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

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

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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 (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
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

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Outlays (Billion$)</th>
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<tr>
<td>Defense Discretionary</td>
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<td>Social Security</td>
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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

DOD, $80.0
HHS (NIH), $30.9
NASA, $11.2
DOE, $10.7
NSF, $5.3
USDA, $2.2
DHS, $1.1
All Other, $6.1

Total R&D = $147.5 billion

Source: AAAS Report XXXIV: Research and Development FY 2010. R&D includes conduct of R&D and R&D facilities. © 2009 AAAS
Trends in R&D by Agency, FY 1976-2010
in billions of constant FY 2009 dollars

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

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
- Buoys 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

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

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

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

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
3.0% 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. © 2009 AAAS
Shares of Total World R&D, 2007

Total World R&D = U.S. $1,054 billion

- US, $369
- Japan, $148
- Korea, $42
- China, $102
- Germany, $72
- Other EU, $97
- U.K., $39
- All Other, $186

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.
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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)
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
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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