

R&D in the President's FY 2011 Budget

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for Battelle's Community of Practice

AAAS R&D Budget and Policy Program
<http://www.aaas.org/spp/rd>

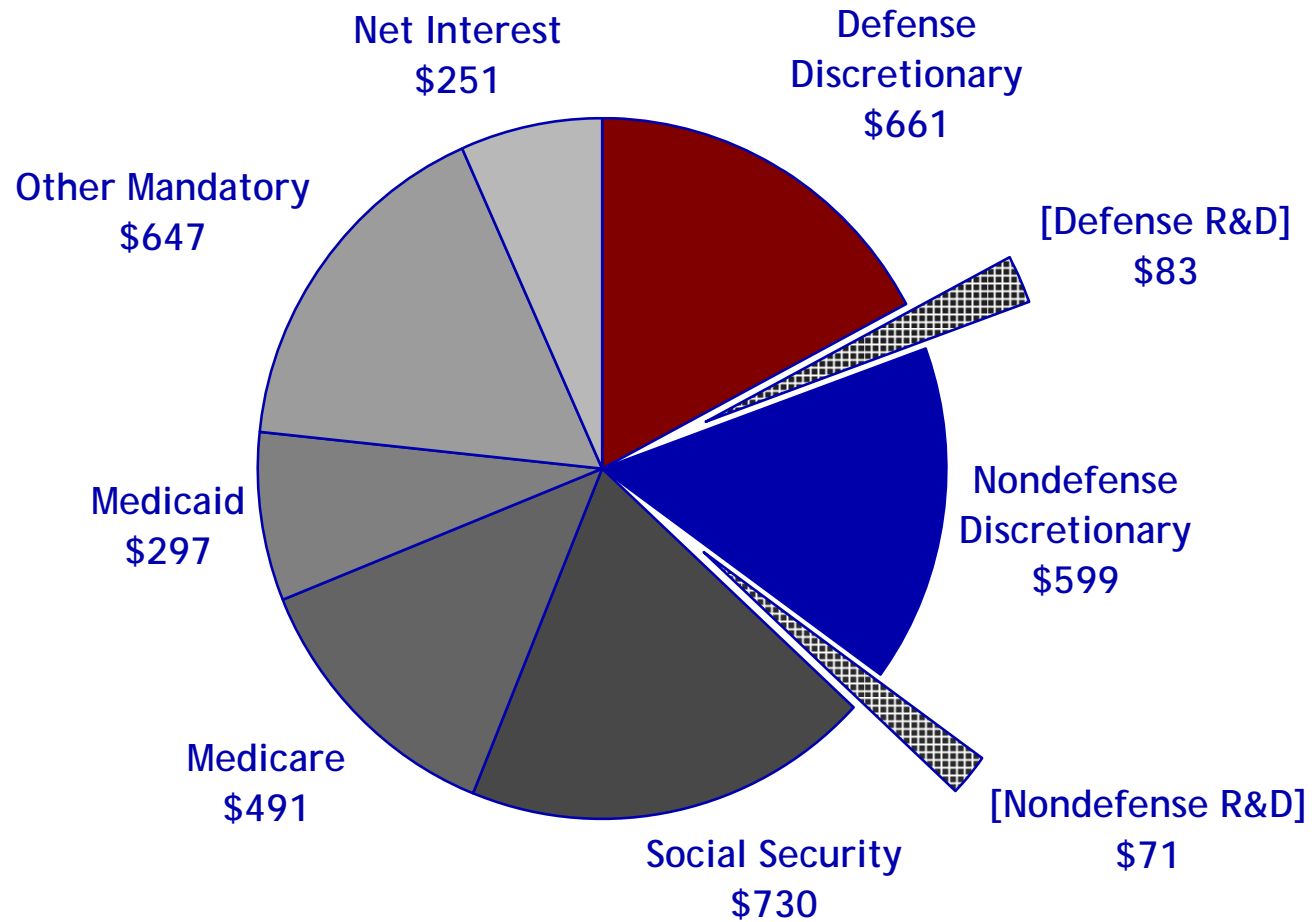
The FY 2011 Federal Budget

- \$3.8t total budget, \$1.3t unified deficit
- \$1.3t discretionary budget (+0.3%)
 - \$532b nondefense budget (+1.4%)
- Rescuing the Economy
- A Foundation for Economic Growth and Job Creation
 - Small business initiatives
 - Investing in science and basic research
- Restoring Responsibility
 - Three year non-security discretionary funding freeze

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*.

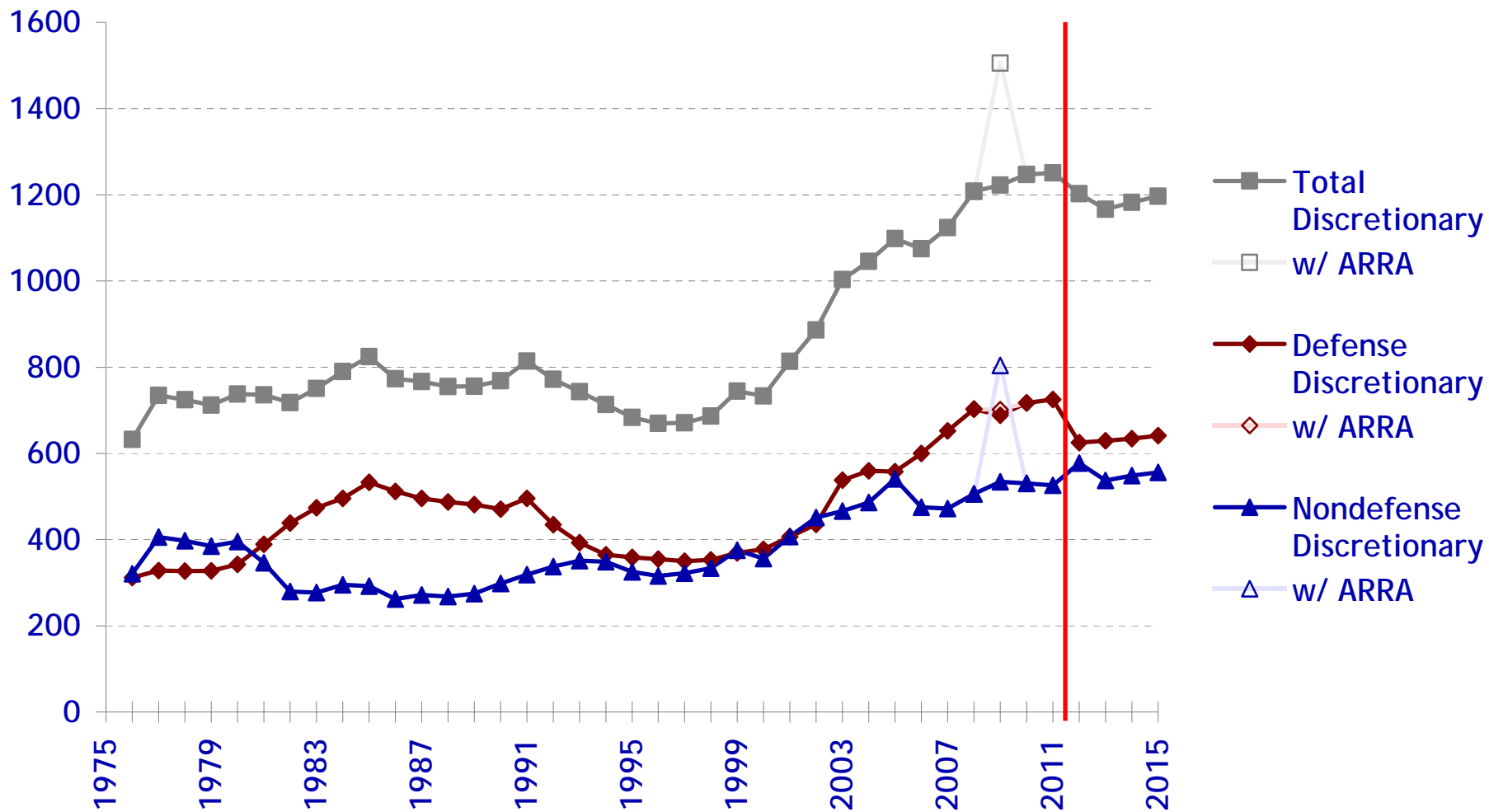
Projected unified deficit is \$1.3 trillion.

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Trends in Discretionary Spending

budget authority in billions of constant FY 2010 dollars



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

FY 2010-2015 data are budget projections.

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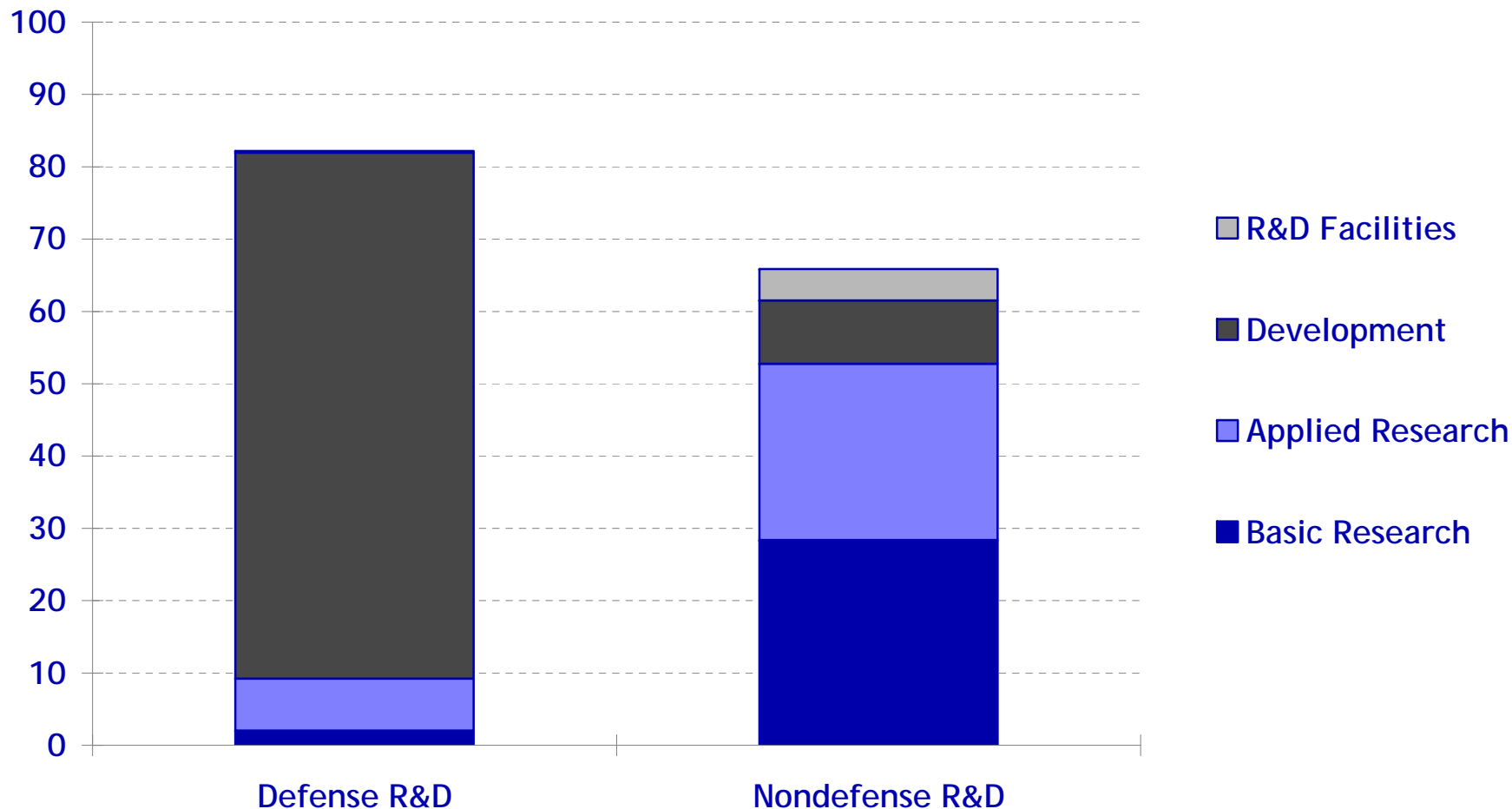


Federal R&D in Context

- The federal R&D investment is spread across over two dozen departments and agencies
 - Only two manage more than 10% of the investment
 - Department of Defense (52.7%)
 - Department of Health and Human Services (21.7%)
- The federal R&D investment is also spread across 11 of the 12 appropriations subcommittees.
- Role of federal R&D
 - Supports federal missions
 - Drives U.S. innovation

Character of R&D, FY 2011

budget authority in billions of dollars



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

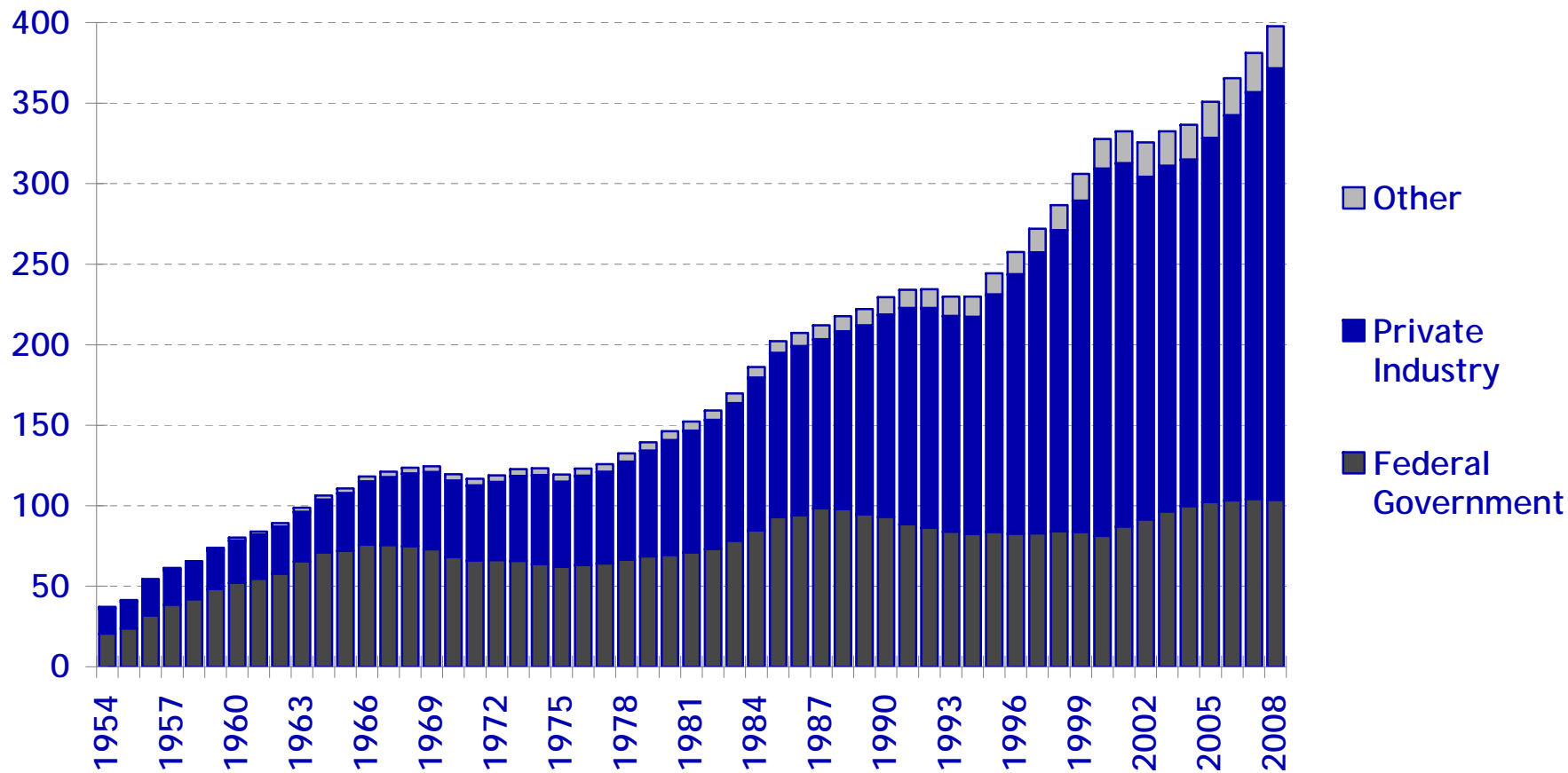
Defense R&D = DOD + DOE defense.

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Federal R&D Funding by Source

outlays in billions of constant 2008 dollars



Source: NSF, Division of Science Resources Statistics,
National Patterns of R&D Resources (NSF 08-318)

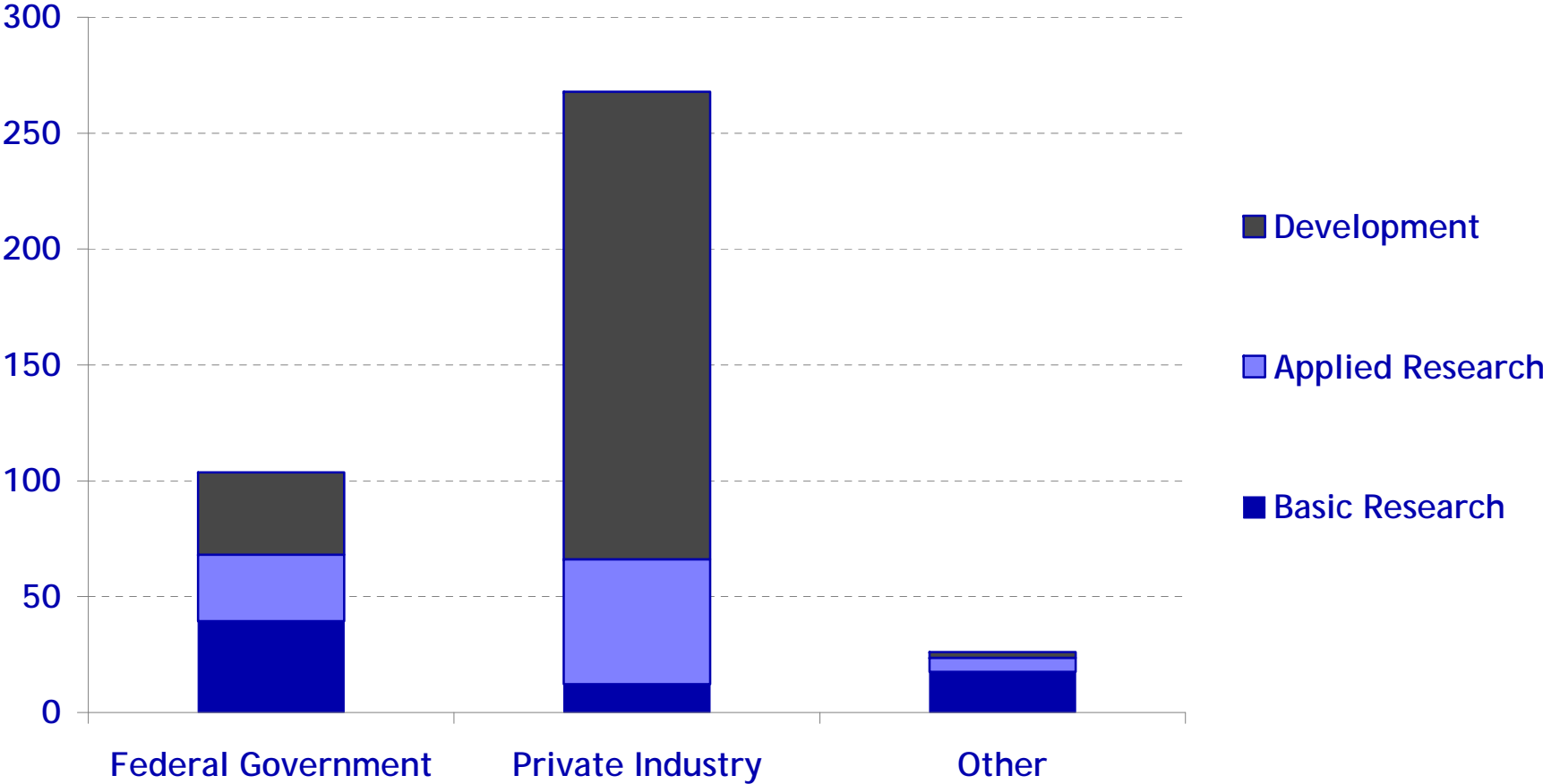
2008 figures are preliminary.

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Character of R&D, 2008

outlays in billions of dollars



Source: NSF, Division of Science Resources Statistics,
National Patterns of R&D Resources (NSF 08-318)

Figures are preliminary.

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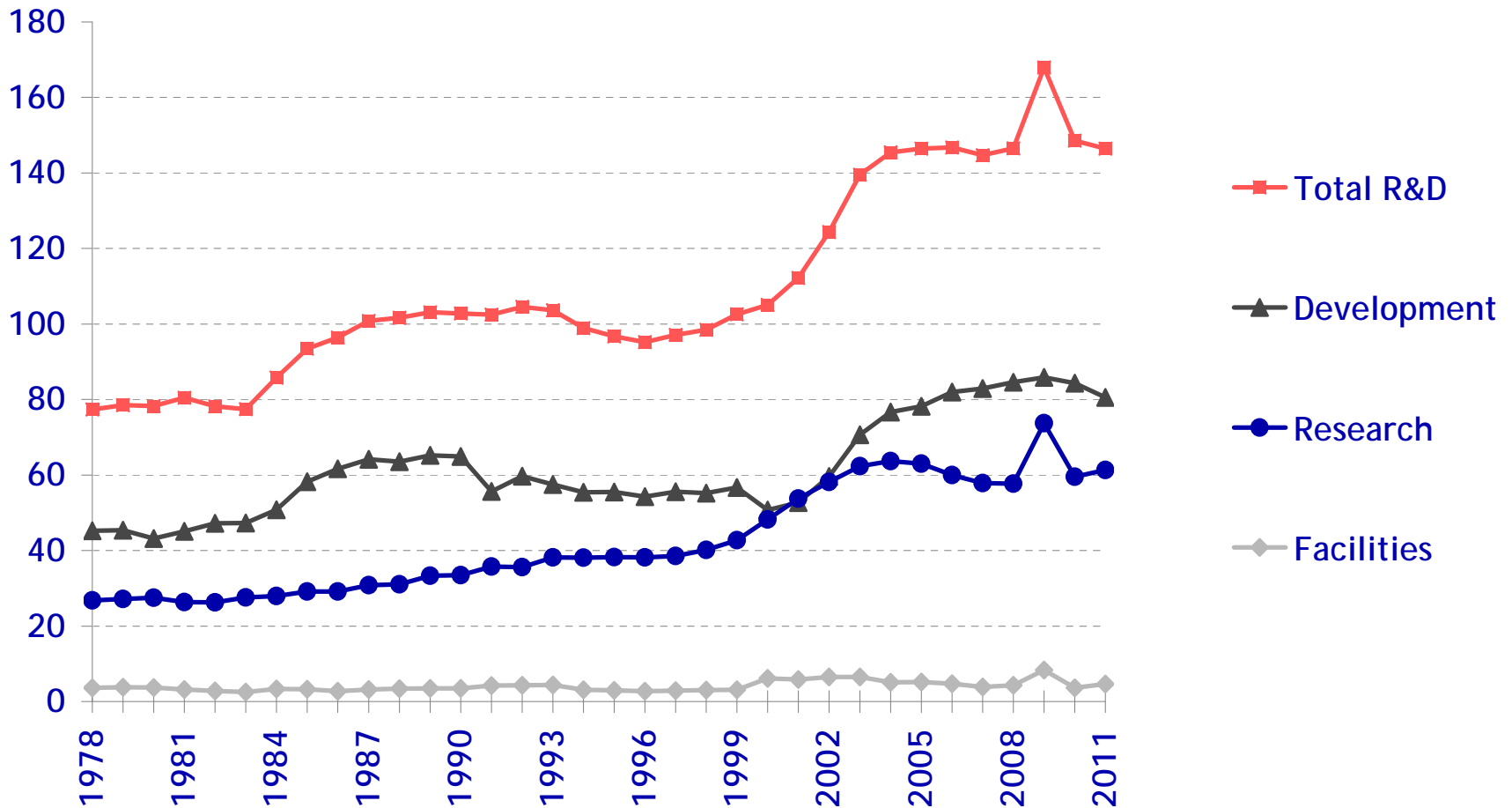


The FY 2011 Federal R&D Investment

- Total R&D: \$148.1b, -0.3% from FY 2010
 - Basic Research: \$30.4b, +4.3%
 - Applied Research: \$31.6b, +2.1%
 - Development: \$81.5b, -2.9%
 - Equipment and Facilities: \$4.6b, +1.3%
- \$82.2b for defense R&D, -4.8%
- \$65.9b for non-defense R&D, +5.9%
- -1.4% in constant dollars from FY 2010
- +0.7% in constant dollars since FY 2004
 - Peak in FY 2009

Trends in Federal R&D

in billions of constant FY 2010 dollars

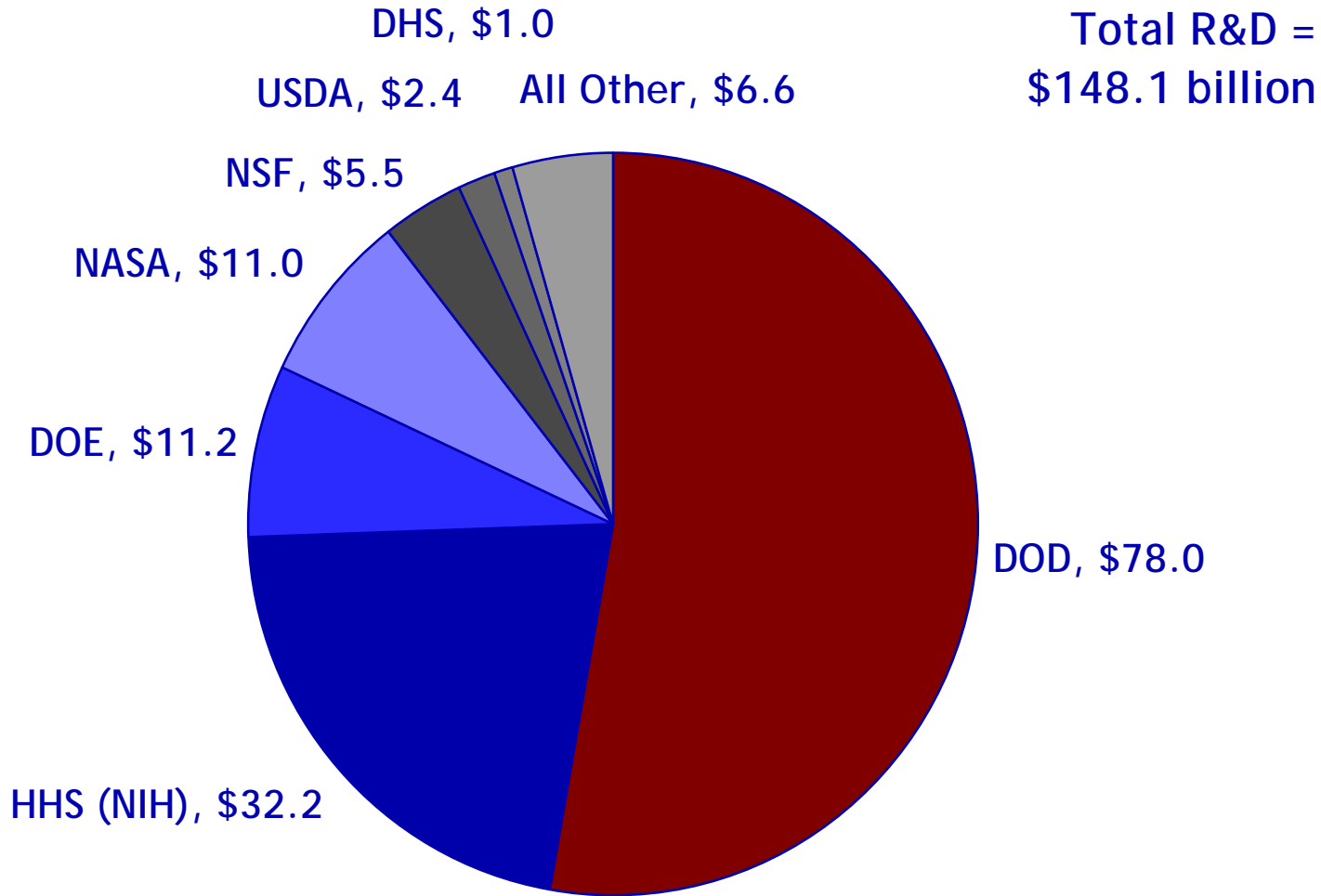


Source: AAAS analyses of R&D in annual AAAS R&D reports.
FY 2011 figures are latest AAAS estimates of FY 2011 request.
R&D includes conduct of R&D and R&D facilities.
1976-1994 figures are NSF data on obligations in the Federal Funds survey.
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Total R&D by Agency, FY 2011

budget authority in billions of dollars



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

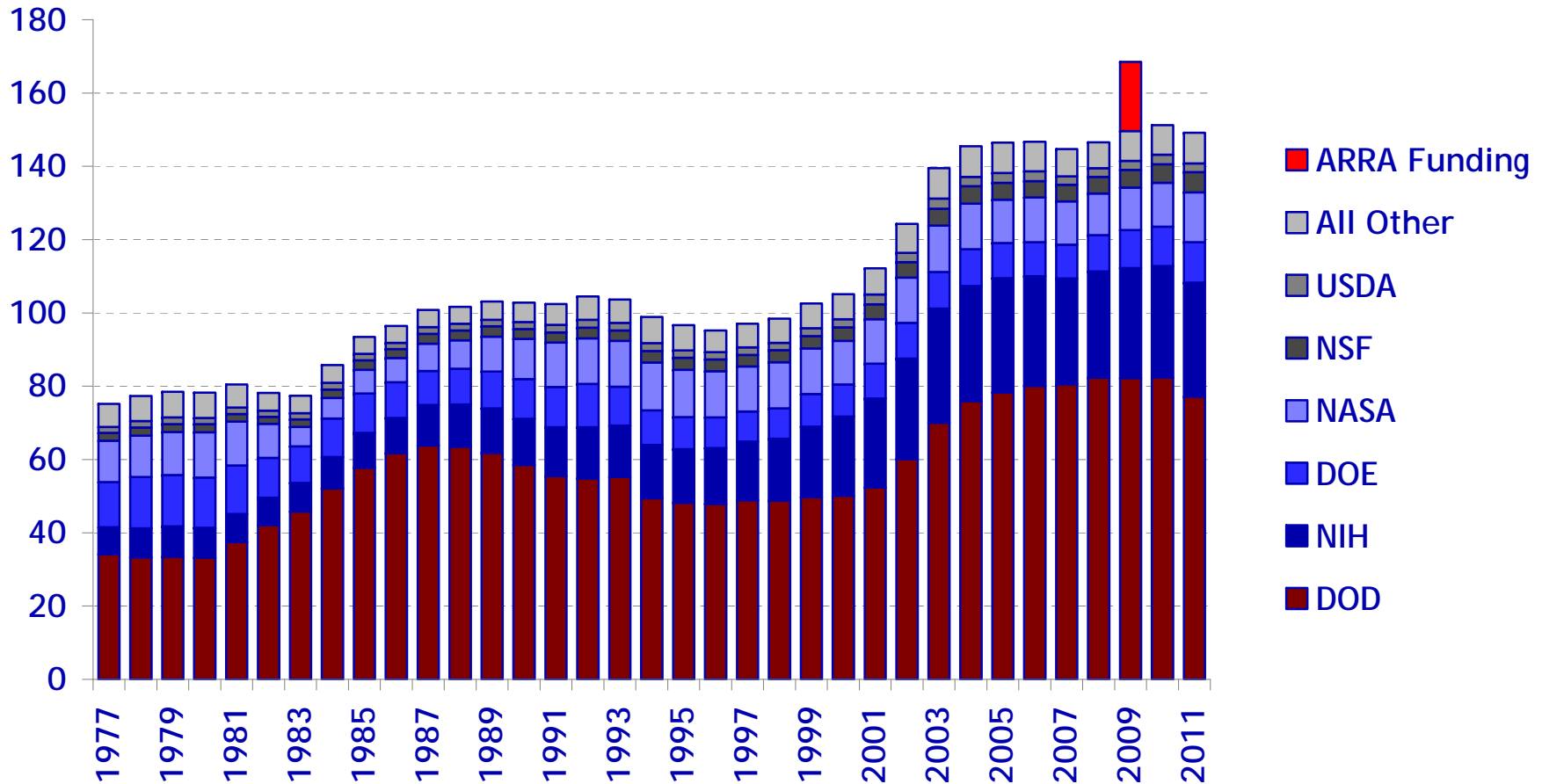
R&D includes conduct of R&D and R&D facilities.

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Trends in R&D by Agency

in billions of constant FY 2010 dollars

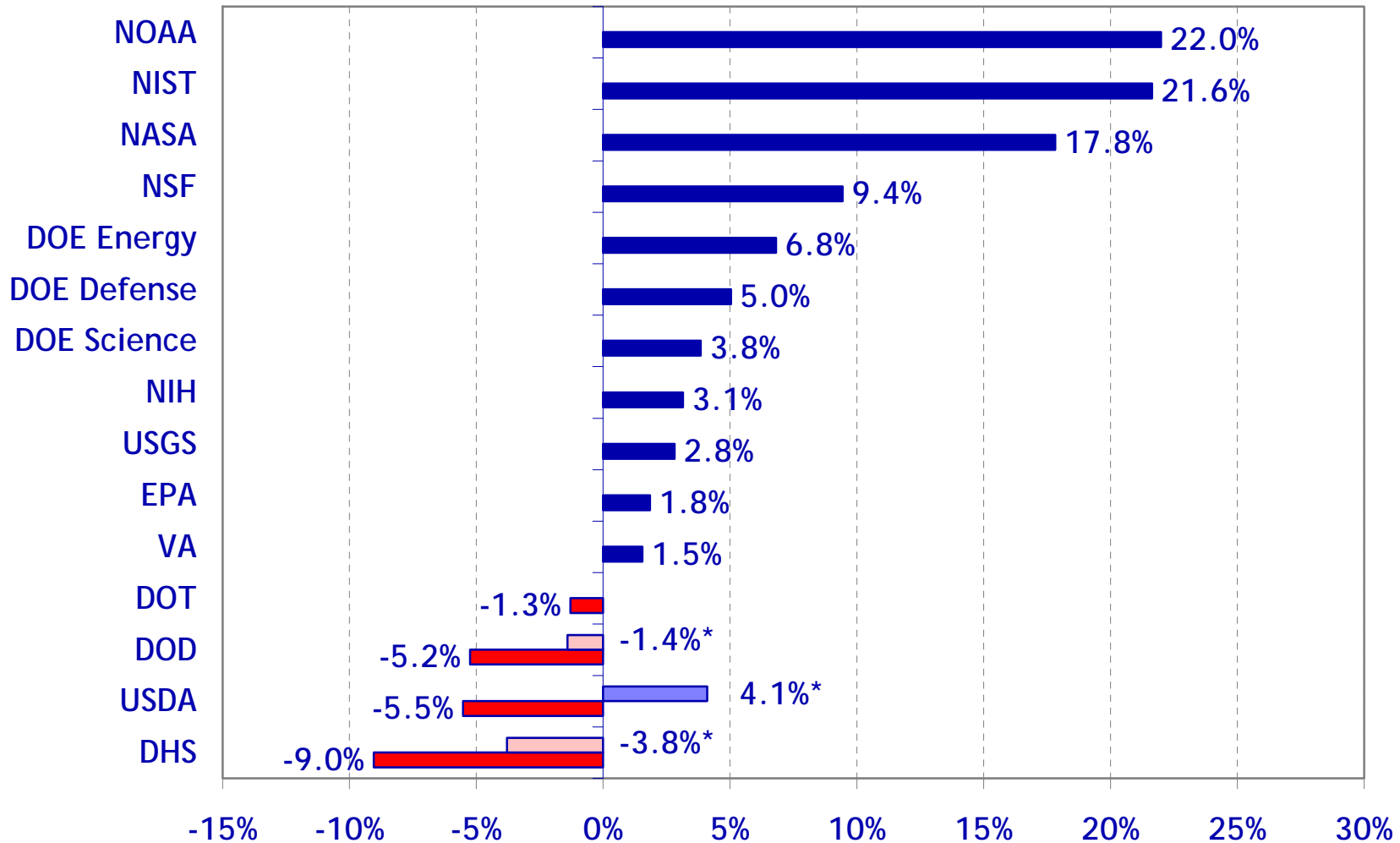


Source: AAAS Report: Research & Development series.
 FY 2010 and FY 2011 figures are latest estimates.
 1976-1994 figures are NSF data on obligations in the Federal Funds survey.
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R&D in the FY 2011 Budget Request

percent change from FY 2010



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

* - Lighter colored bars indicate percent change with projected FY 2011 earmarks.

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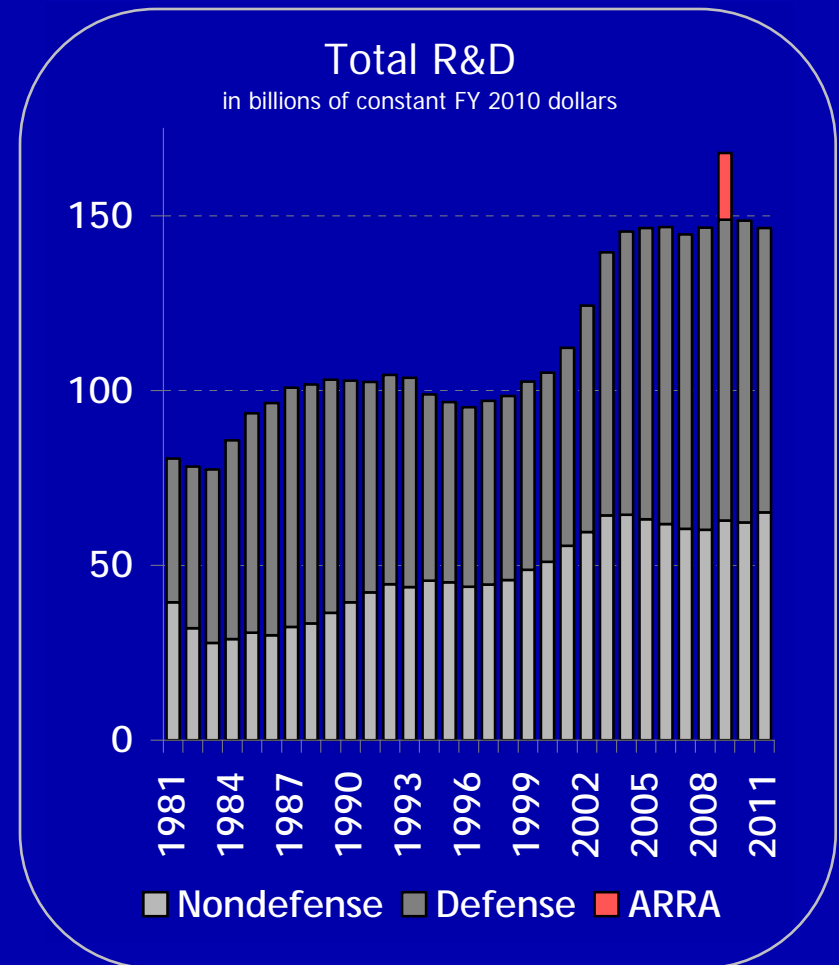


Earmarks

- Early February - Senate Republicans introduce amendment to make earmarks a point of order requiring 60 votes to overcome
- March 9/10 - House Democrat leaders announce ban on earmarks to for-profit entities
- March 10/11 - House Republicans vote in closed-door session to ban all earmarks
- March 17 - Senate amendment fails
- Early April - Some House Republicans, including Young (R-AL), Cao (R-LA), and Paul (R-TX), break rank and request earmarks

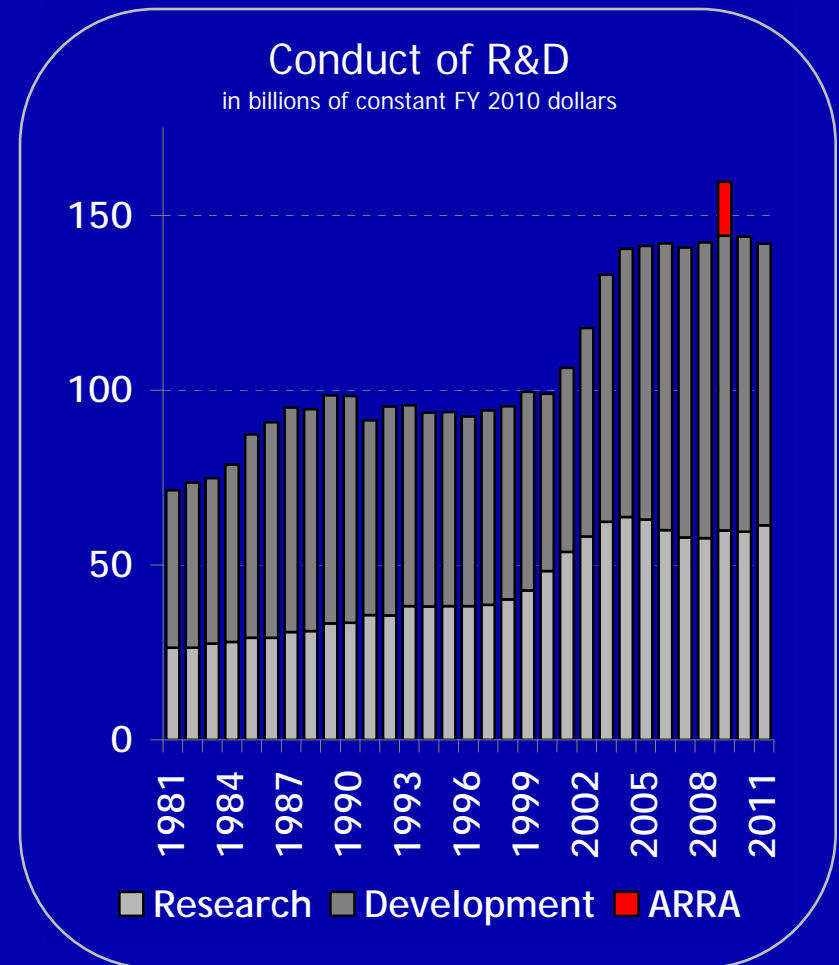
Funding Shifts: Function

- Defense
 - -\$4.1b to \$82.2b
 - 4.8% decrease
- Nondefense
 - +3.6b to \$65.9b
 - 5.8% increase



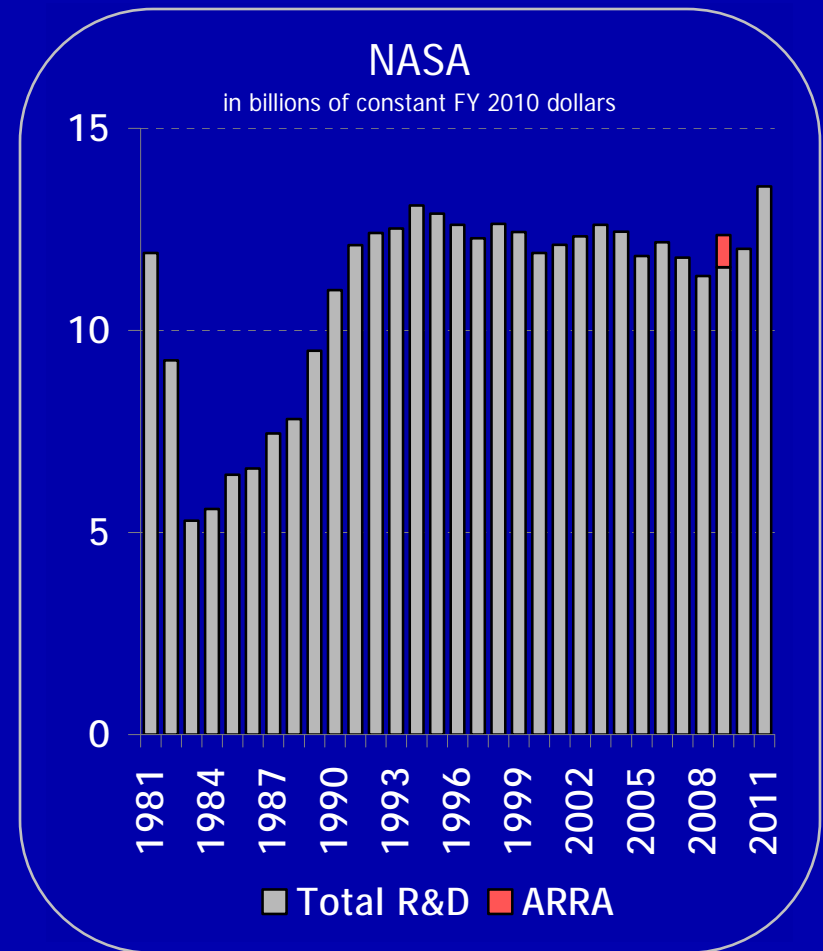
Funding Shifts: Character

- Development
 - -\$2.9b to \$81.5b
 - 3.5% decrease
- Research
 - +\$2.5b to \$62.0b
 - 4.1% increase



Funding Shifts: NASA

- Retire space shuttle and cancel Constellation Program
- Frees \$6.5b over 2 yrs
- Near-earth orbit through private industry
 - +\$6.1b over 5 yrs
- Heavy Lift and Propulsion
 - +\$559m
- International Space Station
 - +\$905m to \$3.2b over 4 yrs

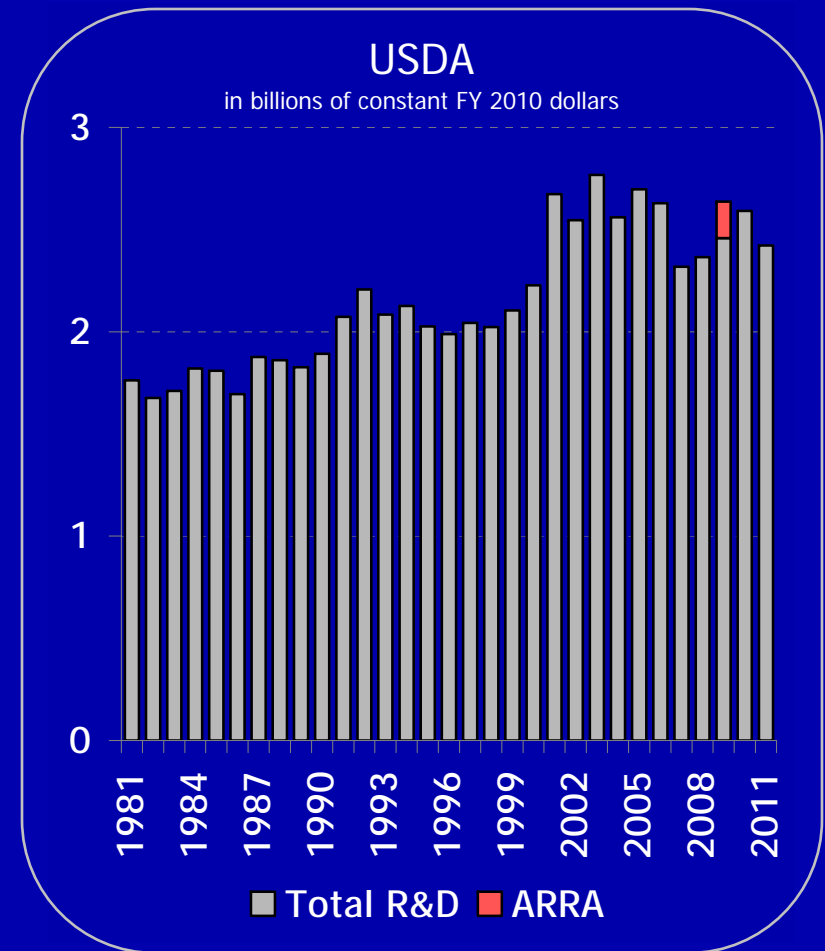


NASA Update

- Congressional Concerns
 - U.S. space leadership
 - Reliance on industry/Russia for near-earth orbit
 - Jobs
- Administration Response - Kennedy Space Center - April 15
 - Use Orion technology for Space Station rescue vehicle
 - Heavy lift and propulsion: \$3b over next few years
 - Final design by 2015
 - Job assistance: \$40m
- Sen. Nelson (D-FL) letter to Sen. Mikulski (D-MD) - June 14
 - International Space Station through 2020; one additional shuttle mission
 - Commercial cargo capability and crew services
 - International effort for beyond-Earth orbit; Heavy-lift and crew exploration vehicles

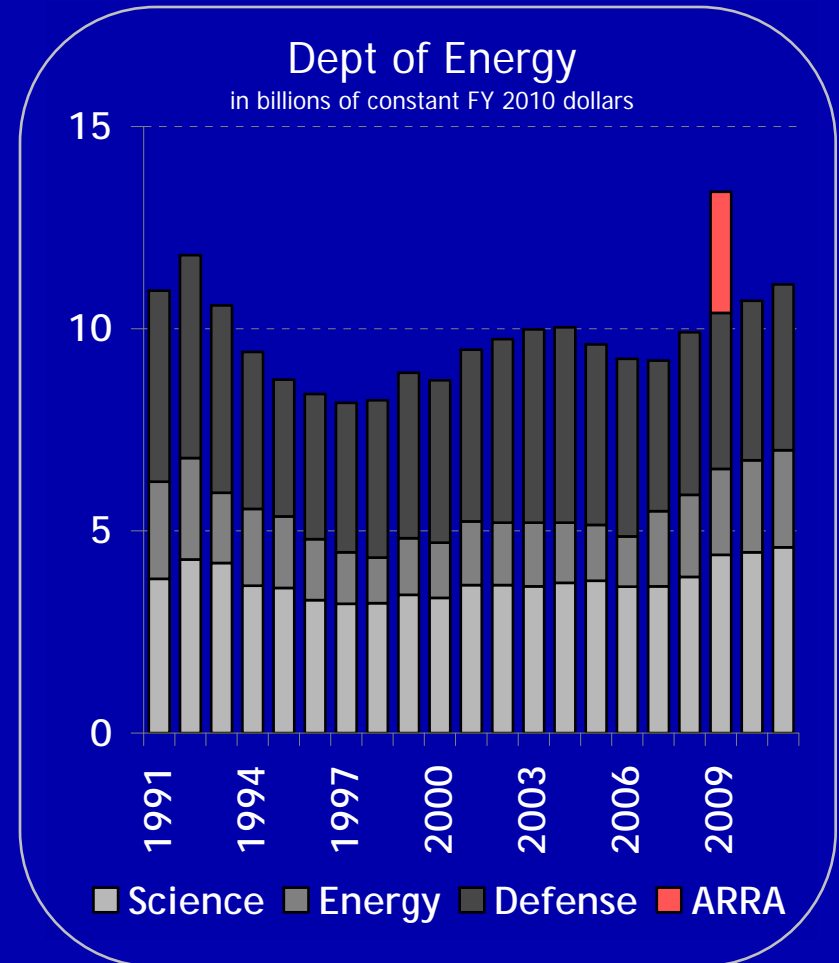
Funding Shifts: USDA

- Buildings and Facilities
 - -\$147m to -\$76m in R&D after rescissions
- Agriculture and Food Research Initiative (AFRI)
 - +\$166m to \$429m in total budget
 - 63.4% increase



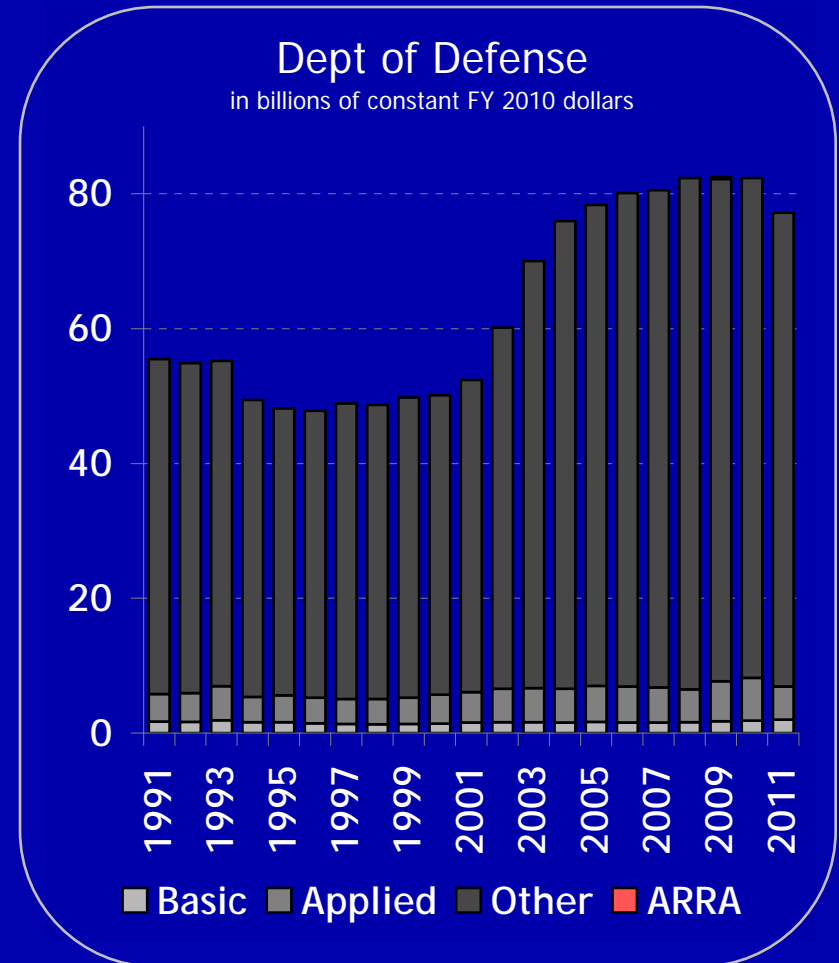
Funding Shifts: Dept of Energy

- Fossil, -\$53m
- Nuclear, -\$122m
- EERE, +\$35m
- Electric Grid, +\$22m
- Office of Science, +\$172m
- ARPA-E, +\$273m



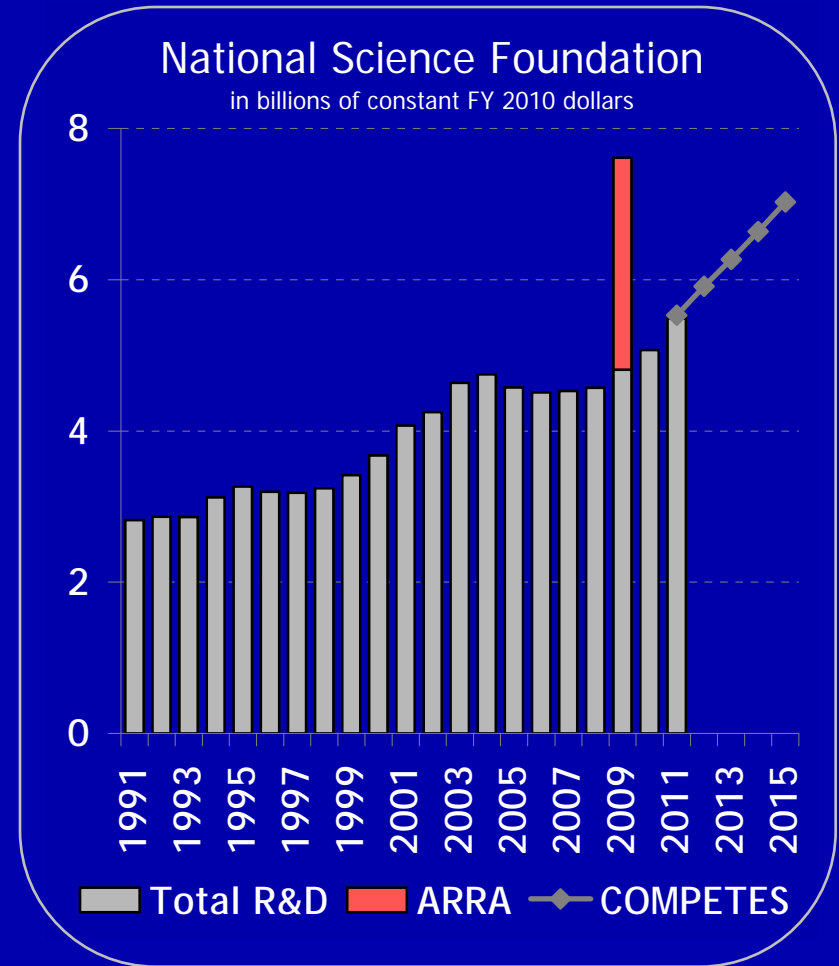
Funding Shifts: Dept of Defense

- Basic Research
 - +6.7% to \$2.0b
- Development
 - -5.0% to \$71.0b
- DARPA
 - +3.7% to \$3.1b
- From major weapons systems to counter insurgency in future years



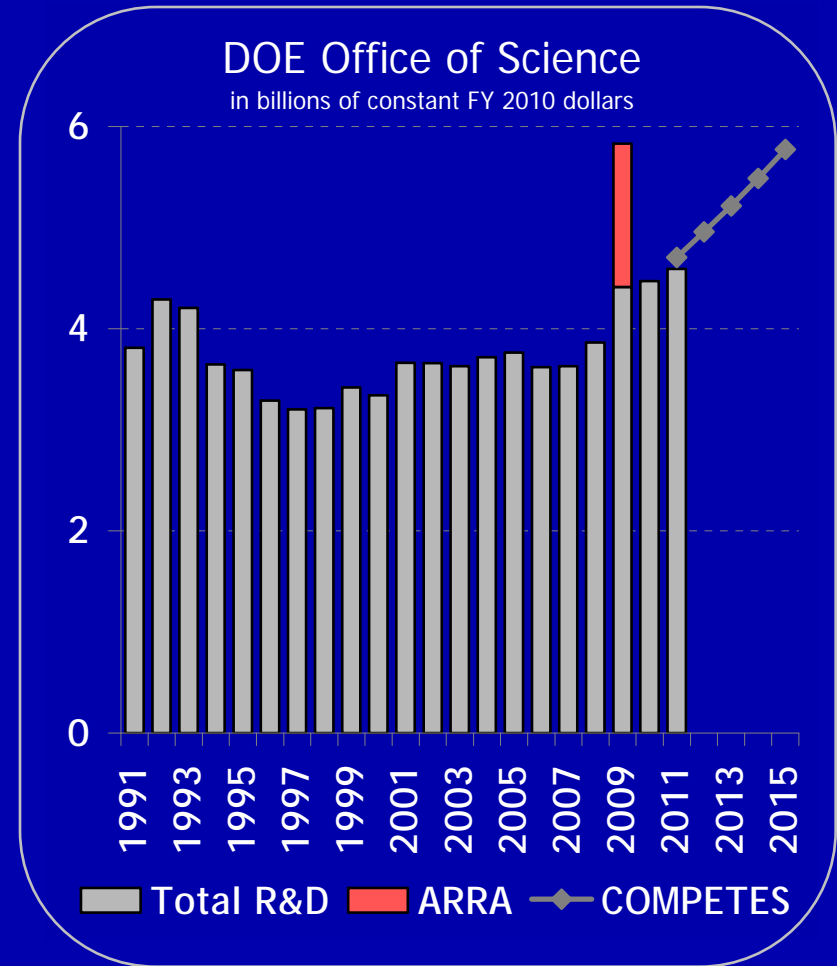
Funding Doubling for Basic Research

- National Science Foundation
 - Total Budget: +8.0% to \$7.4b
 - R&D: +9.4% to \$5.5b
 - National Innovation Strategy
 - Next-Generation Information and Communications Technology
 - Innovation-Based Entrepreneurship
 - Workforce Development
 - Broadening Participation



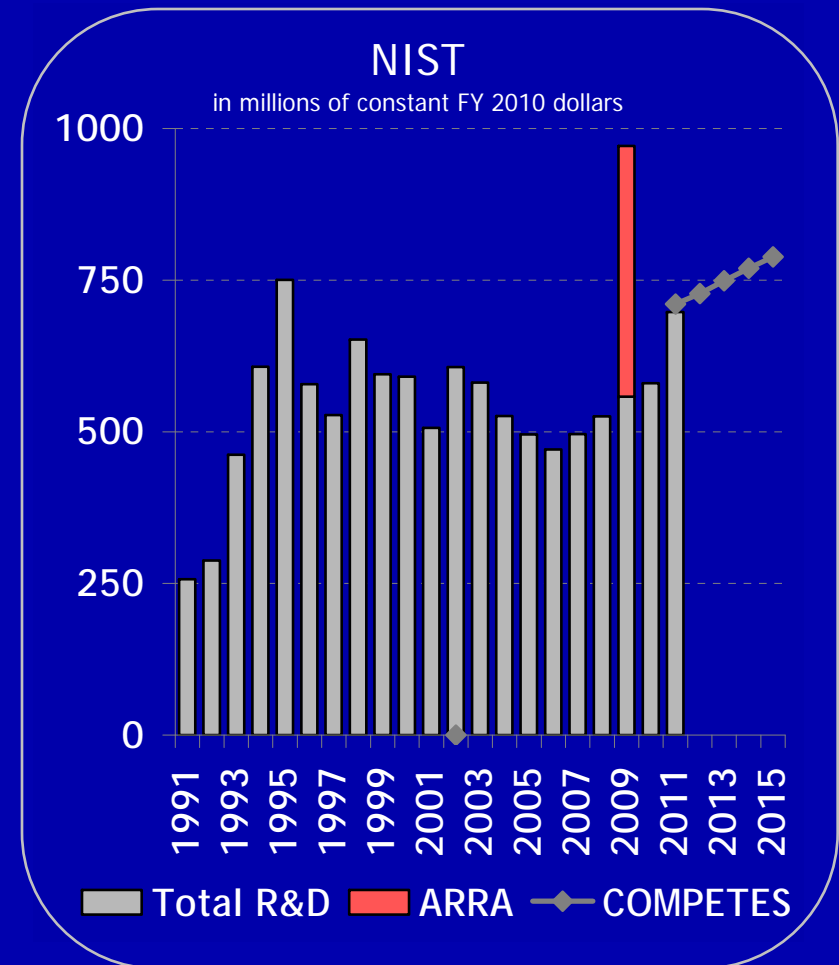
Funding Doubling for Basic Research

- DOE Office of Science
 - Total Budget: +4.4% to \$5.1b
 - R&D: +3.8% to \$4.6b
 - New Energy Innovation Hub
 - Batteries and Energy Storage
 - Energy Frontier Research Centers (EFRCs)
 - Advanced Computing
 - Scientific User Facilities
 - Education and Workforce Development



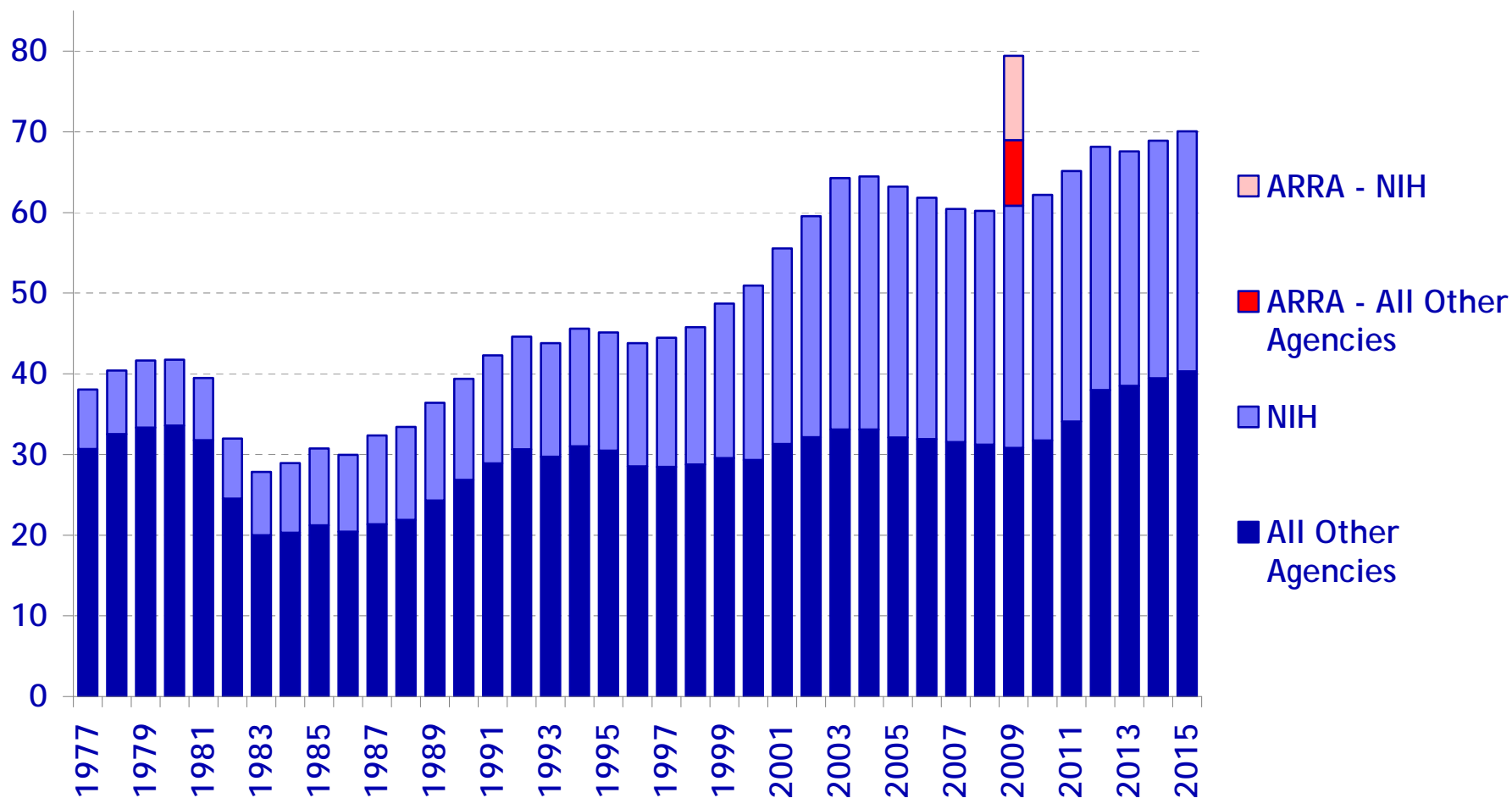
Funding Doubling for Basic Research

- National Institute of Standards and Technology
 - Total Budget: +7.3% to \$919 million
 - NIST Labs (STRS)
 - +13.5% to \$585 million
 - R&D
 - +21.7% to \$706 million
 - Competitive Manufacturing and Construction in a Clean-Energy Economy
 - +\$34.6 million



Trends in Nondefense R&D by Agency

in billions of constant FY 2010 dollars

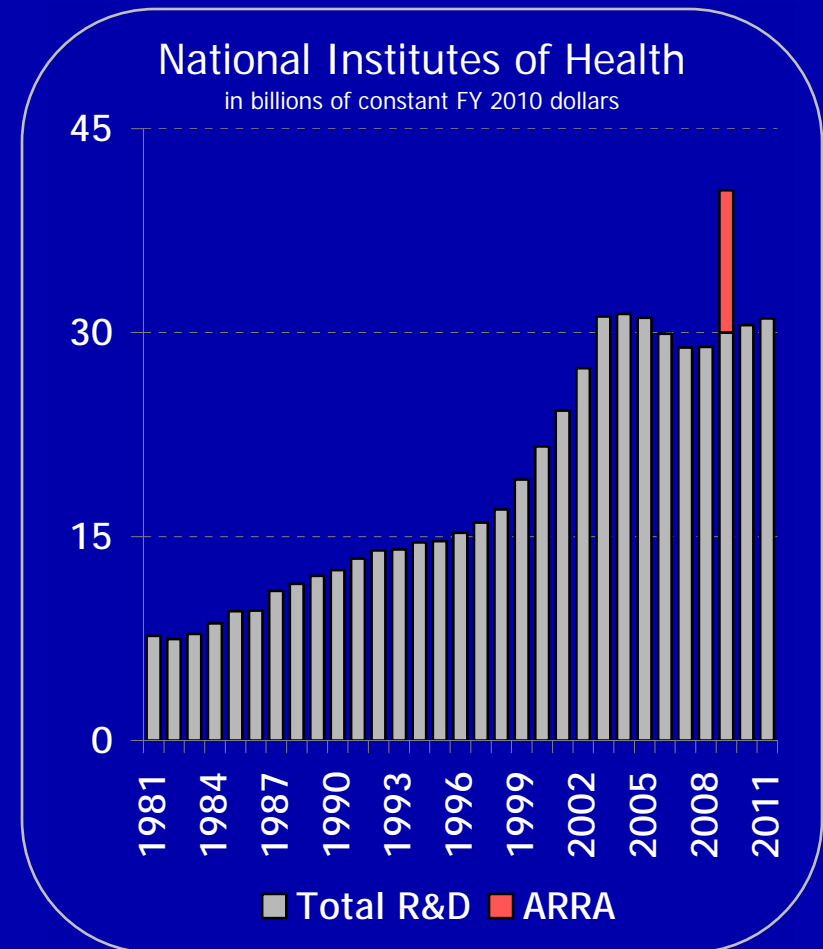


Source: AAAS Report: Research & Development series.
 FY 2010 and FY 2011 figures are latest estimates.
 FY 2012 through FY 2015 are projections.
 1976-1994 figures are NSF data on obligations in the Federal Funds survey.
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National Institutes of Health

- Total Budget: +2.8% to \$32.2b
- R&D: +2.8% to \$31.4b
- Cancer and autism spectrum disorders
- AIDS research - Global Fund
- National Nanotechnology Initiative: +6.0% to \$382m
- Therapeutics for Rare and Neglected Diseases (TRND)
 - +\$26m to \$50m
- National Synchrotron Light Source-II (NSLS-II): \$33m

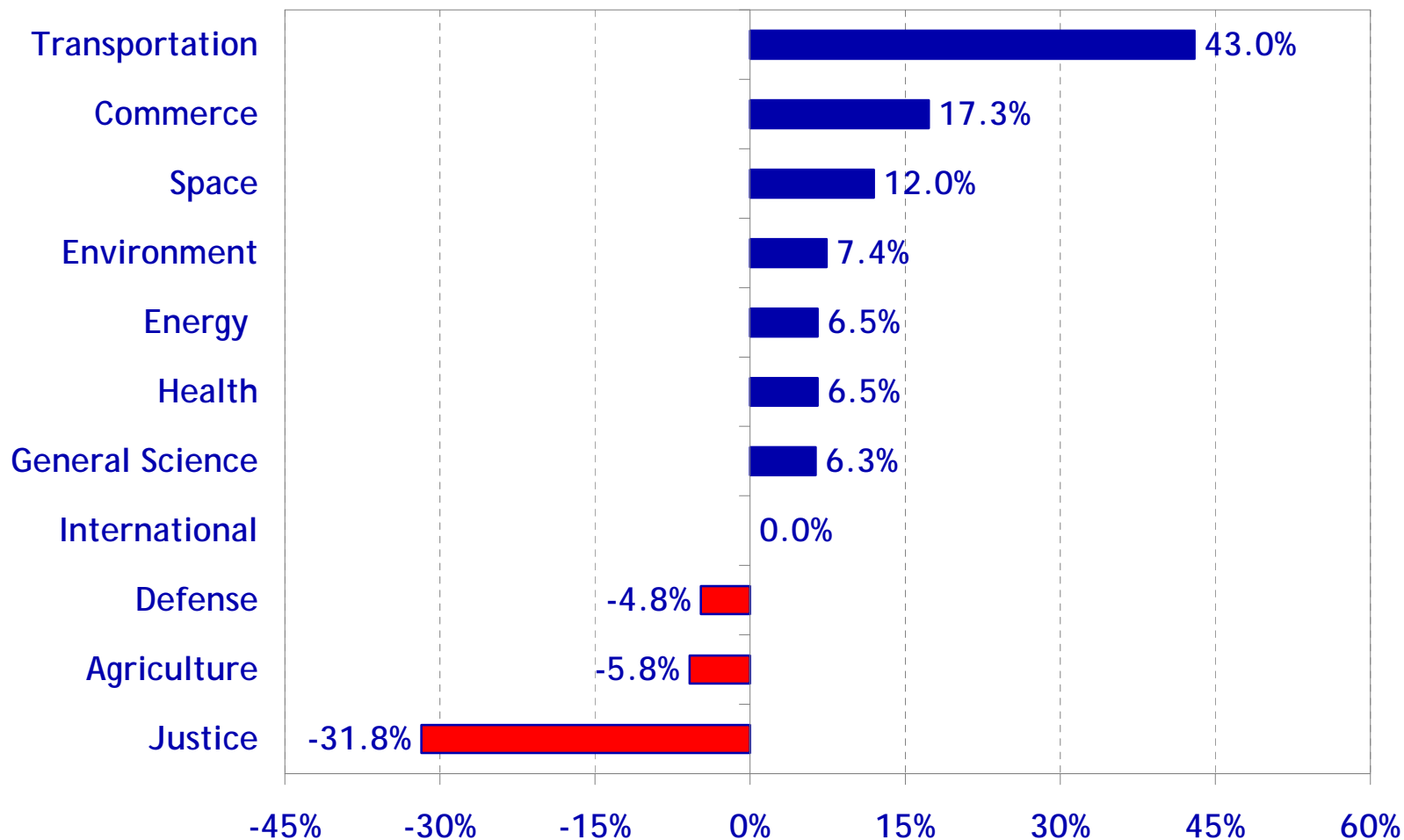


R&D Investment Priorities

- New Industries and Jobs
 - Advanced materials and manufacturing methods
 - \$6.1b over 5 years for commercial earth orbit
- Cleaner Energy
 - +\$155m (+6.8%) for DOE Energy R&D
- Healthier America
 - +\$956m (+3.1%) for National Institutes of Health R&D
- Enhanced Security
 - DOD Basic Research: +6.7% to \$2.0b

FY 2011 R&D Budget Request by Function

percent change from FY 2010



Source: OMB and agency budget data.
Environment includes natural resources R&D
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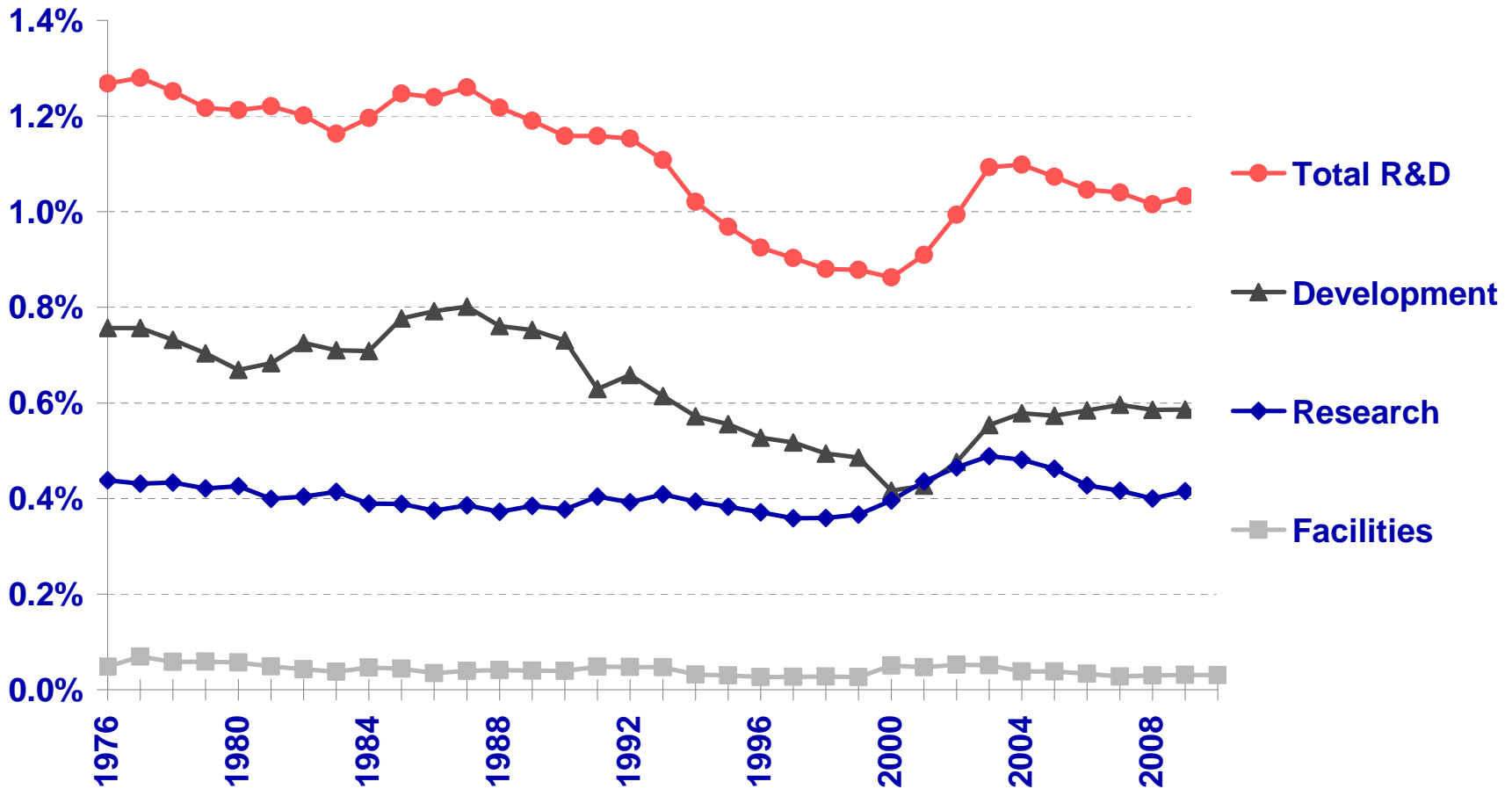
STEM Education

- \$3.7b, +\$32m from FY 2010
- K-12 Education
 - Dept of Ed: \$450m, NASA: \$63m, NSF: \$41m
- RE-ENERGYSE (Undergraduate)
 - NSF: \$19m, DOE: \$55m
- Undergraduate Diversity
 - NSF: +14% to \$103m
- Graduate Fellowships
 - NSF: +16% to \$158m, NIH: +5% to \$824m, EPA: +55% to \$17m
DOD: +4% to \$40m, DOE: +\$10m to \$15m

International R&D Investment

- 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

Trends in Federal R&D as Percent of GDP, FY 1976-2010



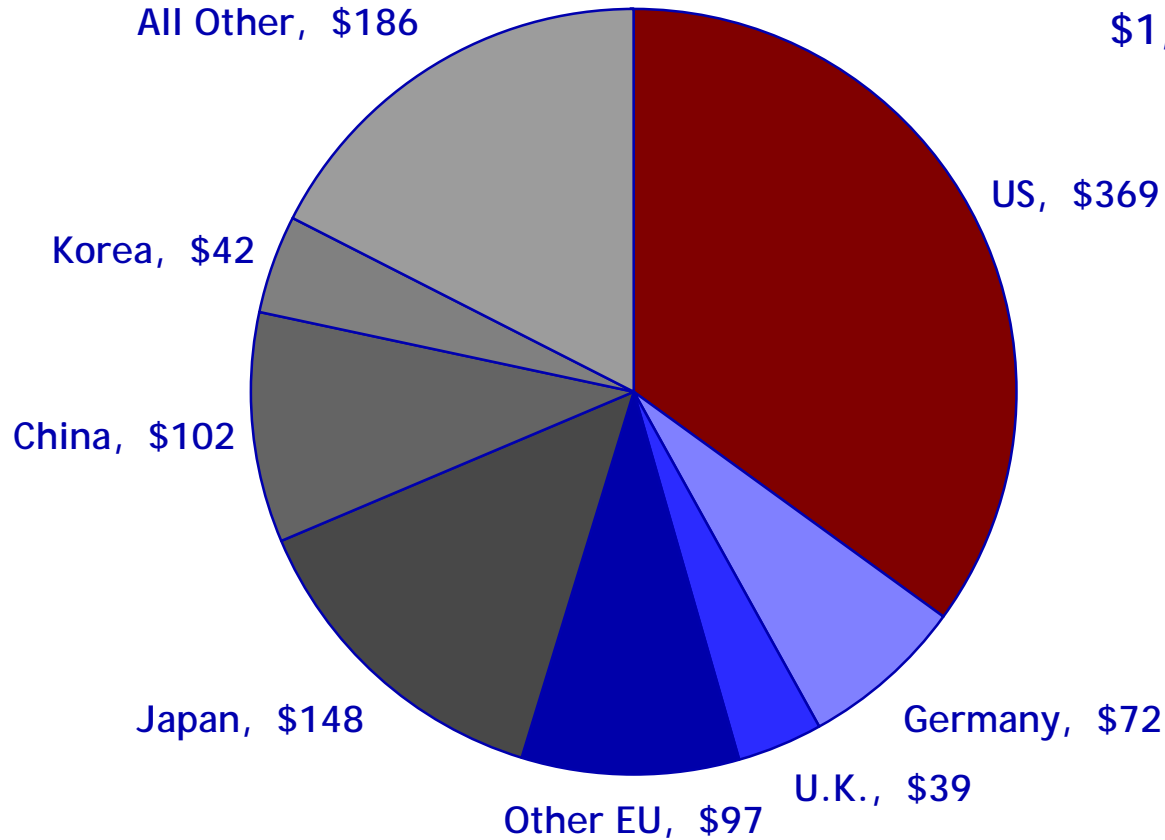
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 R&D includes conduct of R&D and R&D facilities.
 Data to 1984 are obligations from the NSF Federal Funds survey.
 GDP figures are from OMB, *Budget of the U.S. Government FY 2010*.
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Total World R&D, 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.

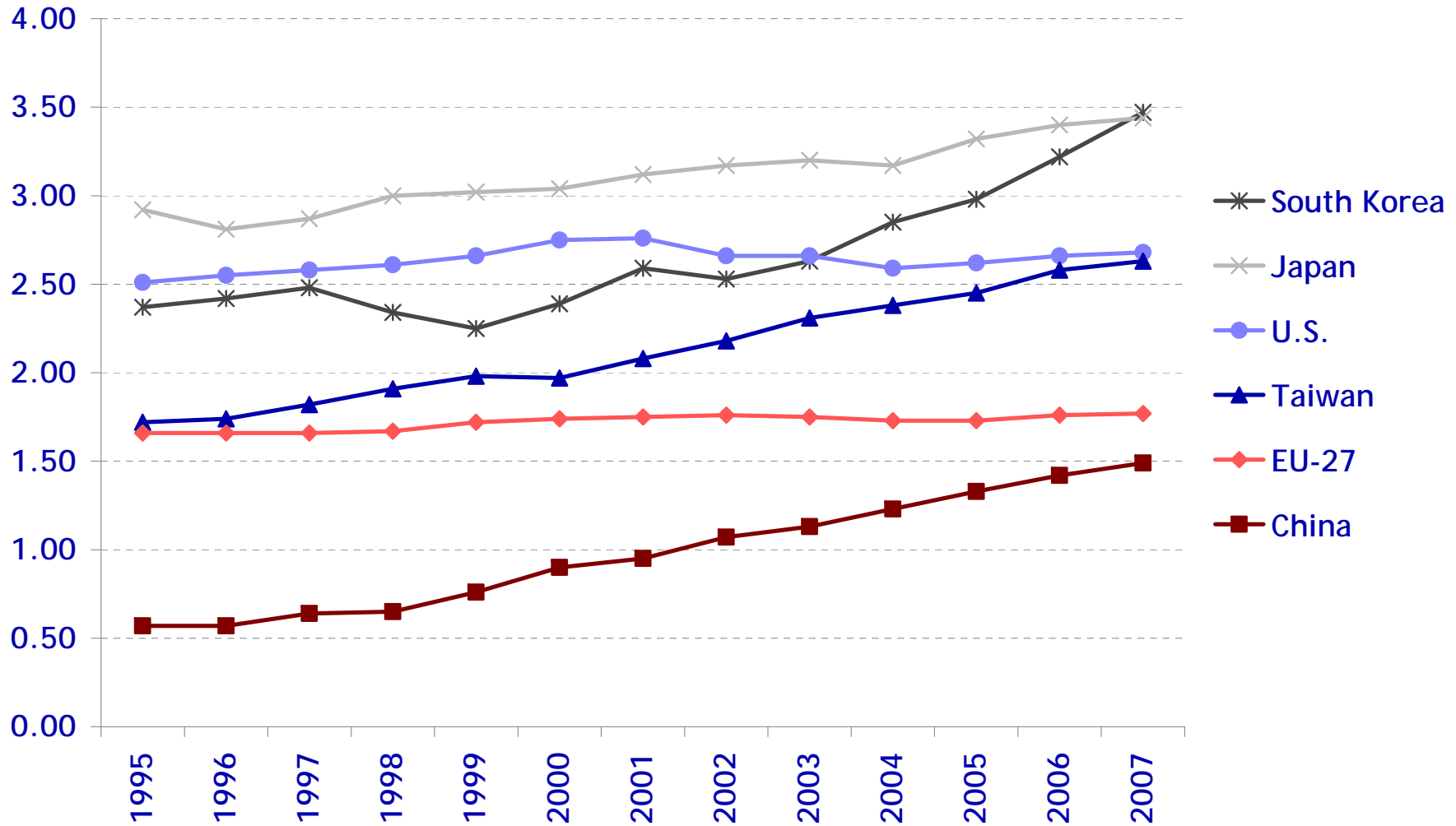
Calculated using purchasing power parities.

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National R&D Investment

percent of GDP



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

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Next Steps

- The Senate Budget Committee has approved a budget resolution.
 - The House leadership is deciding whether to put one together and is negotiating funding levels.
- Fall elections might push budget action back to November.
- After the budget resolution, Congress determines the 302(b)s, allocating a specific amount to each appropriation subcommittee.
- Congress needs to pass 12 appropriation bills, ideally by Sept. 30, the end of FY 2010.
- FY 2012: OMB Memos: 5% reduction; list low-impact programs

For More Information...

The AAAS R&D web site is
<http://www.aaas.org/spp/rd/>

The FY 2012 AAAS Forum on
Science and Technology Policy
is May 5-6, 2011
in Washington, DC

AAAS REPORT XXXV Research & Development FY 2011

Intersociety Working Group



