Research and Development in the FY 2011 and FY 2012 Federal Budgets

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AAAS R&D Budget and Policy Program
http://www.aaas.org/spp/rd
The U.S. Federal Budget in FY 2012

- **Total Budget:** $3.7t
  - Almost one quarter (23.6%) of the total U.S. economy
- **Total Receipts:** $2.6t
- **Deficit:** $1.1t
  - $77b borrowed from Social Security and Postal Service

- **Moving from Rescue to Rebuilding**
  - Tax relief, increased trade, infrastructure investments
- **Putting the Nation on a Sustainable Fiscal Path**
  - Spending freeze, entitlement/tax reform, govt reorganization
- **Competing and Winning in the World Economy**
Composition of the Proposed FY 2012 Budget

Total Outlays = $3.7 trillion

outlays in billions of dollars

- Net Interest: $242
- Defense Discretionary: $647
- Nondefense Discretionary: $542
- Other Mandatory: $625
- Medicaid: $269
- Medicare: $485
- Social Security: $761
- [Defense R&D]: $83
- [Nondefense R&D]: $69

Source: Budget of the United States Government FY 2012.
Projected unified deficit is $1.1 trillion.
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FY 2012 Budget Projections
outlays in billions of constant FY 2011 dollars

Source: Budget of the United States Government FY 2012.
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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 (51.8%)
    - Department of Health and Human Services (21.9%)
- 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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National 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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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.
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The FY 2012 Federal R&D Investment

- Total R&D: $147.9b, +0.5% from FY 2010
  - Basic Research: $32.9b, +11.9%
  - Applied Research: $33.2b, +11.4%
  - Development: $79.4b, -4.7%
  - Equipment and Facilities: $2.4b, -47.8%
- $81.2b for defense R&D, -3.9%
- $66.8b for non-defense R&D, +6.5%
- -2.2% in constant dollars from FY 2010 (Non-defense: +3.7%)
- -0.8% in constant dollars since FY 2004 (Non-defense: +1.0%)
  - Peak in FY 2007
Trends in Federal R&D
in billions of constant FY 2011 dollars

Source: OMB R&D data, AAAS analyses of R&D in annual AAAS R&D reports. FY 2011 and FY 2012 figures are latest AAAS estimates. R&D includes conduct of R&D and R&D facilities. 1976-1994 figures are NSF data on obligations in the Federal Funds survey. © 2011 AAAS
Total R&D by Agency, FY 2012

budget authority in billions of dollars

- DOD, $76.6
- HHS (NIH), $32.3
- DOE, $13.0
- NASA, $9.8
- NSF, $6.3
- USDA, $2.2
- DHS, $1.1
- All Other, $6.6

Total R&D = $147.9 billion

Source: OMB R&D 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 2011 dollars

FY 2011 and FY 2012 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 FEDERAL BUDGET

R&D Investment Priorities

- Jumpstarting Innovation / Scientific Discovery
  - Research Funding: $66.1b, +11.6% ($6.9b)
  - $13.9b combined NSF, DOE SC, NIST, +12.2% ($1.5b)

- Clean Energy Future / Climate Science
  - DOE Sci and Energy: +$1.4b (19.7%) to $8.5b
  - USGCRP: +$446m (20.4%) to $2.6b

- Permanent, Expanded and Simplified R&E Tax Credit

- Education
  - $100m for 100,000 new K-12 STEM teachers

- Infrastructure
  - Wireless Innovation Fund - $3b
FY 2011 Proposals

- **Total Budget**
  - House: $1.029t (H.R. 1)
  - Senate: $1.079t (H.R. 1 Amendment)
  - Working Compromise: $1.055t

- **Total R&D**
  - House: $140.7b (-$6.4b from FY 2010)
  - Senate: $143.4b (-$3.7b from FY 2010)

- **Nondefense R&D**
  - House: $59.5b (-$3.2b from FY 2010, -$7.3b from FY 2012 req)
  - Senate: $62.8b (+$162m from FY 2010)
Department of Energy

- **Total R&D**
  - **FY 11 House CR:** $9.3b, -13.9%
  - **FY 11 Senate CR:** $10.1b, -6.5%
  - **FY 12 Request:** $13.0b, +19.9%

- **Energy R&D**
  - **FY 11 House CR:** $1.7b, -29.7%
  - **FY 11 Senate CR:** $2.1b, -12.8%
  - **FY 12 Request:** $3.5b, +43.7%

- **Office of Science**
  - **FY 11 House CR:** $3.6b, -19.6%
  - **FY 11 Senate CR:** $4.7b, -3.5%
  - **FY 12 Request:** $4.9b, +9.1%

- **FY 12 Request**
  - **ARPA-E:** $550m + $100m WI$^3$
  - **Energy Innov Hubs:** Doubled to six
National Science Foundation

- **Total Budget**
  - FY 11 House CR: $6.6b, -5.8%
  - FY 11 Senate CR: $6.9b, +0.0%
  - FY 12 Request: $7.8b, +13.0%

- **Total R&D**
  - FY 11 House CR: $5.2b, -4.1%
  - FY 11 Senate CR: $5.4b, -1.7%
  - FY 12 Request: $6.3b, +16.1%

- **Clean Energy:** $576m

- **Science, Engineering and Education for Sustainability (SEES)**
  - $998m for climate and energy

- **Cyberinfrastructure for 21st Century Science and Engineering (CIF21):** $117m
NIST

- **Total R&D**
  - FY 11 House CR: $542m, -7.8%
  - FY 11 Senate CR: $573m, -2.5%
  - FY 12 Request: $872m, +48.3%

- **NIST Labs Total Budget (STRS)**
  - FY 11 House CR: $470m, -8.8%
  - FY 11 Senate CR: $505m, -2.0%
  - FY 12 Request: $679m, +31.8%

- Secure and Robust Cyber Infrastructure: +$43.4m

- 21st Century Manufacturing: Faster, Smarter & Cleaner: +13.3m

- Wireless Innovation Fund: $100m
National Institutes of Health

- Total Budget
  - FY 11 House CR: $29.5b, -5.2%
  - FY 11 Senate CR: $31.2b, +0.0%
  - FY 12 Request: $31.8b, +2.4%
- FY 11 House CR
  - Proposals to limit grant size
- National Center for Advancing Translational Science (NCATS)
- Tech to accelerate discovery
- Comparative effectiveness and personalized medicine
- New Innovator Award and Early Independence Award
NIH Policy Issues

- Merger of National Institute on Drug Abuse (NIDA) and National Institute on Alcohol Abuse and Alcoholism (NIAAA)
- National Center for Advancing Translational Sciences (NCATS)
  - Merge select programs from NHGRI, NCRR, Common Fund, and contain the Cures Acceleration Network (CAN).
- Stimulus Cliff
  - $8.2 billion in grants during FY 2009 & FY 2010 in mostly 2 yr grants
- Research Capacity
  - New working group to access “the current composition and size of the workforce to understand the consequences of current funding policies on the research framework.”
- Stem Cell Research
NASA

- Total R&D
  - FY 11 House CR: $9.8b, +6.0%
  - FY 11 Senate CR: $10.0b, +7.7%
  - FY 12 Request: $9.8b, +6.0%

- Guided by NASA Reauthorization (S.3729) - Oct 11, 2010
  - Transition to research and technology development on ISS; Independent NPO management
  - Commercial cargo and crew services for near-earth orbit
  - New space launch system and multi-purpose crew vehicle
  - Space Research and Technology Program: $1.0b
  - Deeper and more effective partnerships internationally
**USDA**

- **Total R&D**
  - FY 11 House CR: $2.2b, -14.2%
  - FY 11 Senate CR: $2.6b, -2.4%
  - FY 12 Request: $2.2b, -17.7%

- **ARS (Intramural)**
  - Buildings and Facilities: -$71m and cancels $224m in unobligated balances
  - Directed Projects: -$42m
  - +$59m in program increases

- **NIFA (Extramural)**
  - R&D: $741m, -11.8% (-$99m)
  - AFRI: $325m, +24.0% (+$62m)
  - Directed Projects: -$141m
Department of Defense

- **Total R&D**
  - FY 11 House CR: $77.2b, -4.2%
  - FY 11 Senate CR: $76.7b, -4.8%
  - FY 12 Request: $76.6b, -4.9%

- **Basic Research**
  - FY 12 Request: $2.1b, +14.5%

- **Total S&T**
  - FY 12 Request: $12.3b, -7.2%

- **Defense Efficiencies Initiative:**
  -$178b over 5 yrs, $100b reinvested

- **UAVs:** $4.8b, **Cyber:** $2.3b, **F-35:** $9.7b and restructured
R&D in the FY 2012 Budget Request
percent change from FY 2010

- NIST: 48.7%
- DOE Energy: 43.7%
- DHS: 18.8%
- DOE Defense: 17.3%
- DOT: 13.1%
- NSF: 13.1%
- DOE Science: 9.1%
- NOAA: 7.6%
- NASA: 6.0%
- NIH: 3.3%
- USGS: 2.8%
- VA: -1.6%
- EPA: -2.1%
- DOD Weapons: -5.0%
- DOD: -6.2%
- DOD S&T: -11.8%
- USDA: -17.7%

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

- SBIR/STTR Extended through May 31, 2011
  - Keeps same percentages (SBIR: 2.5%, STTR: 0.3%)
- R&D Tax Credit Proposal
  - Make the tax credit permanent
  - Increase simple formula credit from 14 to 17 percent
- ARRA Report: $100 billion in innovation
  - $18.7 billion in R&D
- H.R.5297 - Small Business Jobs and Credit Act
  - $30 billion small business lending fund
  - $12 billion in tax breaks
- “Make it in America” Agenda
- “Startup America” Initiative
- Patent Reform
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
Total World R&D, 2007
in billions of PPP $

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

● FY 2011
  ● Current continuing resolution (CR) expires April 8.
  ● House Rules Cmte posted a one-week CR through April 15.
  ● FY 2011 funding levels are likely to be around $1.055 trillion, a $33 billion cut from current spending levels.

● Debt Ceiling Limit Increase
  ● $14.3 trillion limit will be reached no later than May 16.
  ● “Extraordinary measures” could delay default until July 8.

● FY 2012
  ● Results of FY 2011 appropriations will be the best insight.
For More Information...

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

Twitter: @AAAS_RDBudget

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