronomy?

- We must, “Out innovate, out education, and out build.”
- Main priorities of FY 2012 budget (1) moving from rescue to rebuilding, (2) putting the nation on a sustainable fiscal path, and (3) competing and winning in the world economy
- Astronomy and planetary science are not viewed as part of the national agenda or contributing to the country’s economic growth. They are not currently viewed as priorities and are therefore at risk.

Decadal Surveys for Astronomical Sciences

- **The New World, New Horizons in Astronomy & Astrophysics and Visions and Voyages in Planetary Sciences decadal surveys have been released by the National Research Council and are a community consensus on priorities for federal support.**
- Review of the current state of understanding of the science and have a prioritized list of projects, programs and missions important in the next decade.
- The funding agencies look to these reports for guidance on scientific priorities.



AAAS REPORT XXXVI

Research & Development FY 2012

Intersociety Working Group



 AAAS
ADVANCING SCIENCE. SERVING SOCIETY

- Federal R&D in FY2012 budget
- Historical Trends in Federal R&D
- Political and Policy Context
- Agency R&D budgets
- Disciplinary analyses

Outlook

REGULAR FISCAL YEAR 2012 302(b) SUBALLOCATIONS¹

(in millions; budget authority)

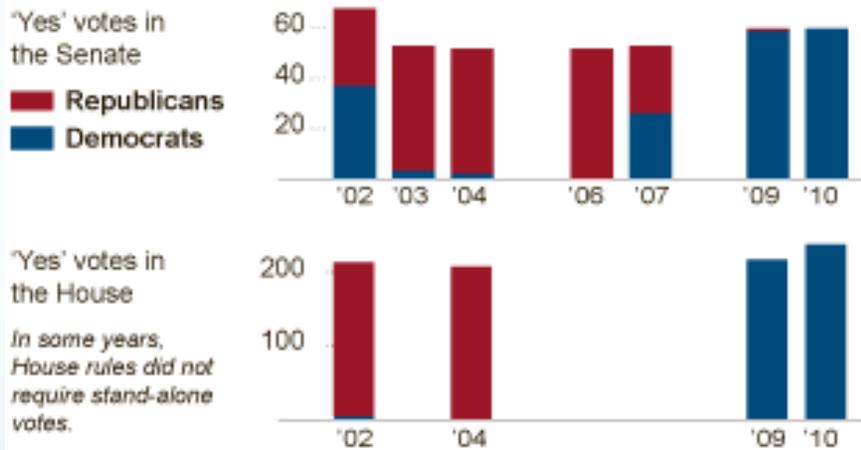
| <u>SUBCOMMITTEE</u> | FY 2011 <u>Enacted</u> | 2012 | | 302(b)s compared to: | |
|--------------------------------|---------------------------|------------------------------------|-------------------------|----------------------|------------------------|
| | | Pres. <u>Budget²</u> | Draft <u>302(b)s</u> | <u>FY 2011</u> | Pres. <u>Budget</u> |
| Agriculture, FDA..... | 19,922 | 22,291 | 17,250 | -2,672 | -5,041 |
| Commerce, Justice, Science.... | 53,327 | 57,675 | 50,237 | -3,090 | -7,438 |
| Defense..... | 513,025 | 538,938 | 530,025 | 17,000 | -8,913 |
| Energy and Water..... | 31,682 | 36,540 | 30,639 | -1,043 | -5,901 |
| Financial Services..... | 21,950 | 25,700 | 19,895 | -2,055 | -5,805 |
| Homeland Security..... | 41,661 | 43,577 | 40,592 | -1,069 | -2,985 |
| Interior, Environment..... | 29,559 | 31,291 | 27,473 | -2,086 | -3,818 |
| Labor, HHS, Education..... | 157,436 | 180,801 | 139,218 | -18,218 | -41,583 |
| Legislative Branch..... | 4,541 | 4,855 | 4,314 | -227 | -541 |
| Military Construction, VA..... | 73,150 | 73,791 | 72,535 | -615 | -1,256 |
| State, Foreign Operations..... | 48,162 | 50,796 | 39,569 | -8,593 | -11,227 |
| Transportation, Housing..... | 55,367 | 74,712 | 47,655 | -7,712 | -27,057 |
| TOTAL..... | 1,049,782 | 1,140,967 | 1,019,402 | -30,380 | -121,565 |

1/ Fiscal year 2012 bills will also include \$127 billion in funding for GWOT activities consistent with the President's FY 2012 Budget request. These include: Defense subcommittee (\$119 billion), Homeland Security subcommittee (\$258 million), and State, Foreign Operations subcommittee (\$7.6 billion).

2/Does not assume the President's budget proposal to shift discretionary transportation spending to the mandatory side.

Debt Ceiling Debate

Members of Congress Who Vote To Raise the Debt Limit ...



... Are Generally Those in Power



Bipartisan votes occurred in 2002 and 2007, when the parties shared power.

Source: Donald Marron (dmarron.com), Tax Policy Center

THE NEW YORK TIMES

- Game of “Mother may I?”
- Not a necessary budget tool
- Debate is all politics
- Where does Congress stand?

Building Relationships with Legislators

- Write, call and email on current issues often and regularly, thanking members for their work.
- Make personal visits either in Washington, D.C. or in the home district offices
- Participate in forming public opinion, letters to the editor, op-ed pieces etc.
- Invite legislators to tour local facilities, agencies, companies or universities
- Get involved



Organizing your Visit

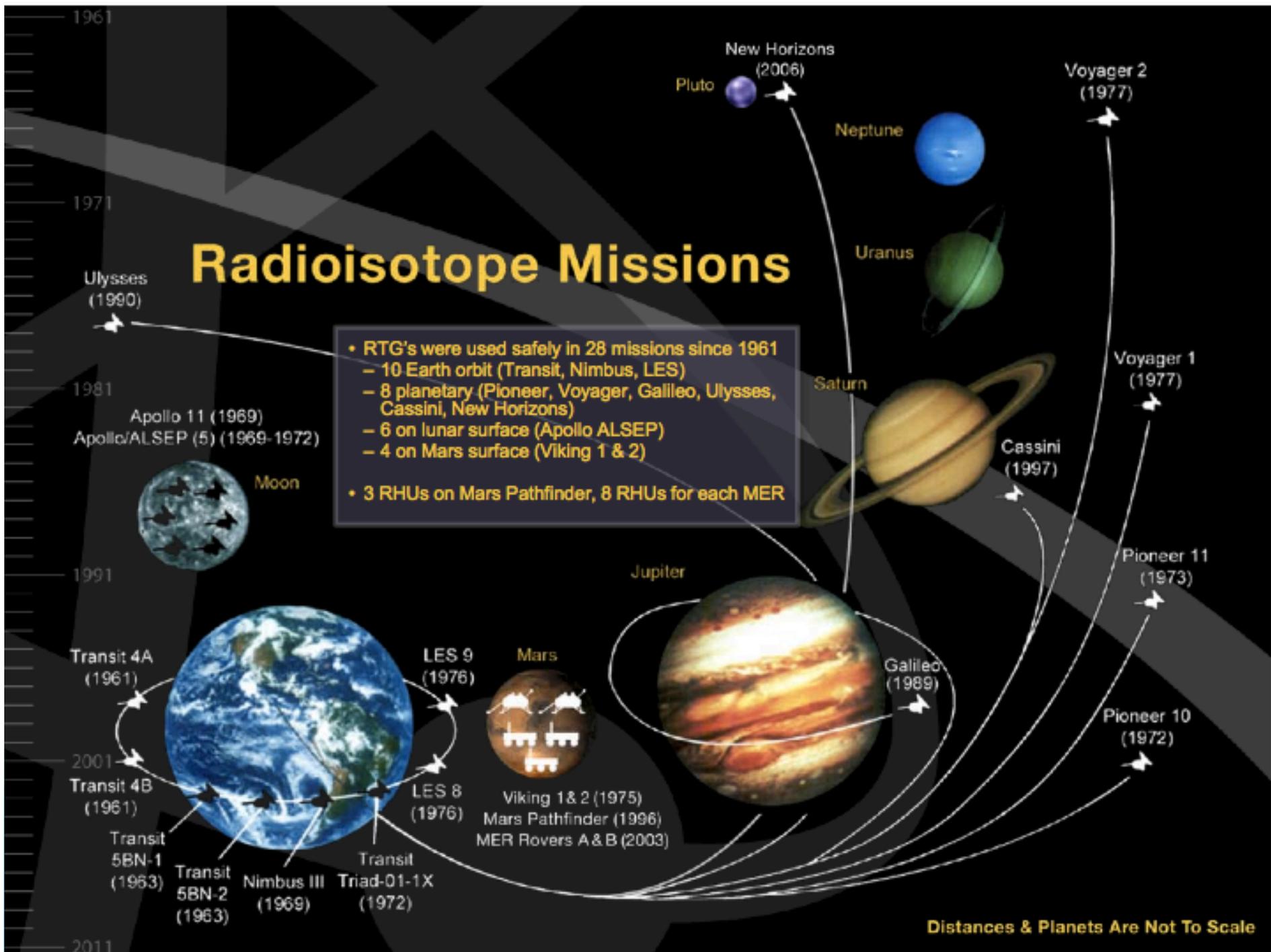
- Be on time
- You must be prepared and succinct. If you do not know the answer, be honest! Always commit to finding out the answer and follow up
- Explain how your issue affects the Senator's or Representative's state or district with a short anecdote or facts about the district. (e.g., how many people work for your company/university and their economic impact)
- Limit the presentation; let everyone speak to the issue if they want to contribute.
- Never be negative about politicians; do not whine or lecture to Members or staffers; do not imply that R&D funding is or should be an entitlement.
- Follow-up! Send a letter of thanks to the Member and staffer offering to be a source of information in the future.

General Tips

- Do no harm
- Stick to the Decadal Survey. Our community is unique.
- Make an effort. A silent constituency is a nonexistent constituency.
- Congressional Science staff may not be experts, but are very smart and influential.
- Don't let visits or communications be a one-time deal, make it a part of your professional life...the farmers do, the veterans do, the scientists should.

Radioisotope Missions

- RTG's were used safely in 28 missions since 1961
 - 10 Earth orbit (Transit, Nimbus, LES)
 - 8 planetary (Pioneer, Voyager, Galileo, Ulysses, Cassini, New Horizons)
 - 6 on lunar surface (Apollo ALSEP)
 - 4 on Mars surface (Viking 1 & 2)
- 3 RHUs on Mars Pathfinder, 8 RHUs for each MER



Distances & Planets Are Not To Scale

“The current plan assumes ... plutonium-238 will be purchased from Russia, and ... new domestic production can begin, but no earlier than 2015. The Russian purchase is subject to ongoing negotiations.”

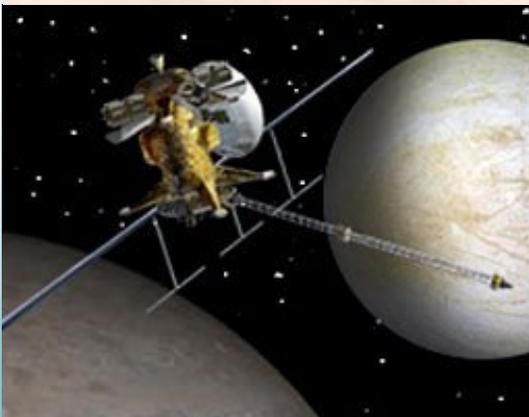
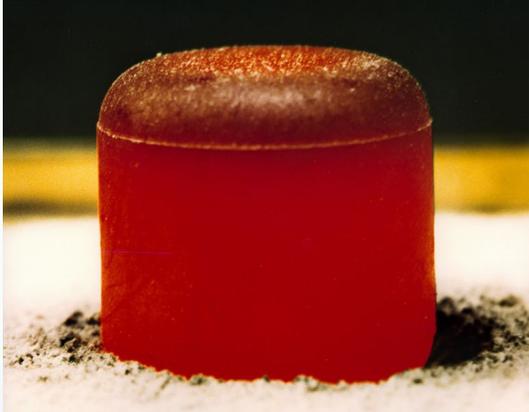
“The recommended program cannot be carried out without new plutonium-238 production or completed deliveries from Russia. ”

“Without a restart of plutonium-238 production, it will be impossible for the United States, or any other country, to conduct certain important types of planetary missions after this decade.”

Vision and Voyages for Planetary Science in the Decade 2013-2022

Timeline

Plutonium-238



- FY2010: Request \$30M to DOE. House favorable, but no funding, and wanted plan of shared cost with other users, e.g. NASA
- FY2011: Request \$30M split NASA/DOE. No funding appropriated. NASA should pay as primary user.
- Letter from Rep. Culberson (R-TX) and Rep. Schiff (D-CA) to NASA Administrator and Energy Secretary
- FY2012: Request \$20M and in “earmark” list
- NASA Authorization Act 2010, report from DOE and NASA on details of production at OMB

For more information

- Bethany Johns, bjohns@aaas.org
www.aaas.org/policy
- www.nasa.gov/budget
www.nsf.gov/about/budget/
- www.aip.org
www.aaas.org/spp
- www.house.gov, House Science Committee and House Appropriations Subcommittee
www.senate.gov, Commerce, Science, & Transportation; CJS Appropriations Subcommittee
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