R&D in the FY 2011 Budget Request

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

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The FY 2011 Federal Budget

- $3.8 trillion total budget, $1.3 trillion unified deficit
- $1.3 trillion discretionary budget (0.3% increase)
  - $532 billion nondefense budget (1.4% increase)
- 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)

- Defense Discretionary: $661
- Net Interest: $251
- [Defense R&D]: $83
- Other Mandatory: $647
- Medicaid: $297
- Medicare: $491
- Social Security: $730
- Medicare Discretionary: $599
- Nondefense Discretionary: $599
- Nondefense [Nondefense R&D]: $71

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

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%)
- 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

- $148.1 billion, 0.3% decrease from FY 2010
  - Basic Research - $30.4 billion, 4.4% increase
  - Applied Research - $31.6 billion, 3.9% increase
  - Development - $81.5 billion, 3.5% decrease
  - Equipment and Facilities - $4.6 billion, 1.1% decrease
- $82.2 billion for defense R&D, 4.8% decrease
- $65.9 billion for non-defense R&D, 5.8% increase
- 1.4% decrease in constant dollars from FY 2010
- 0.7% increase 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

DOD, $78.0
HHS (NIH), $32.2
DOE, $11.2
NASA, $11.0
All Other, $6.6
NSF, $5.5
USDA, $2.4
DHS, $1.0

Total R&D = $148.1 billion

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

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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Trends in Research by Agency

in billions of constant FY 2010 dollars

FY 2010 and FY 2011 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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Funding Shifts

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

- Basic Research
  - +6.7% to $2.0 billion
- Development
  - -5.0% to $71.0 billion
- DARPA
  - +3.7% to $3.1 billion
Funding Shifts

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

- **NASA Constellation**
  - $3.1b over 3 yrs to...
    - Near earth orbit through private industry
      - $6.1b over 5 yrs
    - Heavy Lift and Propulsion
      - $559m
    - International Space Station
      - $812m, 35.1% over 3 yrs

- **Hutchison (R-TX) Bill**
  - Extends Space Shuttle and Space Station operations
  - Utilize Commercial Orbital Trans Services (COTS)
Funding Shifts

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

- US Dept of Agriculture
  - 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 Doubling for Basic Research

- National Science Foundation
  - 8.0% increase to $7.4 billion
  - R&D - 9.4% increase to $5.5 billion
- 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
  - 4.4% increase to $5.1 billion
  - R&D - 3.8% increase to $4.6 billion
- New Energy Innovation Hub
  - Batteries and Energy Storage
- Energy Frontier Research Centers (EFRCs)
- Advanced Computing
- Scientific User Facilities
- Education and Workforce Development

[Graph showing DOE Office of Science funding from 1991 to 2009, with a notable increase in 2009 indicated by ARRA.]
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
R&D IN THE FY 2011 BUDGET REQUEST

National Institutes of Health

- 2.8% increase to $32.2 billion
- R&D - 2.8% increase to $31.4 billion
- 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
FY 2011 R&D Budget Request
percent change from FY 2010

- NIST: 21.7%
- NASA: 18.3%
- NOAA: 10.0%
- NSF: 8.3%
- DOE Energy: 6.8%
- DOE Defense: 5.0%
- EPA: 4.7%
- USGS: 4.3%
- DOE Science: 3.8%
- NIH: 3.1%
- VA: 1.5%
- DOT: 0.6%
- DOD: -4.4%
- USDA: -5.5%
- DHS: -9.0%

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

- **New Industries and Jobs**
  - Advanced materials and manufacturing methods
  - $6.1 billion over 5 years for commercial earth orbit
- **Cleaner Energy**
  - $155 million (6.8%) increase for DOE Energy R&D
- **Healthier America**
  - $956 million (3.1%) increase for National Institutes of Health
- **Enhanced Security**
  - DOD Basic Research - 6.7% increase to $2.0 billion
FY 2011 R&D Budget Request by Function
percent change from FY 2010

Transportation: 43.0%
Commerce: 17.3%
Space: 12.0%
Environment: 7.4%
Energy: 6.5%
Health: 6.5%
General Science: 6.3%
International: 0.0%
Defense: -4.8%
Agriculture: -5.8%
Justice: -31.8%

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

- $3.7 billion, +$32 million from FY 2010
- K-12 Education
  - $450m at Dept of Ed, $63m at NASA, $41m at NSF
- RE-ENERGYSE (Undergraduate)
  - $19 million for NSF, $55 million for DOE
- Undergraduate Diversity
  - +14% to $103m for NSF
- Graduate Fellowships
  - NSF: +16% to $158m, NIH: +5% to $824m
  - DOD: +4% to $40m, DOE: +$10m to $15m
International R&D Investment

- The United States leads the world in R&D investment
  - $369 billion 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 $

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

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

- Congress currently holding budget briefings for agencies.
- Congress will pass a budget resolution and determine 302(a) and (b)s.
- Congress needs to pass 12 appropriation bills, ideally by Sept. 30, the end of FY 2010.
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