

Research and Development in the FY 2010 U.S. Federal Budget

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for The American Society for Cell Biology

AAAS R&D Budget and Policy Program

<http://www.aaas.org/spp/rd>

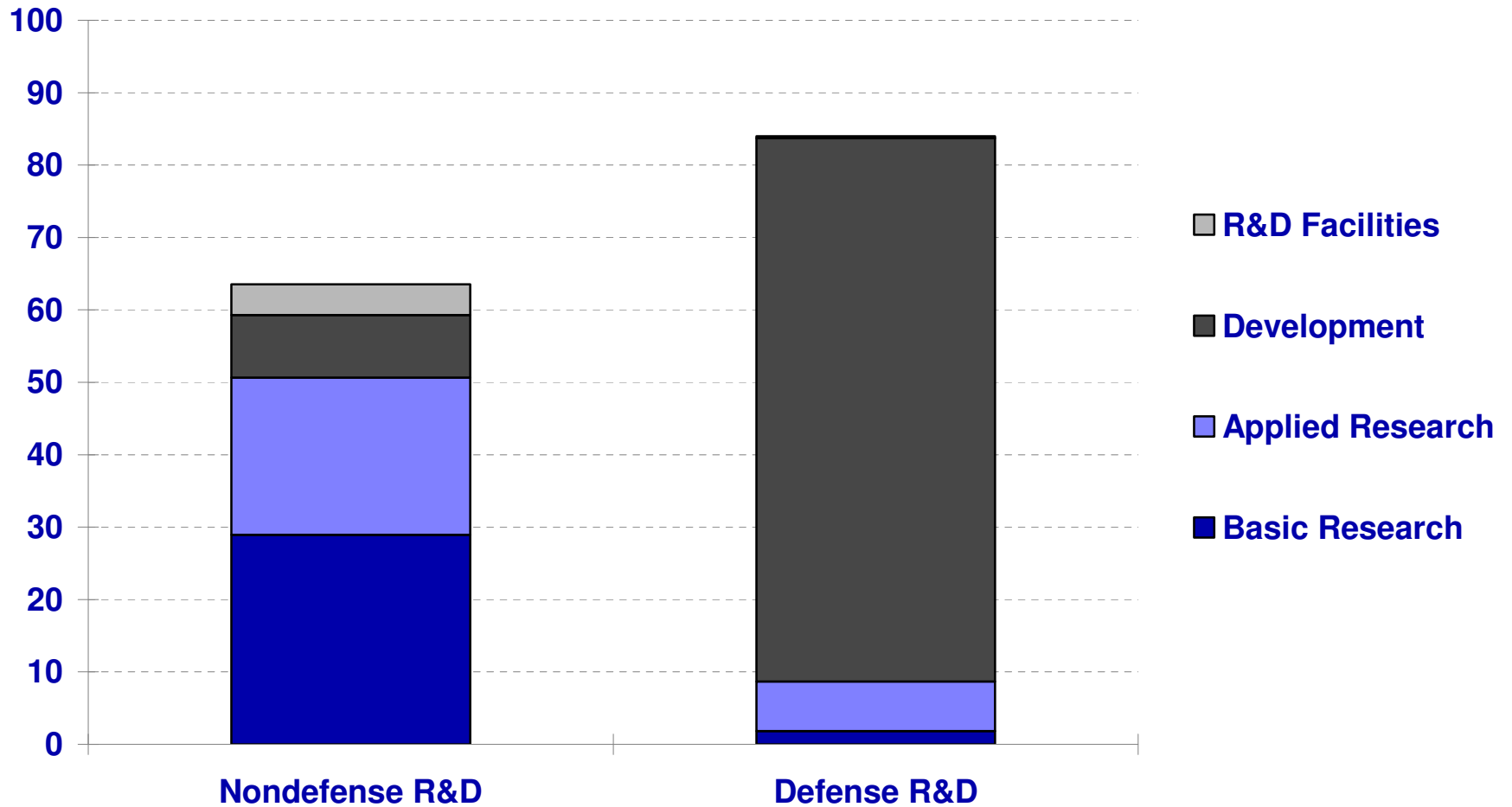
See the “Seminars and Presentations” section for
copies of this presentation.

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 (54.2%)
 - Department of Health and Human Services (21.0%)
- Role of federal R&D
 - Supports federal missions
 - Drives U.S. innovation

Character of Defense and Nondefense R&D, FY 2010

budget authority in billions of dollars

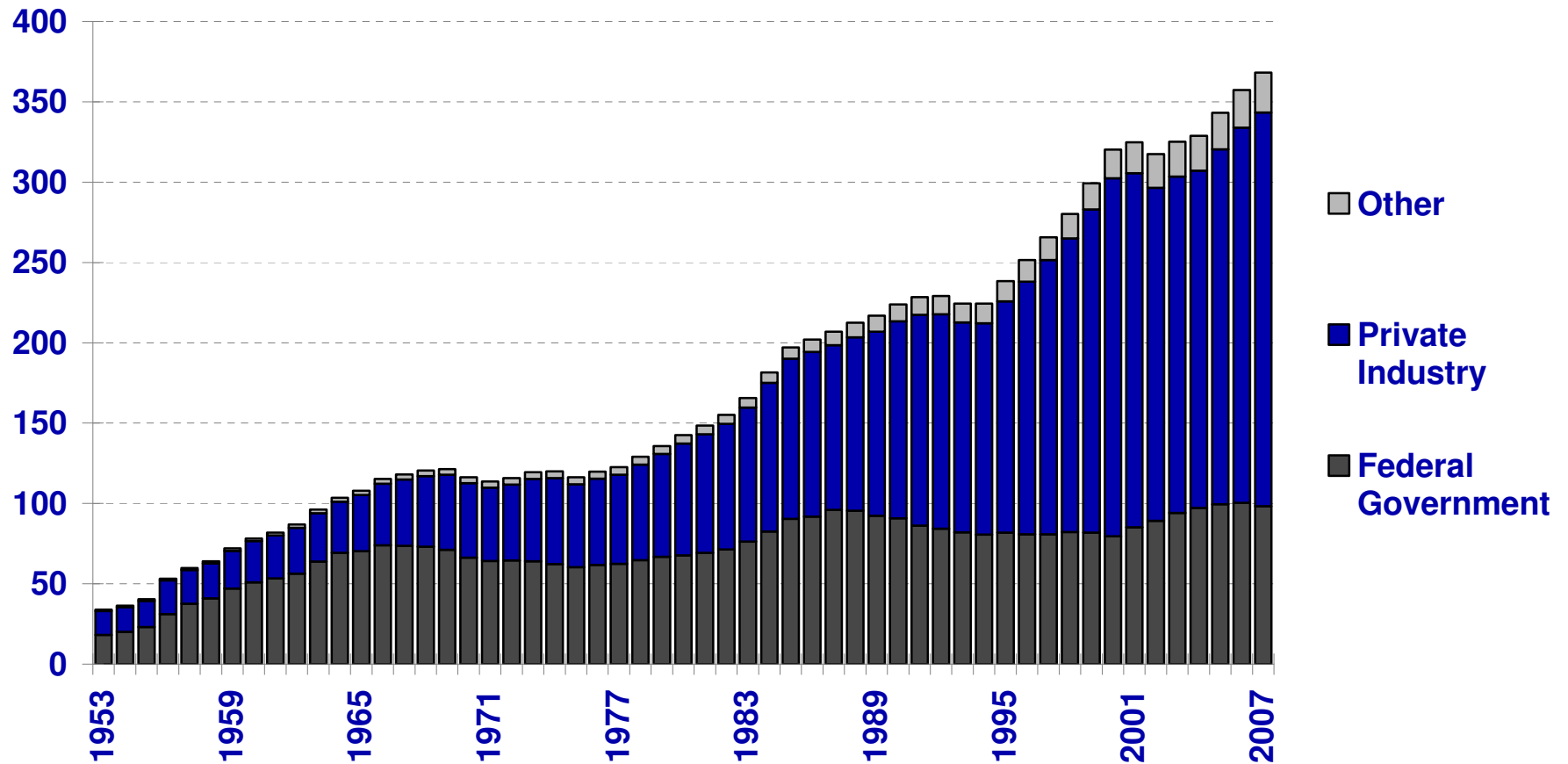


Source: OMB R&D budget data and agency budget justifications.
Defense R&D = DOD + DOE defense.
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Federal R&D Funding by Source, 1953-2007

outlays in billions of constant 2007 dollars

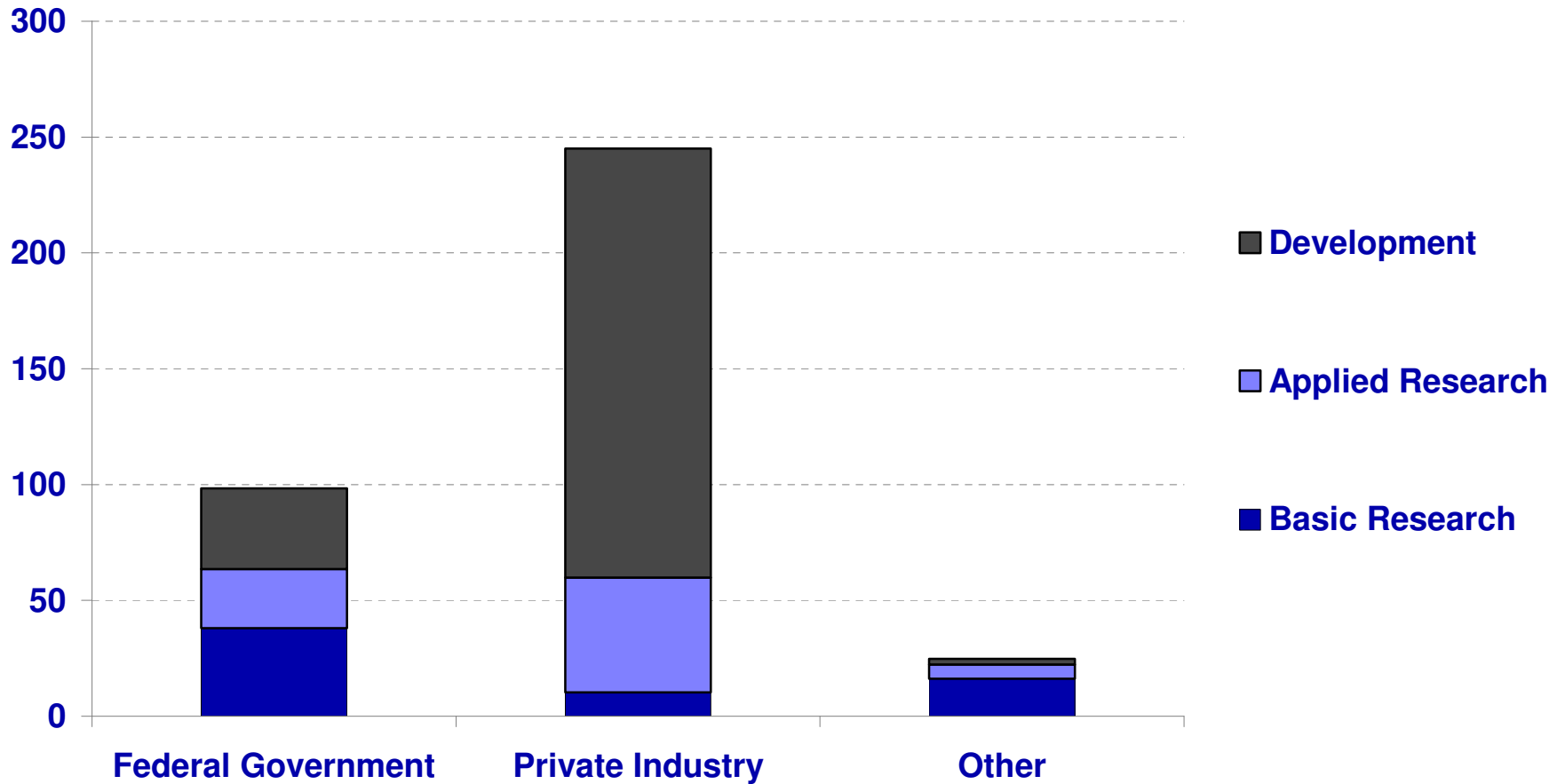


Source: NSF, Division of Science Resources Statistics,
National Patterns of R&D Resources (NSF 08-318)
2007 figures are preliminary.
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Character of R&D, 2007

outlays in billions of dollars



Source: NSF, Division of Science Resources Statistics,
National Patterns of R&D Resources (NSF 08-318)
2007 figures are preliminary.
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The Federal Budget Cycle

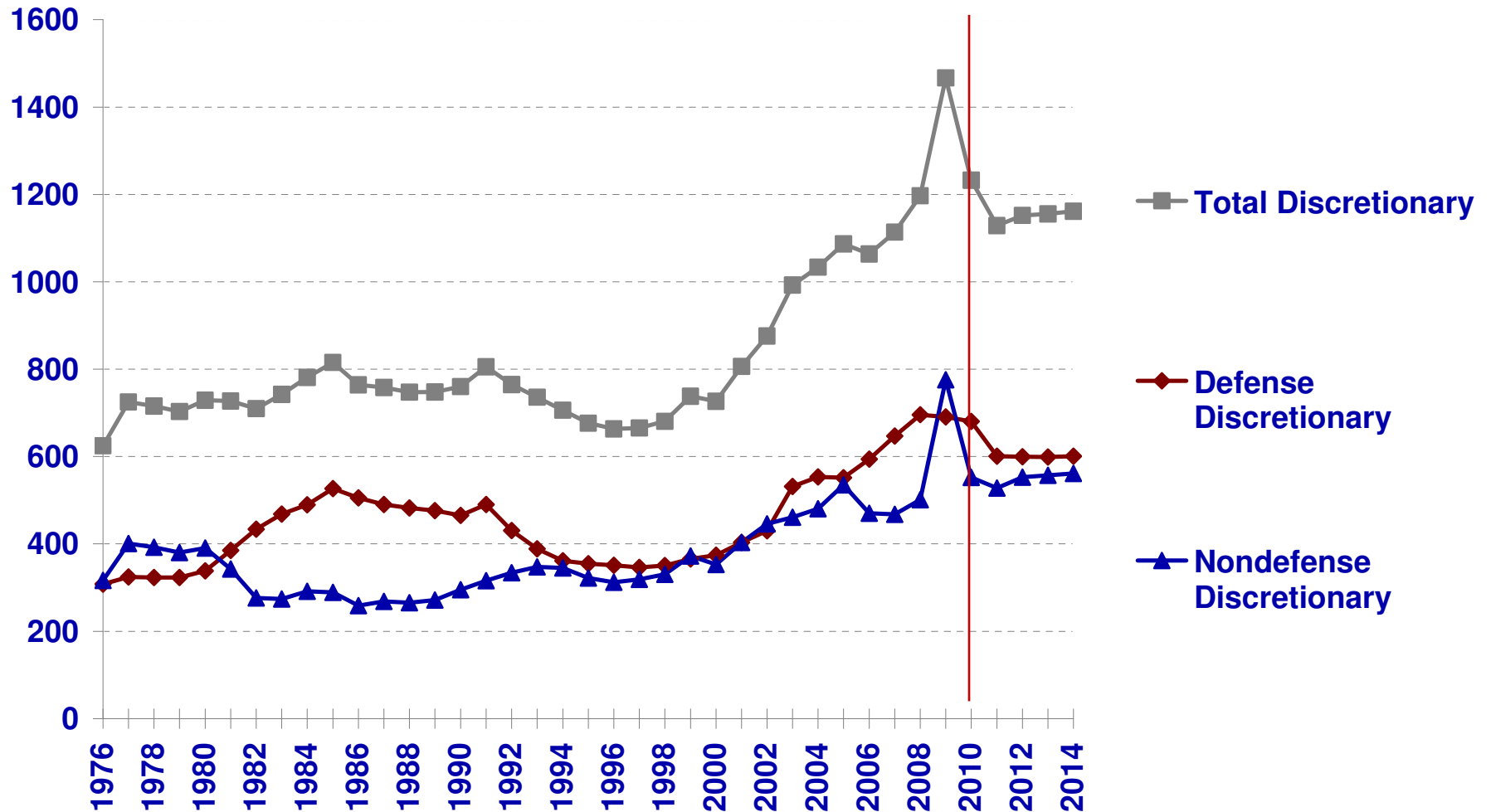
FY 2010	----- Spend Fiscal Year Budget -----																							
FY 2011	Negotiate and finalize budget proposal with OMB via passbacks				Budget Release	Budget Resolution 302(a) and (b) Hearings			Write, pass, and conference twelve appropriation bills				----- Spend Fiscal Year Budget -----											
FY 2012	Strategic planning within Agency					Agencies receive strategic guidance from OMB			Agencies submit budget proposals to OMB			Negotiate and finalize budget proposal with OMB via passbacks				Budget Release	Budget Resolution 302(a) and (b) Hearings			Write, pass, and conference twelve appropriation bills				
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep

The FY 2010 Budget

- \$3.6 trillion total budget, \$1.3 trillion unified deficit
- \$1.4 trillion discretionary spending (9.1% increase)
 - \$704 billion nondefense spending (16.0% increase)
- Includes military costs for activities in Iraq and Afghanistan
- Focuses on “stable and broad economic growth” by investing in:
 - Education
 - Healthcare
 - Energy

Trends in Discretionary Spending, FY 1976-2014

outlays in billions of constant FY 2009 dollars



Source: *Budget of the United States Government, FY 2010.*

FY 2009-2014 data are budget projections.

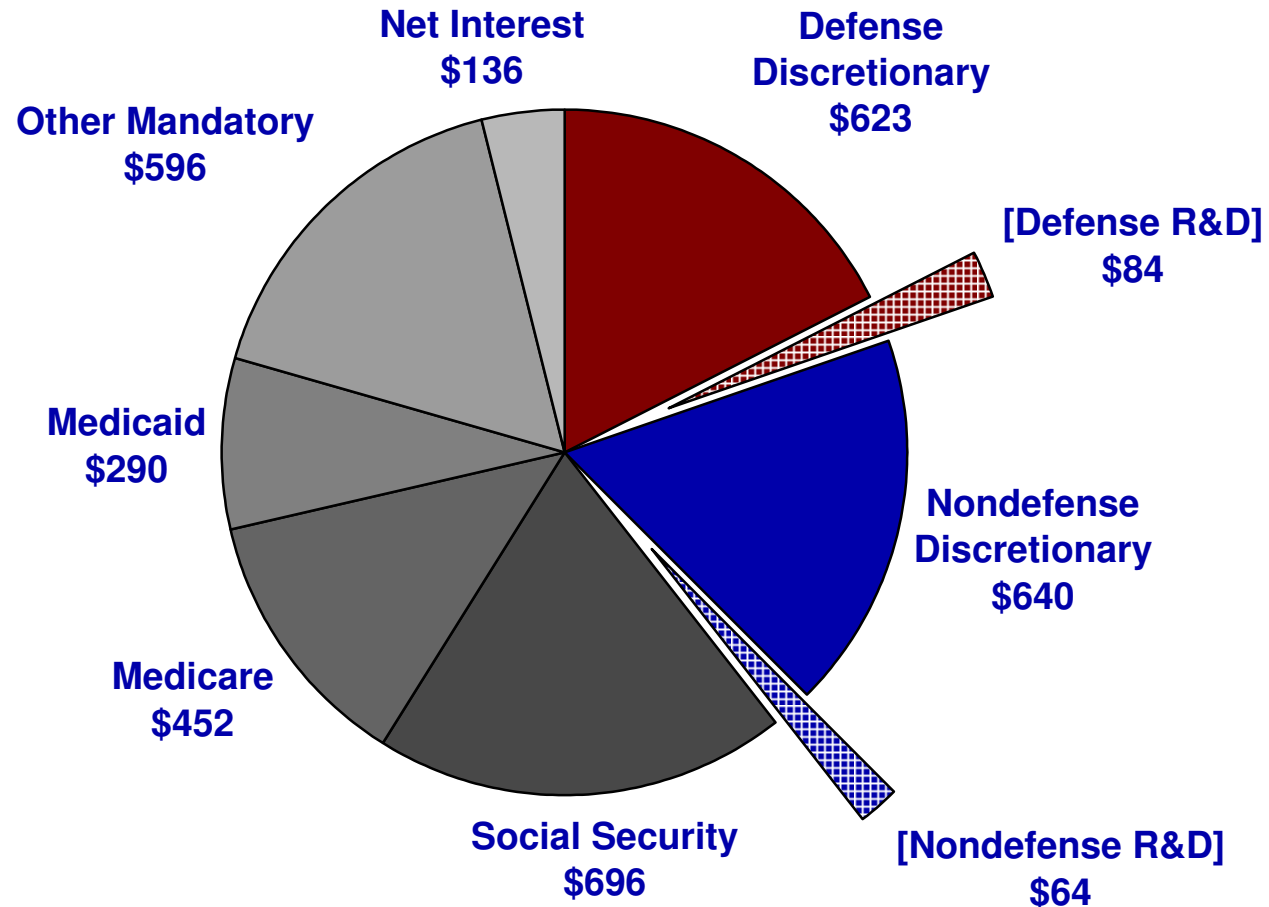
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Composition of the Proposed FY 2010 Budget

Total Outlays = \$3.6 trillion

outlays in billions of dollars



Source: *Budget of the United States Government FY 2010*

Projected unified deficit is \$1.3 trillion.

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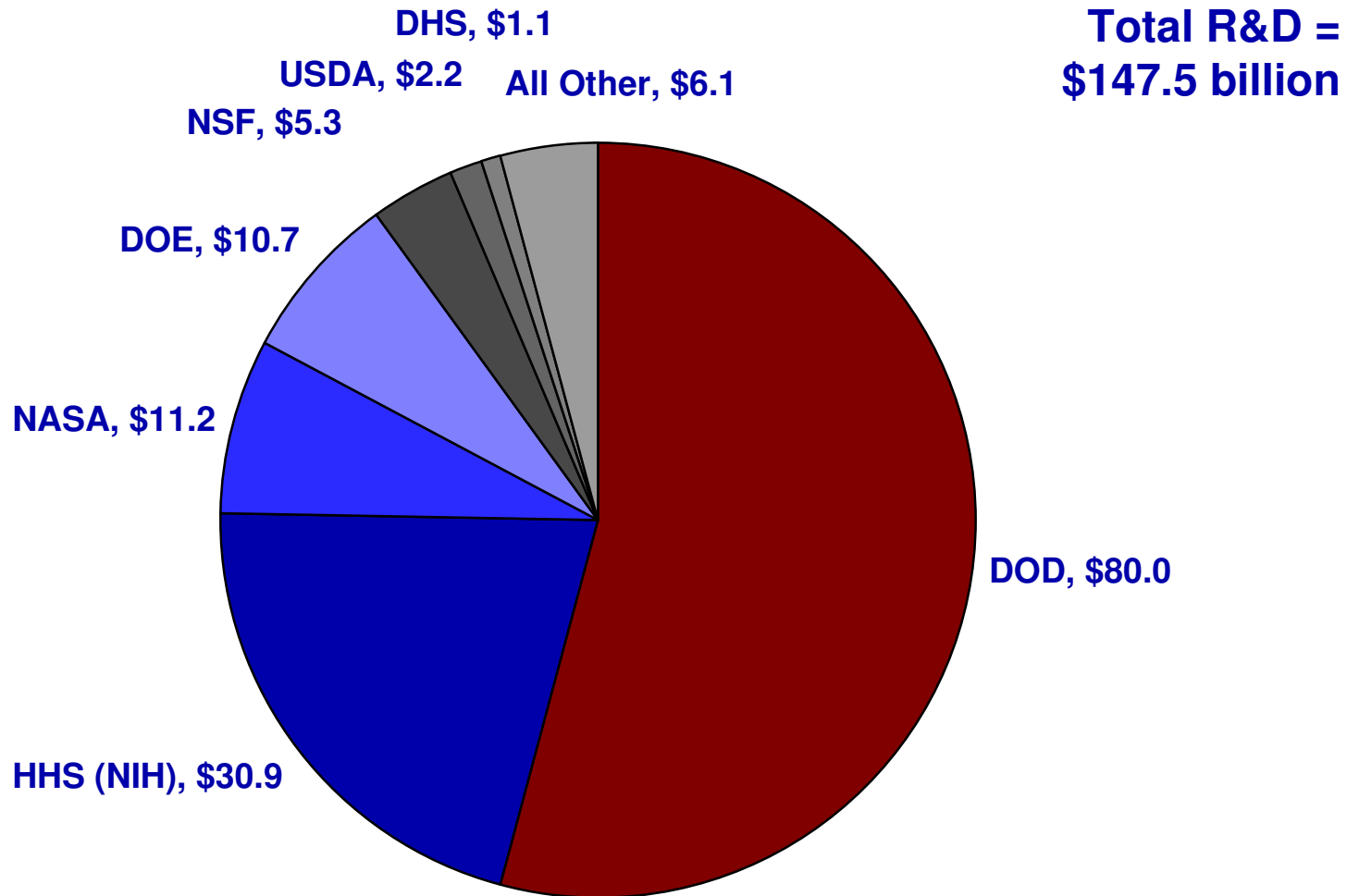


The FY 2010 Federal R&D Investment

- \$147.5 billion, 0.3% increase from FY 2009
 - Basic Research – \$30.8 billion, 3.4% increase
 - Applied Research – \$28.5 billion, 3.1% decrease
 - Development – \$83.7 billion, 0.4% increase
 - Equipment and Facilities – \$4.5 billion, 0.2% increase
- 0.7% decrease in real dollars from FY 2009
 - 1.5% increase in R&D investment since FY 2004
 - 6.8% decrease in research investment since FY 2004

Total R&D by Agency, FY 2010

budget authority in billions of dollars



Source: AAAS Report XXXIV: Research and Development FY 2010.

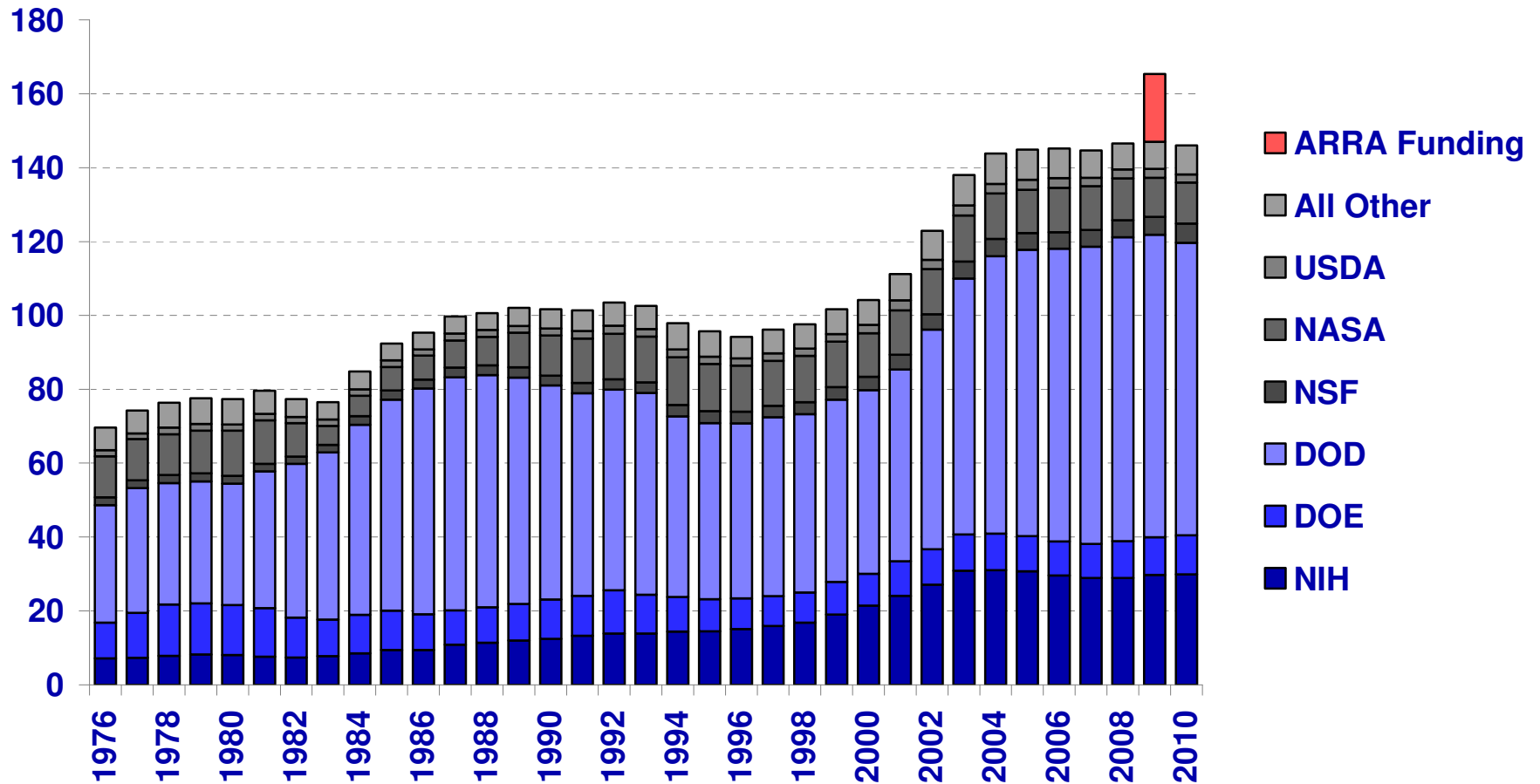
R&D includes conduct of R&D and R&D facilities.

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Trends in R&D by Agency, FY 1976-2010

in billions of constant FY 2009 dollars

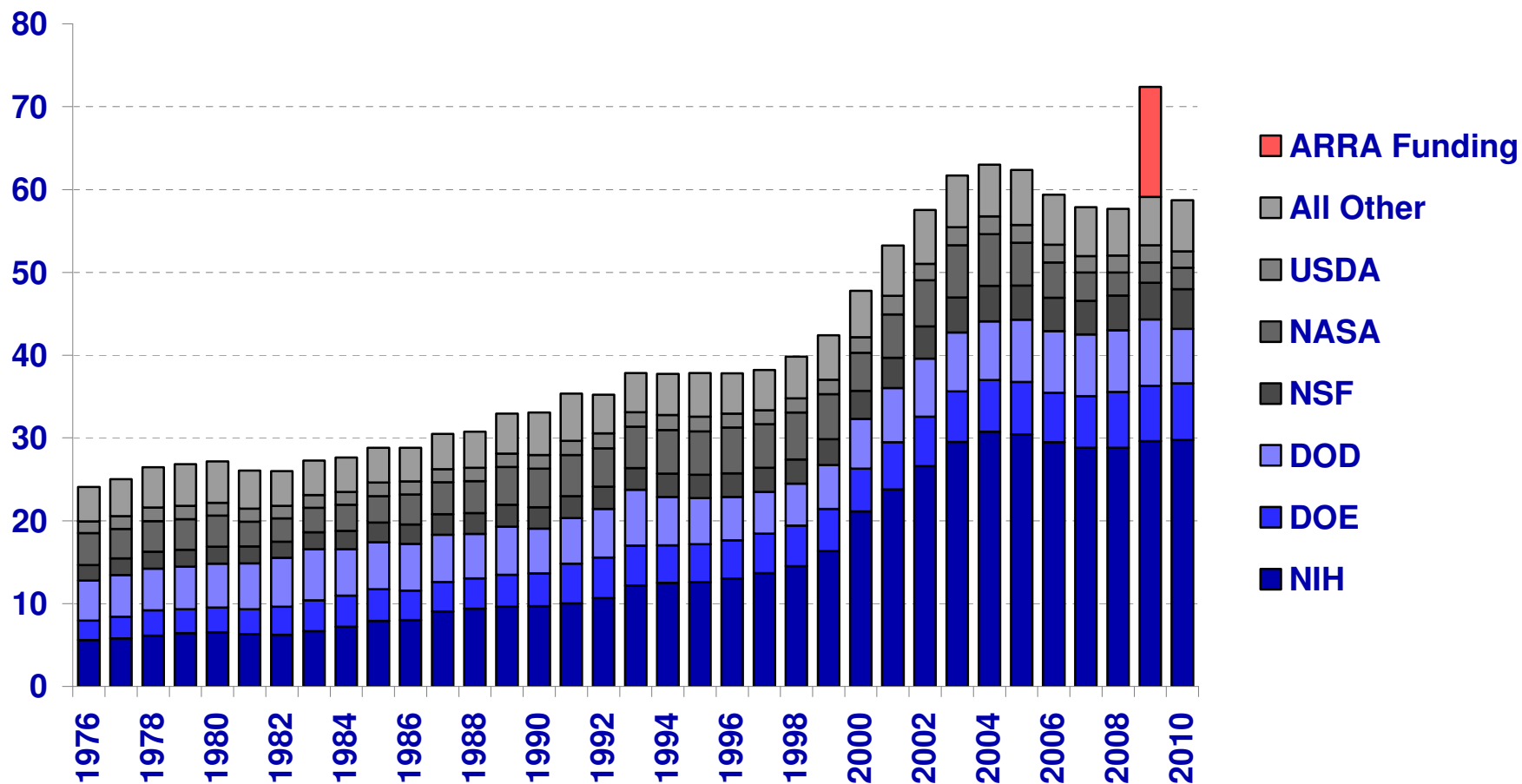


Source: AAAS Report: Research & Development series.
 FY 2009 and FY 2010 figures are latest estimates.
 1976-1994 figures are NSF data on obligations in the Federal Funds survey.
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Trends in Research by Agency, FY 1976-2010

in billions of constant FY 2009 dollars



Source: AAAS Report: Research & Development series.
 FY 2009 and FY 2010 figures are latest estimates.
 Research includes basic research and applied research.
 1976-1994 figures are NSF data on obligations in the Federal Funds survey.
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Counting the FY 2010 Budget

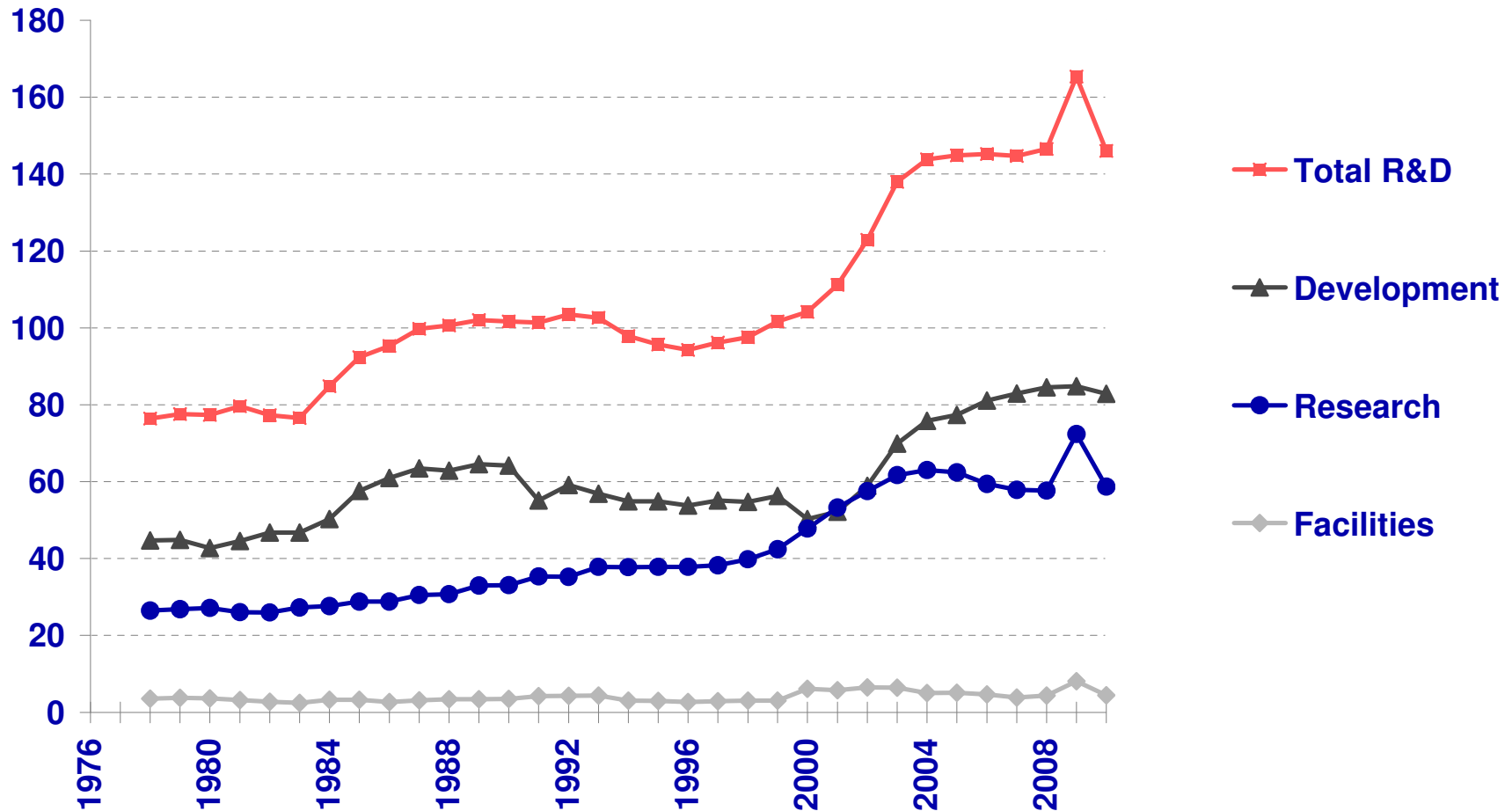
- 1** H.R.1: American Recovery and Reinvestment Act (ARRA)
- 2** Double Funding for Basic Research Agencies from 2006–2016
- 3** 3.0% of GDP Investment in R&D
- 4** Four R&D Investment Priorities

1 H.R.1: American Recovery and Reinvestment Act

- \$18.4 billion in R&D (12.5 percent of FY 2009 Investment)
 - National Institutes of Health - \$10.4 billion
 - National Science Foundation - \$3.0 billion
 - DOE Office of Science - \$1.6 billion
 - National Institute of Standards and Technology - \$600 million
- ARRA Obligation Deadline: September 30, 2010
- Different agencies, different mechanisms
- Buoyed the 0.3% increase in R&D investment from FY 09-10

Trends in Federal R&D, FY 1976-2010

in billions of constant FY 2009 dollars



Source: AAAS analyses of R&D in annual AAAS R&D reports.
 FY 2010 figures are latest AAAS estimates of FY 2010 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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NIH Stimulus Appropriations (\$10.4 B)

- To be spent over two years
- \$8.2 B for research priorities (\$7.4 B to institutes and common fund based on percentage); \$800 M to director's office
- \$1 B for extramural construction, repairs, alterations
- \$300 M for shared instrumentation, other capital equipment
- \$500 M for NIH buildings & facilities
- \$400 M for comparative effectiveness research (part of \$1.1 B HHS program)

ARRA Spending Update

- Department of Energy (\$36.7 billion)
 - Office of Science – 86.3%
 - ARPA-E – 1.1%
 - Electric Grid – 3.3%
 - Total – 50.2%
- National Institutes of Health (\$10.4 billion)
 - Grants – 53.6%
- National Science Foundation (\$3.0 billion)
 - Conduct of R&D – 91.8%
 - Total – 73.2%

2 Doubling Funding for Basic Research Agencies

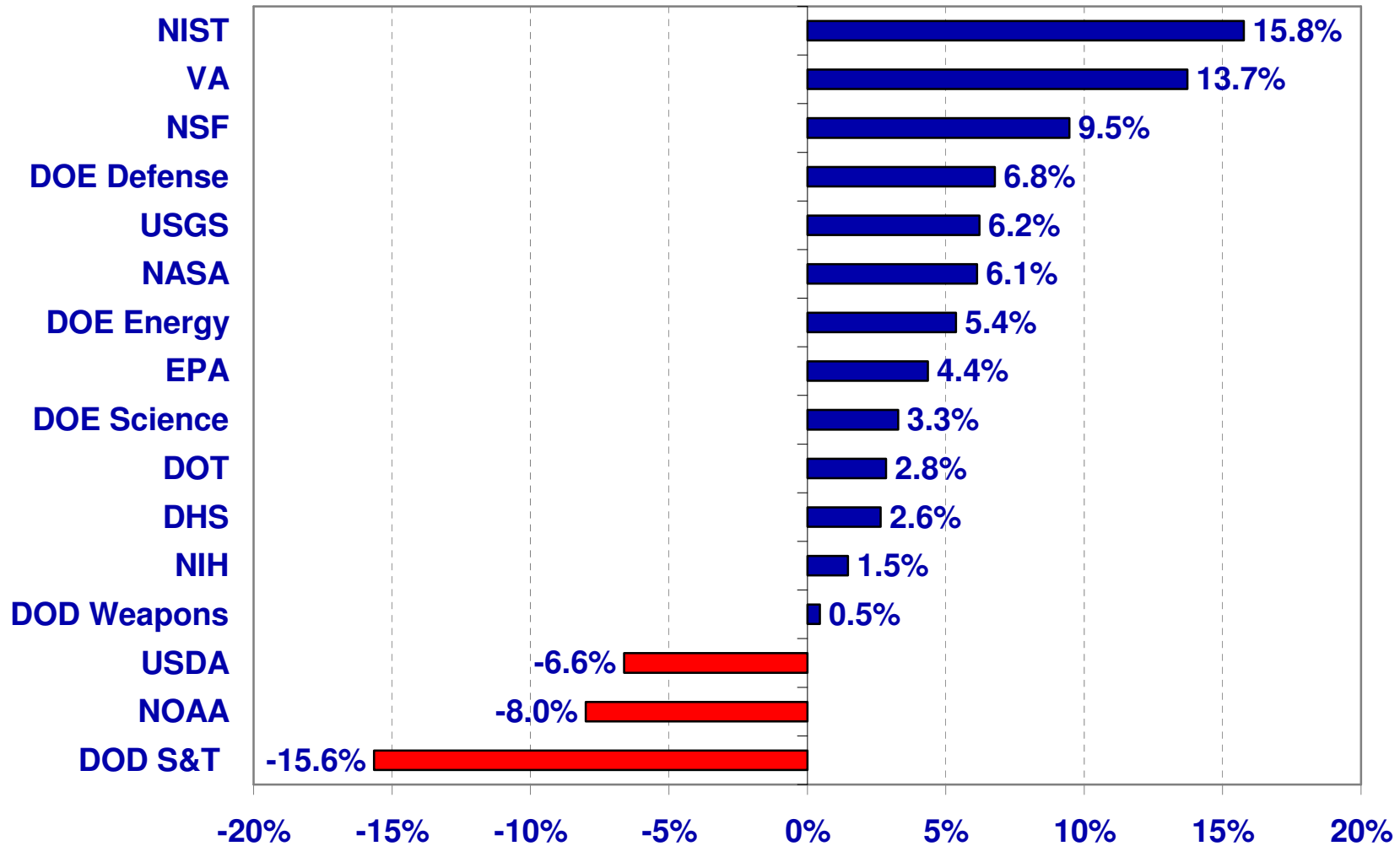
- National Science Foundation
 - 8.5% increase to \$7.0 billion
 - R&D – 9.5% increase to \$5.3 billion
- DOE Office of Science
 - 3.5% increase to \$4.9 billion
 - R&D – 3.3% increase to \$2.2 billion
- National Institute of Standards and Technology
 - 2.4% increase to \$849 million
 - R&D – 15.8% increase to \$637 million

Congressional Action on Basic Research Agencies

- National Science Foundation
 - Request – 8.5% increase to \$7.0 billion
 - House – 6.9% increase to \$6.9 billion
 - Senate – 6.6% increase to \$6.9 billion
- DOE Office of Science
 - Request – 3.5% increase to \$4.9 billion
 - Enacted – 2.7% increase to \$4.9 billion
- National Institute of Standards and Technology
 - Request – 3.3% increase to \$846 million
 - House – 4.6% decrease to \$781 million
 - Senate – 7.3% increase to \$879 million

FY 2010 R&D Budget Request

Percent Change from FY 2009



Source: Based on OMB R&D data and agency estimates for FY 2010.

DOD "S&T" = DOD R&D in "6.1" through "6.3" categories plus medical research.

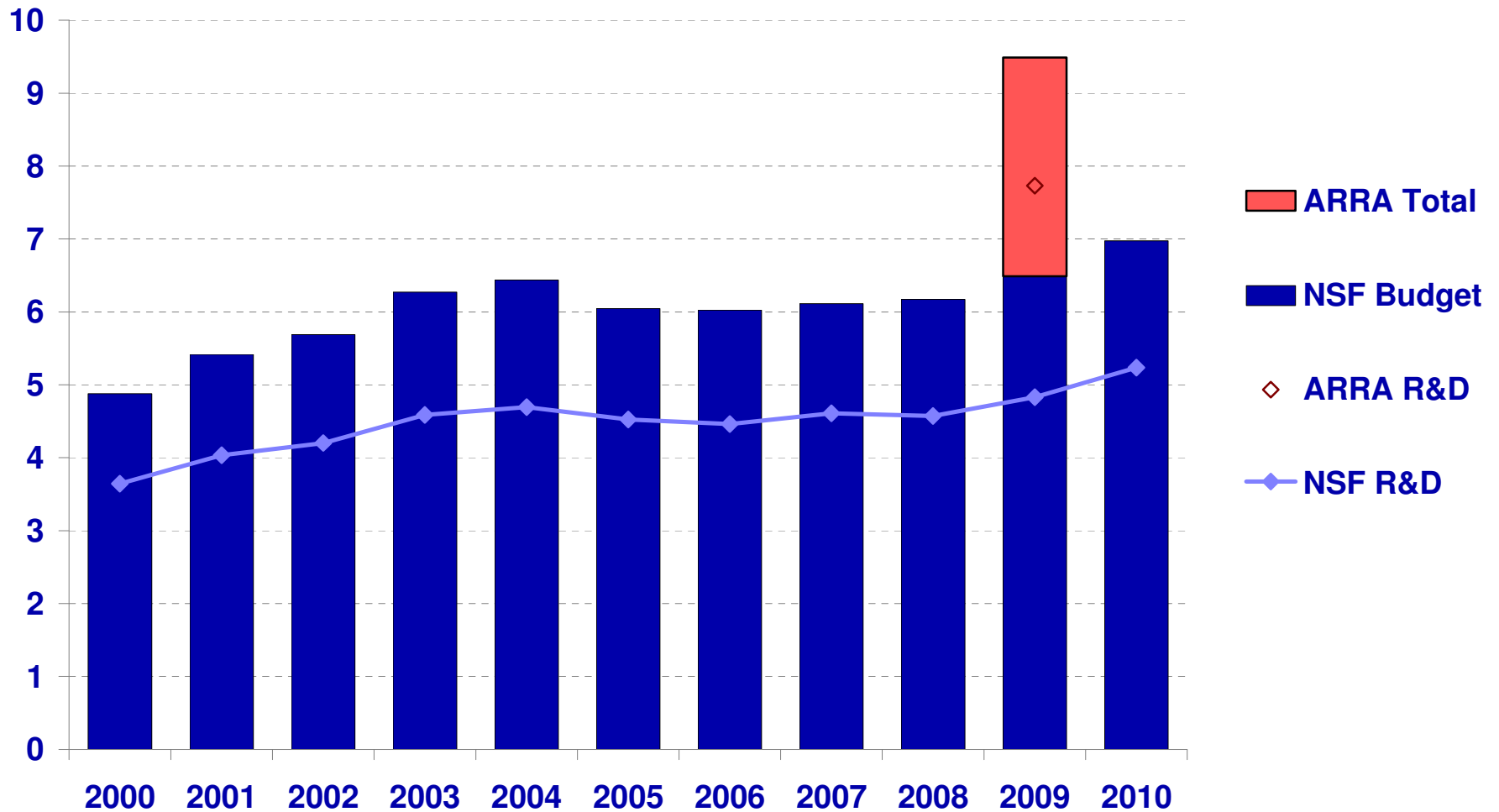
DOD weapons = DOD R&D in "6.4" and higher categories.

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National Science Foundation Budget, FY 2000-2010

budget authority in billions of constant FY 2009 dollars



Source: AAAS Report: Research & Development series.

FY 2009 and FY 2010 figures are latest estimates.

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

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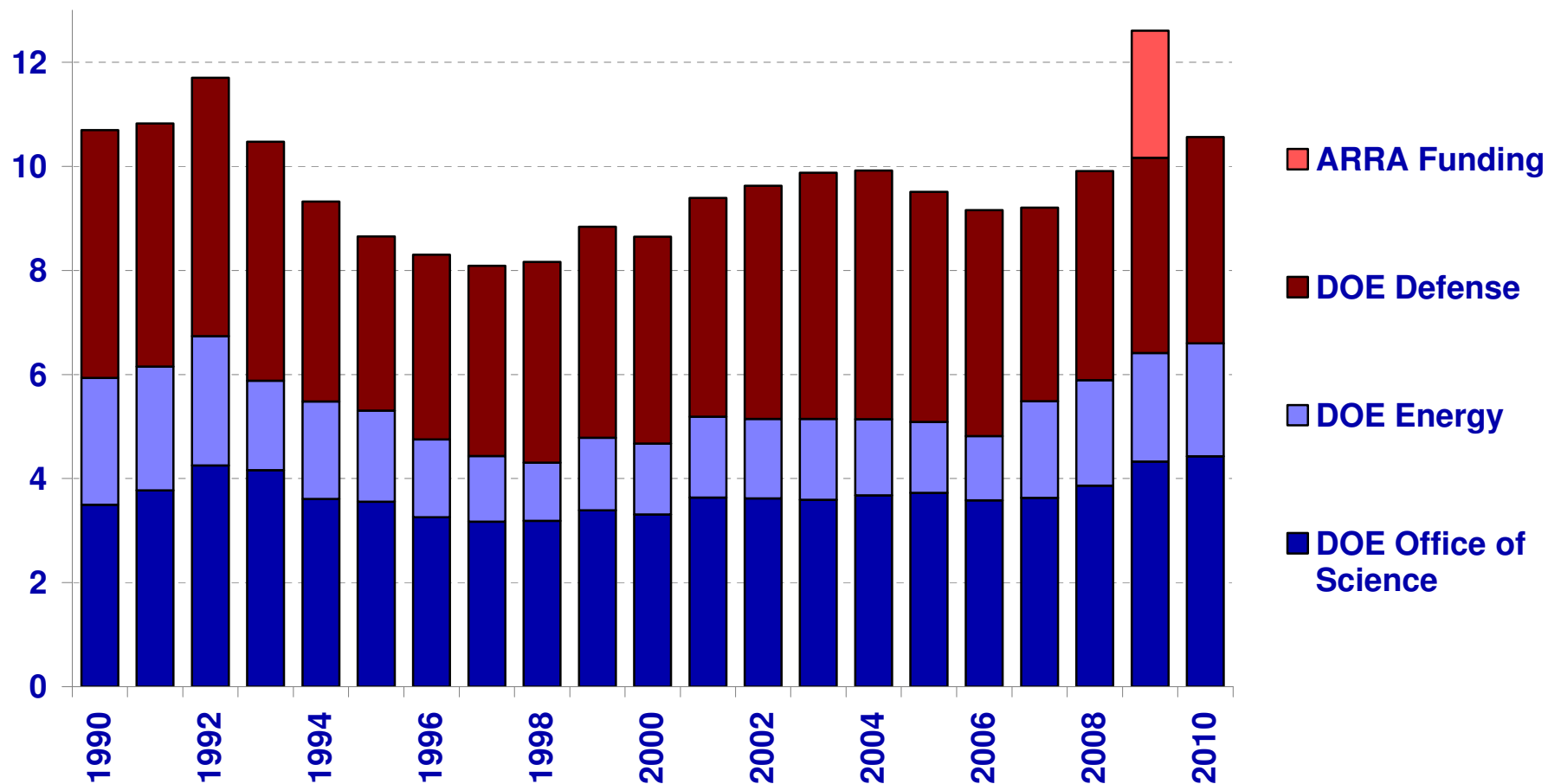


National Science Foundation

- FY 2009 – \$6.5 billion
- Request – \$7.0 billion
- House – \$6.9 billion
- Senate – \$6.9 billion
- Administration issued a statement expressing concern over Senate funding levels for NIST and NSF
- Sen. Coburn (R-OK) amendment to eliminate Political Science funding failed (36 votes in favor)

Trends in DOE R&D, FY 1990-2010

in billions of constant FY 2009 dollars



Source: AAAS Report: Research & Development series.

FY 2009 and FY 2010 figures are latest estimates.

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

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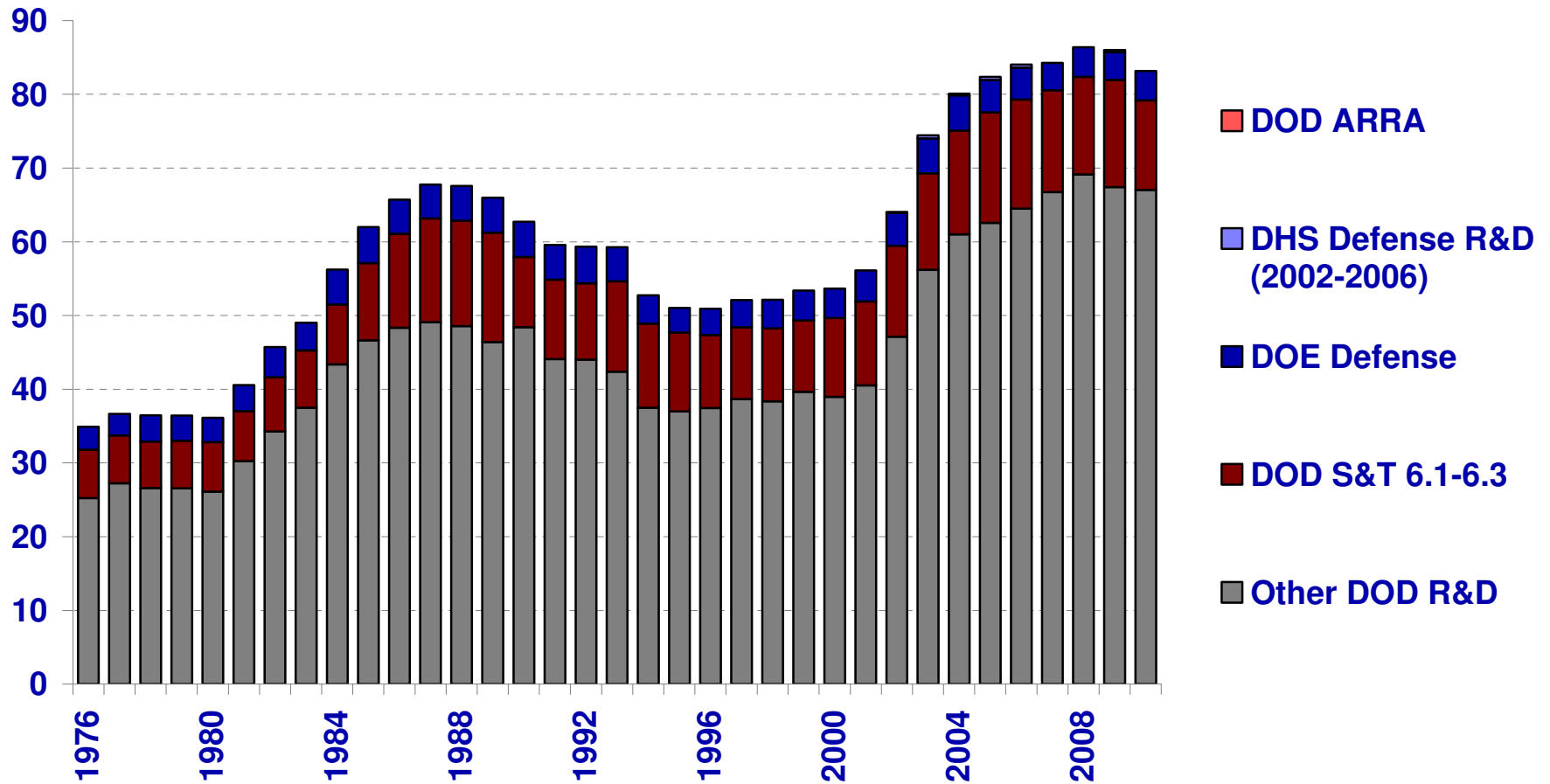


Department of Energy

- FY 2009 - \$26.8 billion (\$10.2 billion R&D)
- Request - \$28.4 billion (\$10.7 billion R&D)
- Enacted - \$27.1 billion (\$10.7 billion R&D)
- 3 of 8 Energy Innovation Hubs Funded
 - Fuels from Sunlight (EERE)
 - Energy Efficient Building Systems Design (EERE)
 - Modeling and Simulation (Nuclear Energy)
- Office of Science
 - 2.7% increase to \$4.9 billion (\$4.5 billion R&D)
- Energy R&D Refocus
 - Nuclear and Fossil down, Renewable and Reliability up

Trends in Defense R&D, FY 1976-2010

in billions of constant FY 2009 dollars



Source: AAAS Report: Research & Development series.

FY 2009 and FY 2010 figures are latest estimates.

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

DOD S&T figures are not comparable for all years because of changing definitions.

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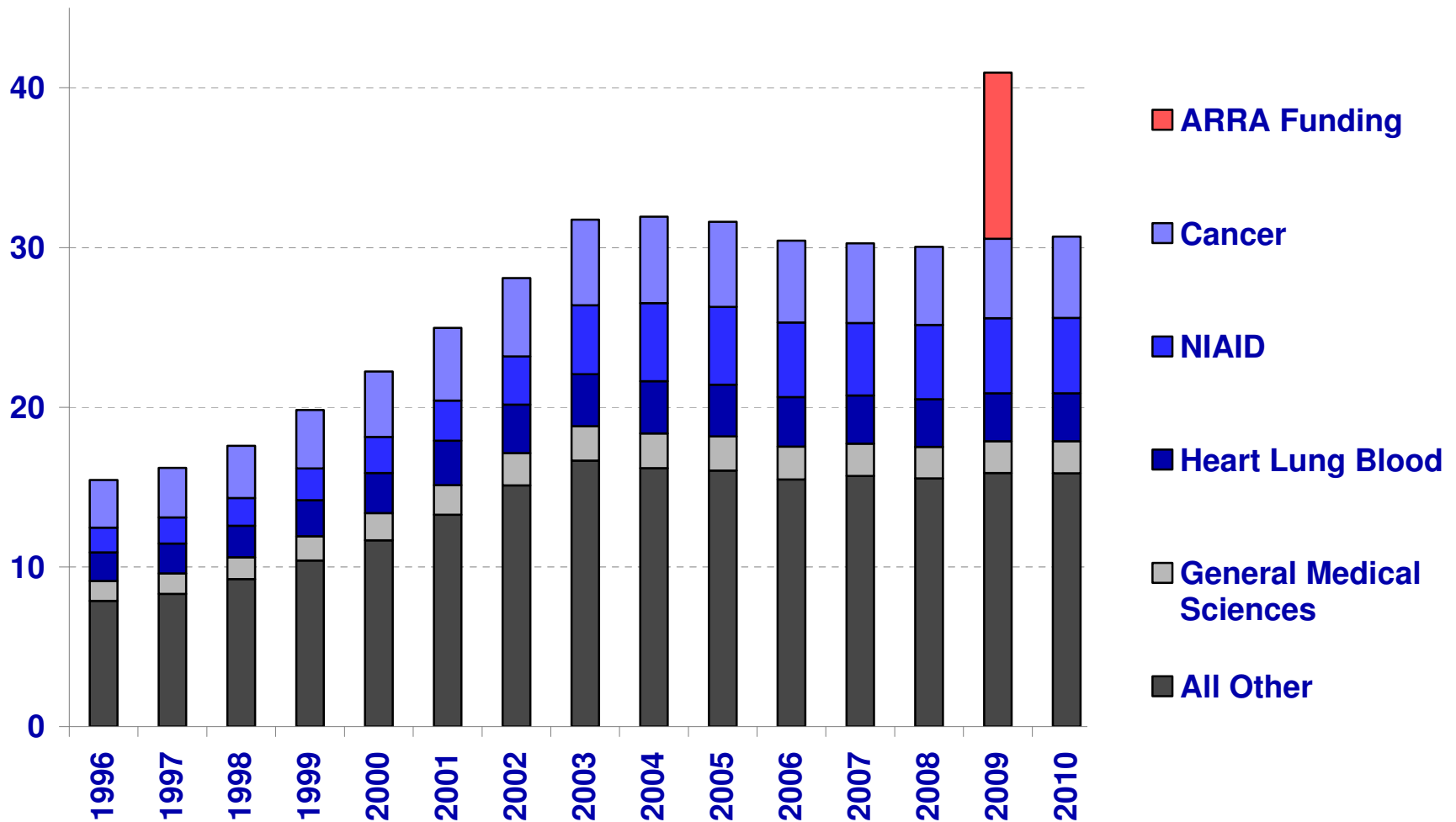


Department of Defense

- FY 2009 – \$80.0 billion for RDT&E
- Request – \$78.6 billion for RDT&E
- House – \$80.2 billion for RDT&E
- Senate – \$78.5 billion for RDT&E
- Authorization - \$79.3 billion for RDT&E
- VH-71A Executive Helicopter
 - House – Yes, Senate – No, Authorization – No
- Alternative Engine for Joint Strike Fighter
 - House – Yes, Senate – No, Authorization - Yes

National Institutes of Health Budget by Institute, 1996-2010

budget authority in billions of constant FY 2009 dollars



Source: AAAS Report: Research and Development series.

FY 2009 and FY 2010 figures are latest estimates.

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

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National Institutes of Health

- Overall, a 1.4 percent budget increase over FY 2009.
 - NCI (Cancer): 3.6 percent increase
 - NIEHS (Environmental Health): 3.0 percent increase
 - NCRR (Research Resources): 2.1 percent increase
 - Office of Director: 5.1 percent decrease
- Strategic Priorities
 - Cancer, \$268M increase, start of 8-year doubling through 2017
 - Autism, \$19M increase, with CDC and HRSA (\$211M total)
 - Nanotechnology Safety, \$9M increase, NIEHS
 - Common Fund, 1.5%, trans-NIH programs
 - Bioethics and Oversight, \$5M each, Office of Director

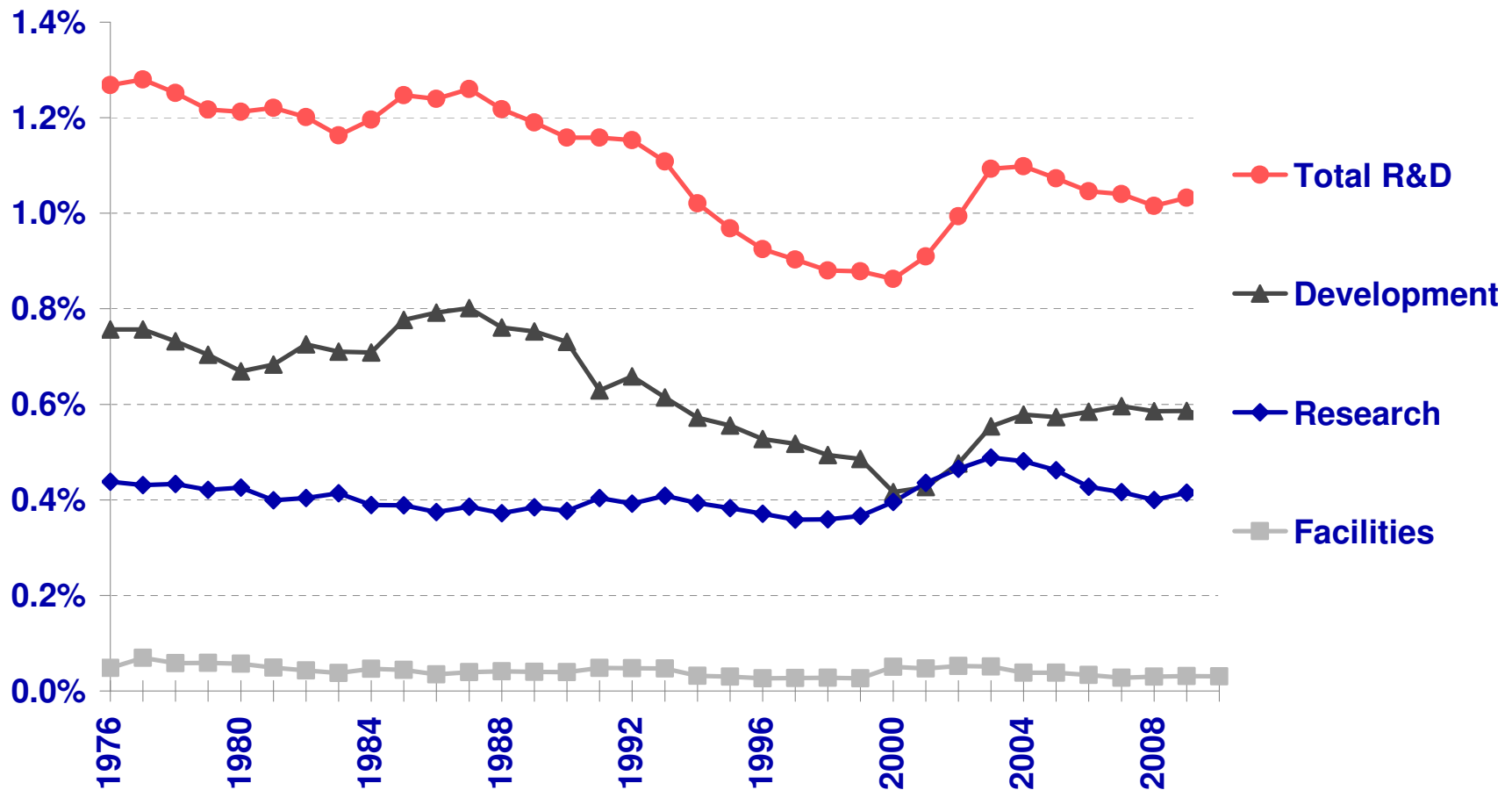
Congressional Action on National Institutes of Health

- FY 2009 – \$30.3 billion
- Request – \$30.8 billion
- House – \$31.3 billion
- Senate – \$30.8 billion
- House Action
 - Issa (R-CA) amendment to defund 3 international AIDS/HIV proposals passed
 - Eliminates \$99 million in teen abstinence programs
 - Renews restrictions on use of funds for abortion and research that creates or destroys human embryos

3 3.0% of GDP Investment in R&D

- Goal set by President Obama
 - April 27, National Academy of Sciences Annual Meeting
- 3.0% of GDP also chosen as EU goal in 2000
- Many Asian nations' investment in R&D is increasing
- Significant share of U.S. R&D investment is for defense
 - 57.0% at \$84 billion

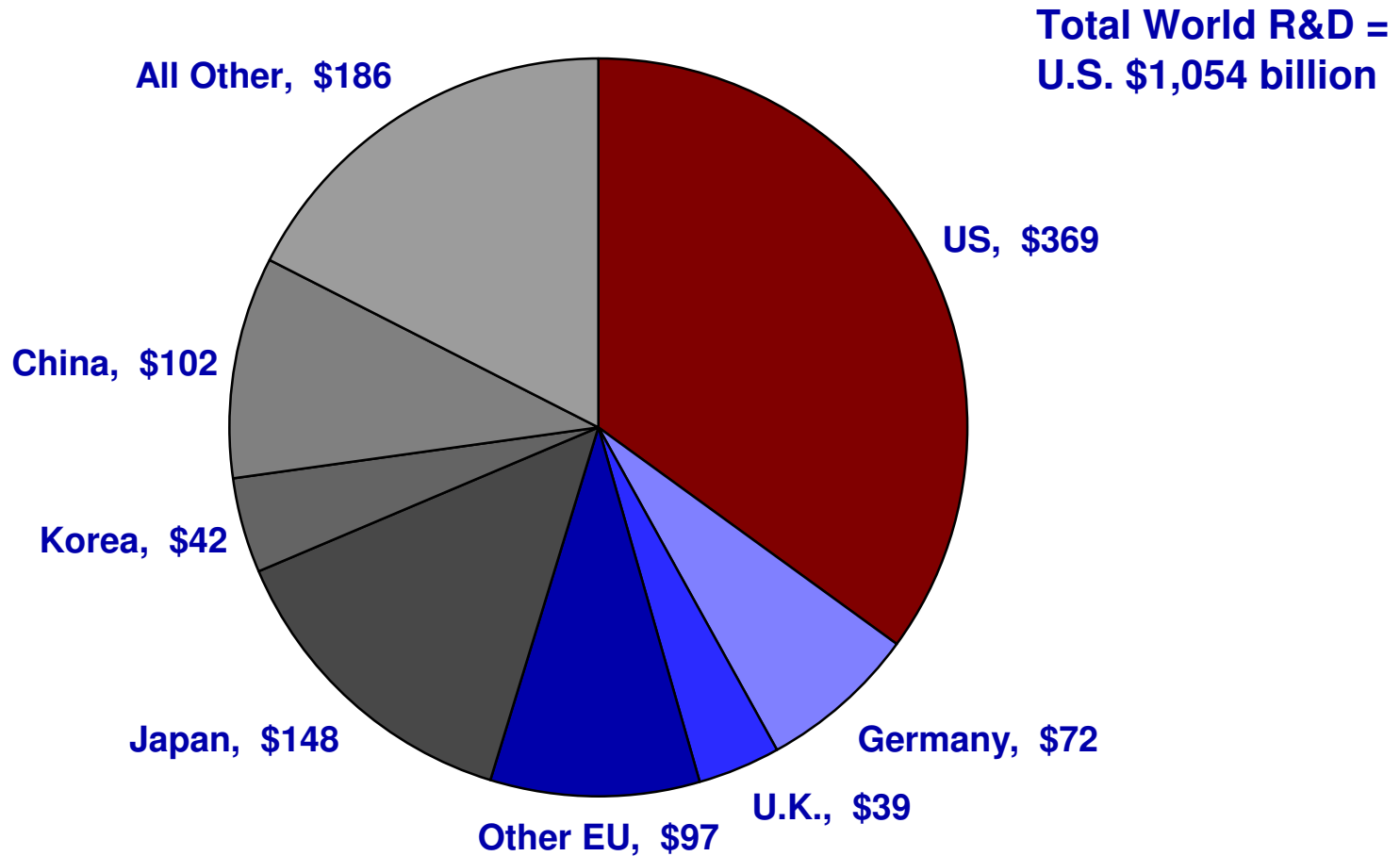
Trends in Federal R&D as Percent of GDP, FY 1976-2010



Source: AAAS Report: Research and Development series.
 FY 2010 figures are latest AAAS estimates of the FY 2010 request.
 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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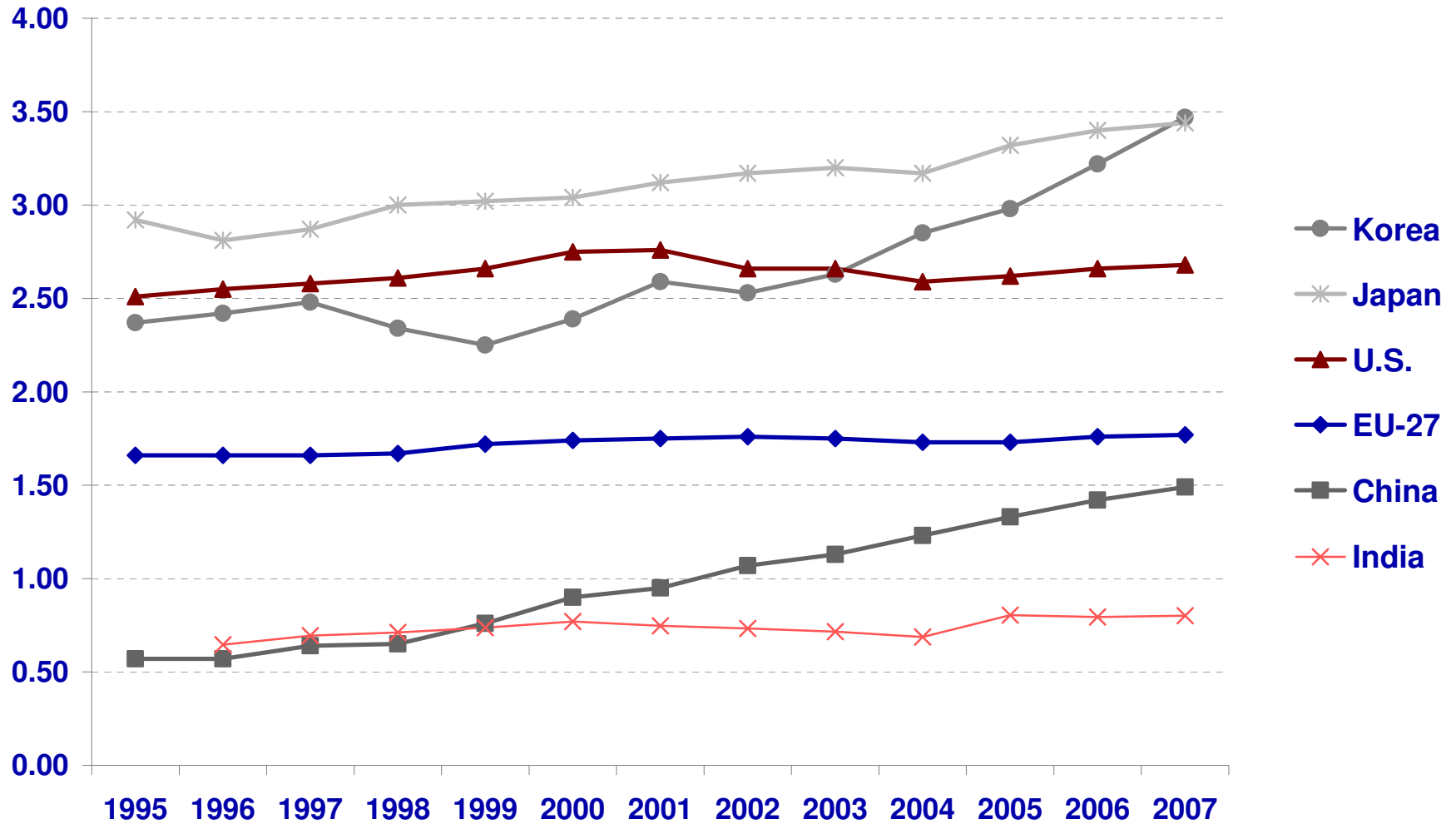
Shares of Total World R&D, 2007



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 as % of GDP, 1995-2007



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

Source: UNESCO, Institute for Statistics.

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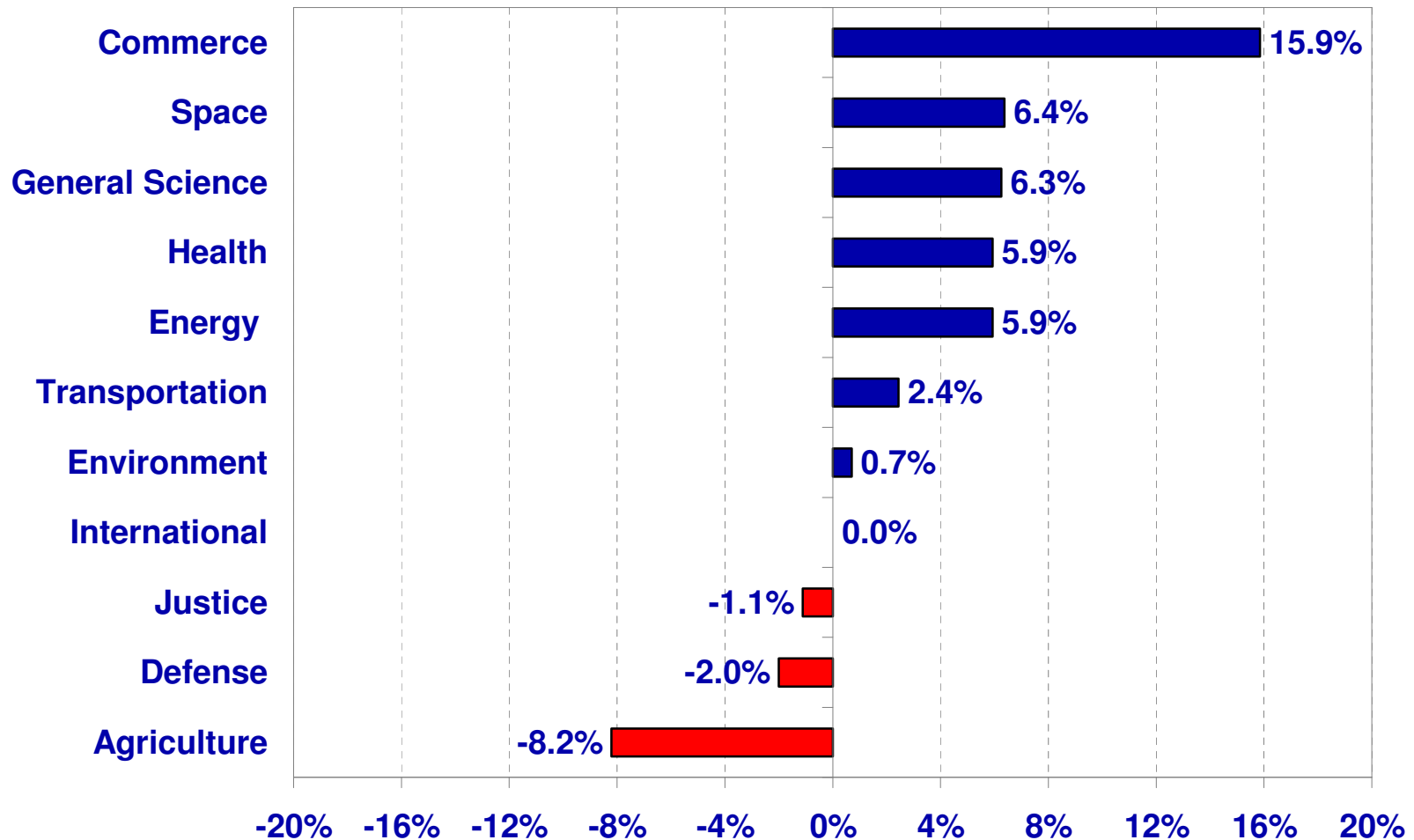


4 Four R&D Investment Priorities

- Investing in the Sciences for a Prosperous America
 - General increases in science funding, especially basic research (3.4% increase, plus ARRA)
- A Clean Energy Future
 - DOE Energy Programs (5.4% increase, plus ARRA)
- Healthy Lives for All Americans
 - National Institutes of Health (1.5% increase, plus ARRA)
- A Safe and Secure America
 - Homeland Security Funding (23.8% increase)

FY 2010 R&D Budget Request by Function

percent change from FY 2009

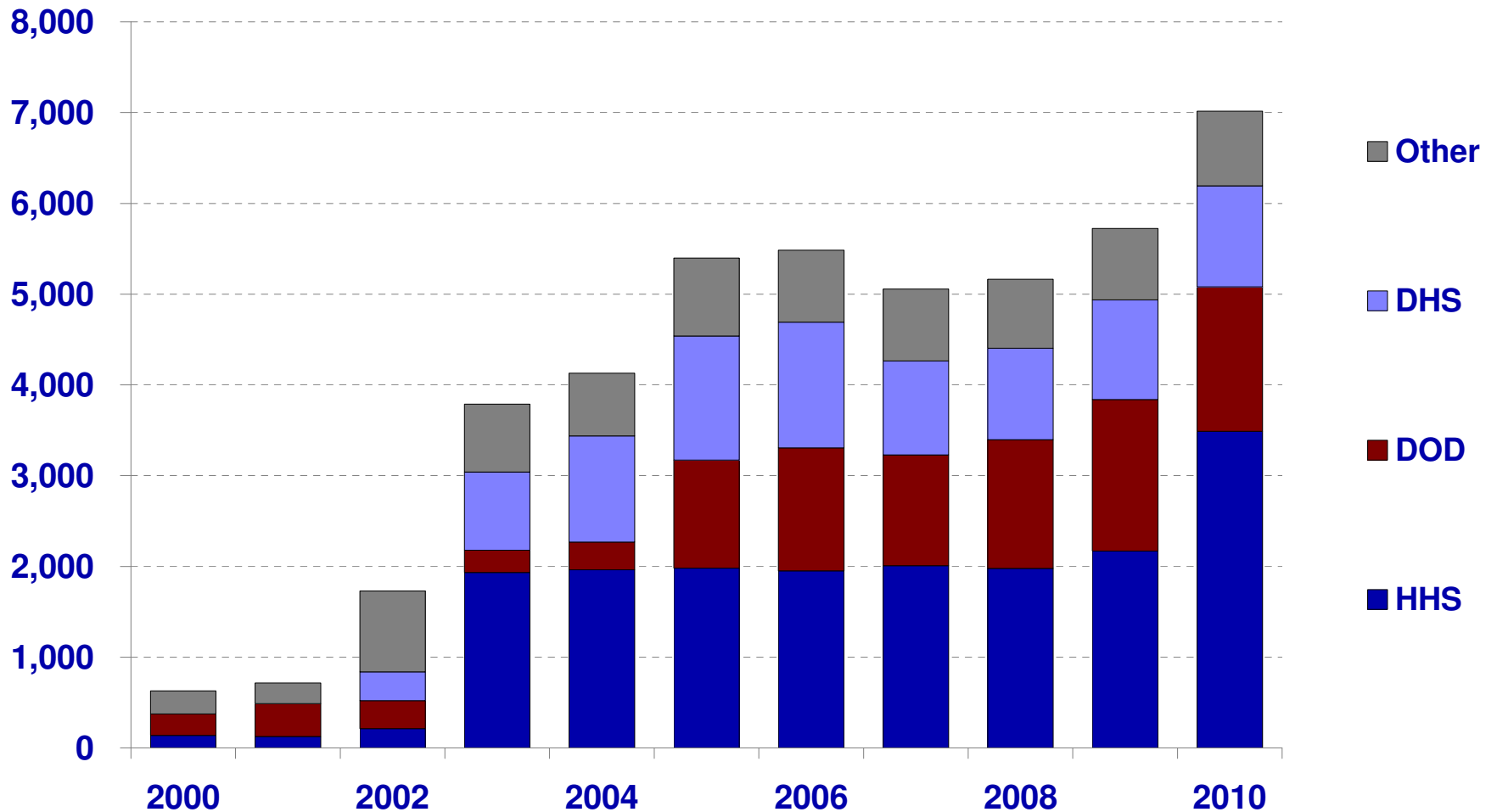


Source: OMB and agency budget data.
Environment includes natural resources R&D
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Federal Homeland Security R&D by Agency

budget authority in millions of constant FY 2009 dollars



Source: OMB R&D data.

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

DOD expanded its reporting of HS spending beginning in 2005.

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The FY 2010 Federal R&D Investment

- **1** H.R.1: The American Recovery and Reinvestment Act
- **2** Double Budget for Basic Research Agencies
- **3** 3.0% of GDP Investment in R&D
- **4** Four R&D Investment Priorities

Next Steps

- FY 2010
 - Continuing Resolution through December 18
 - Four bills (of twelve) waiting for conference after passing the House and Senate
 - The Senate needs to pass their version of three others
- FY 2011
 - S&T guidance given by August 4 OMB/OSTP memo
 - Agencies submitted their FY 2011 budgets to OMB by the September 14 deadline
 - Agencies given passbacks on November 30

For More Information...

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

The AAAS Forum on Science
and Technology Policy is
May 13–14, 2010 in
Washington, DC

