

# Federal R&D Funding and Innovation Policy

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

See the “What’s New” section for the latest updates; see the “Seminars and Presentations” section for copies of this presentation.



## INNOVATION (1)

- There have been many recent reports calling for a major government effort to address the innovation challenge facing the U.S. economy, and there is a growing consensus among policymakers and scientists that major efforts in R&D funding, science and math education, S&E careers, and innovation policies are needed.
- In response, President Bush announced the American Competitiveness Initiative (ACI) in his 2006 State of the Union address.
- In August, Congress and the President agreed on the America COMPETES Act authorizing several new initiatives to boost math and science education, U.S. science and engineering careers, and innovative R&D programs.
- Because the new law is an authorization bill, funding to implement the bill still has to be appropriated every year.

## INNOVATION (2)

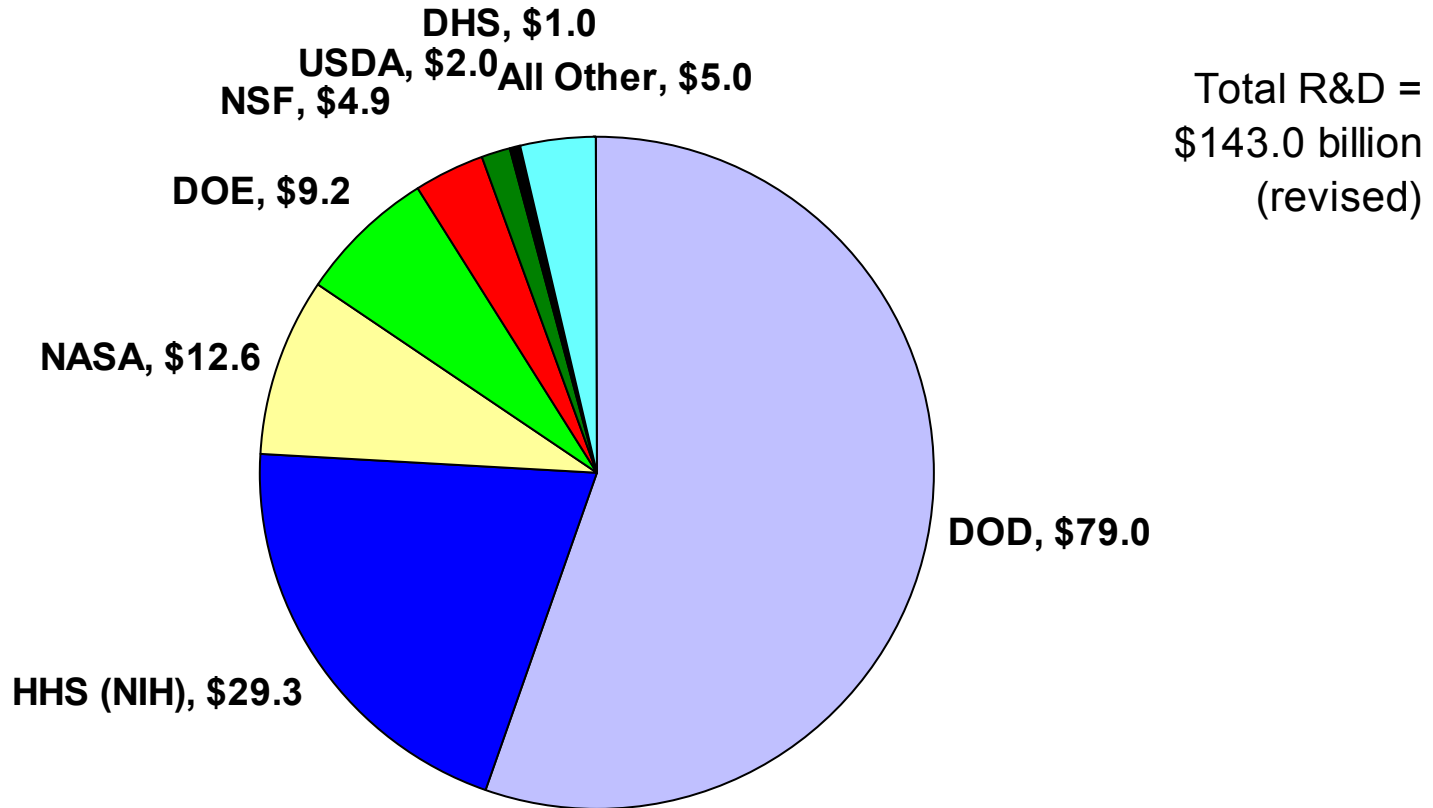
- The ACI and the America COMPETES Act focus on funding for three physical sciences agencies: NSF, DOE Office of Science, and the NIST laboratories.
- The plan is to double funding for these R&D agencies over the next 7-10 years.
- In the first year (2007), the doubling plan remains on track, but the 2008 budget isn't finished yet.
- Some provisions aren't funded yet, such as DOE's ARPA-E.
- Other parts of the innovation agenda, such as immigration reform or making the R&E tax credit permanent, are unlikely to be considered.

## THE FEDERAL BUDGET IN FY 2008

- The federal government's fiscal year (FY) 2008 began last month, but the 2008 budget is far from finished.
- The big dispute: the President's budget plan would continue to reduce domestic discretionary appropriations, while congressional budget plans would allow a slight real increase.
- The \$23 billion difference between the two sides could result in vetoes, and more delays in an already-delayed appropriations process.
- Federal R&D investments come from the discretionary (appropriated) budget.

# Total R&D by Agency: FY 2008 Proposed

Budget Authority in billions of dollars



Source: AAAS, based on OMB R&D Budget Data and agency estimates for FY 2008.

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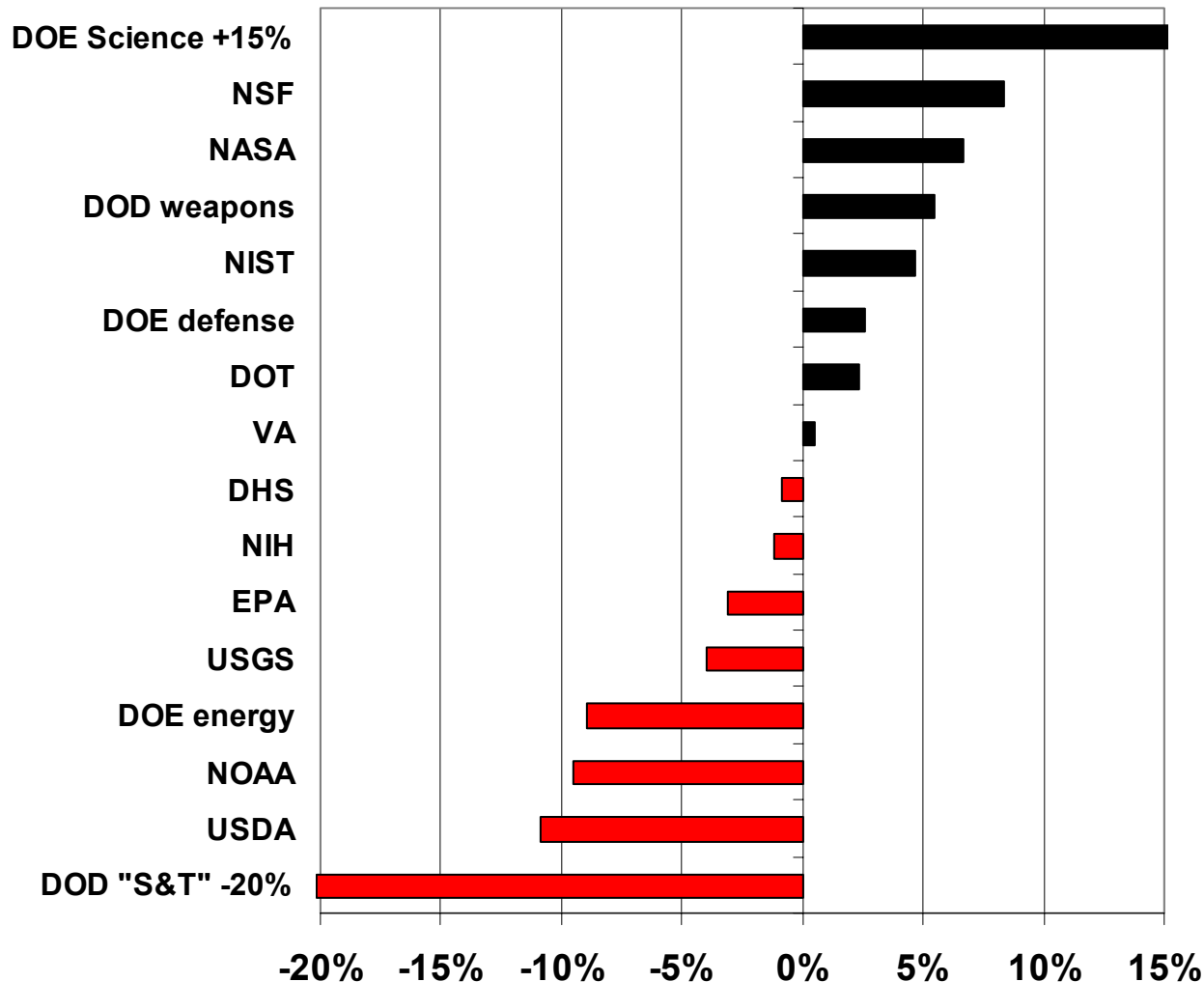


## R&D IN THE FY 2008 BUDGET: ACI, DEFENSE, AND SPACE

- In the President's budget, the American Competitiveness Initiative (ACI) continues for a 2<sup>nd</sup> year in FY 2008.
- As in past years, there would be large increases for DOD weapons and NASA spacecraft development.
- But within a shrinking domestic budget, there would be flat or declining funding for most other research programs.
- Congress would endorse the President's increases, but would also like to increase R&D funding across the board, with particular attention to energy R&D, climate change research, and biomedical research.

# FY 2008 R&D Request (revised)

Percent Change from FY 2007



Source: AAAS, based on OMB R&D data and agency estimates for FY 2008.

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

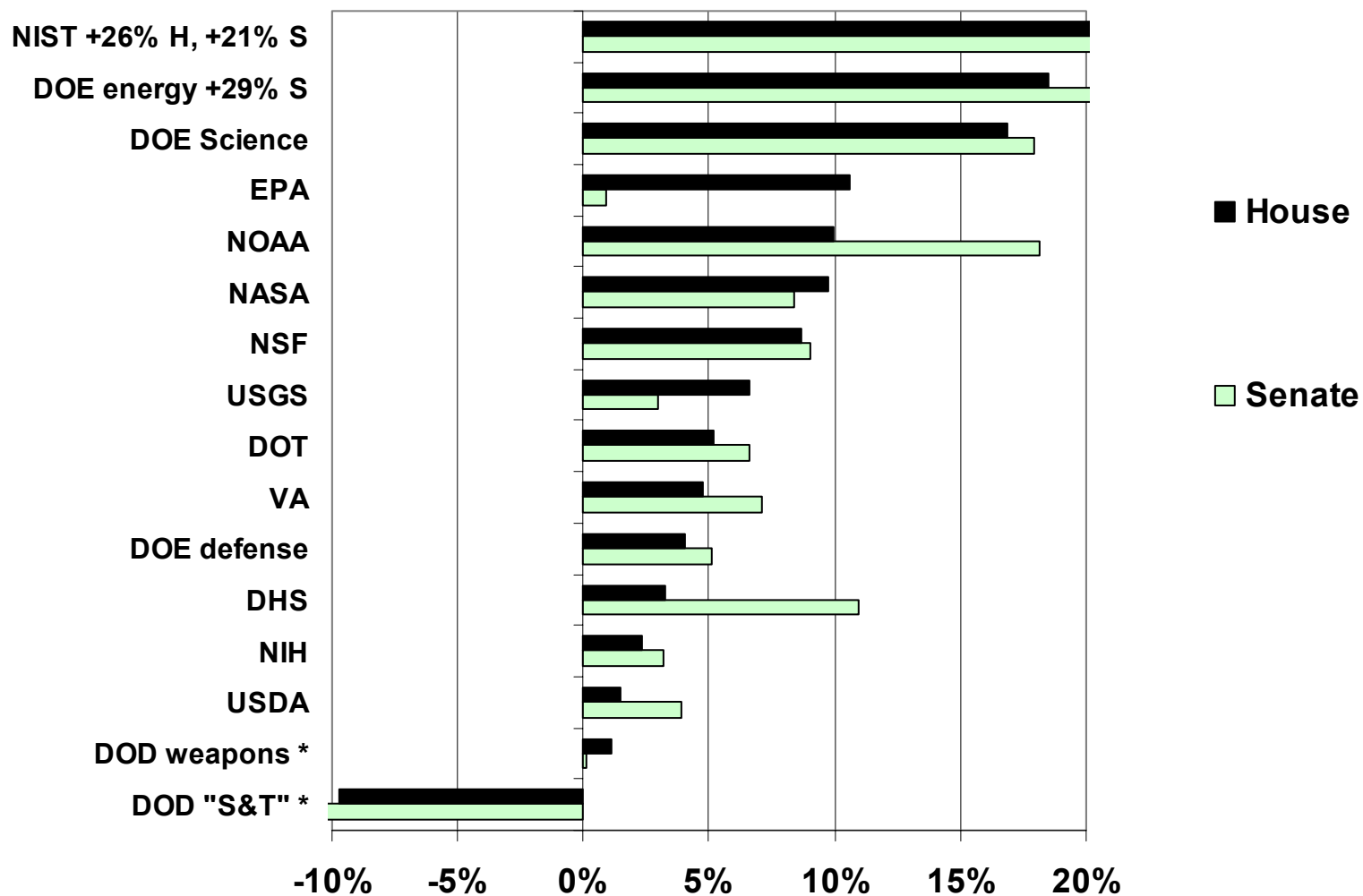
DOD weapons = DOD R&D in "6.4" and higher categories. FY 2007 and 2008 figures include requested supplementals. FY 2007 = latest estimates of final appropriations.

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# FY 2008 R&D Appropriations (House and Senate)

Percent Change from FY 2007 (as of October '07)



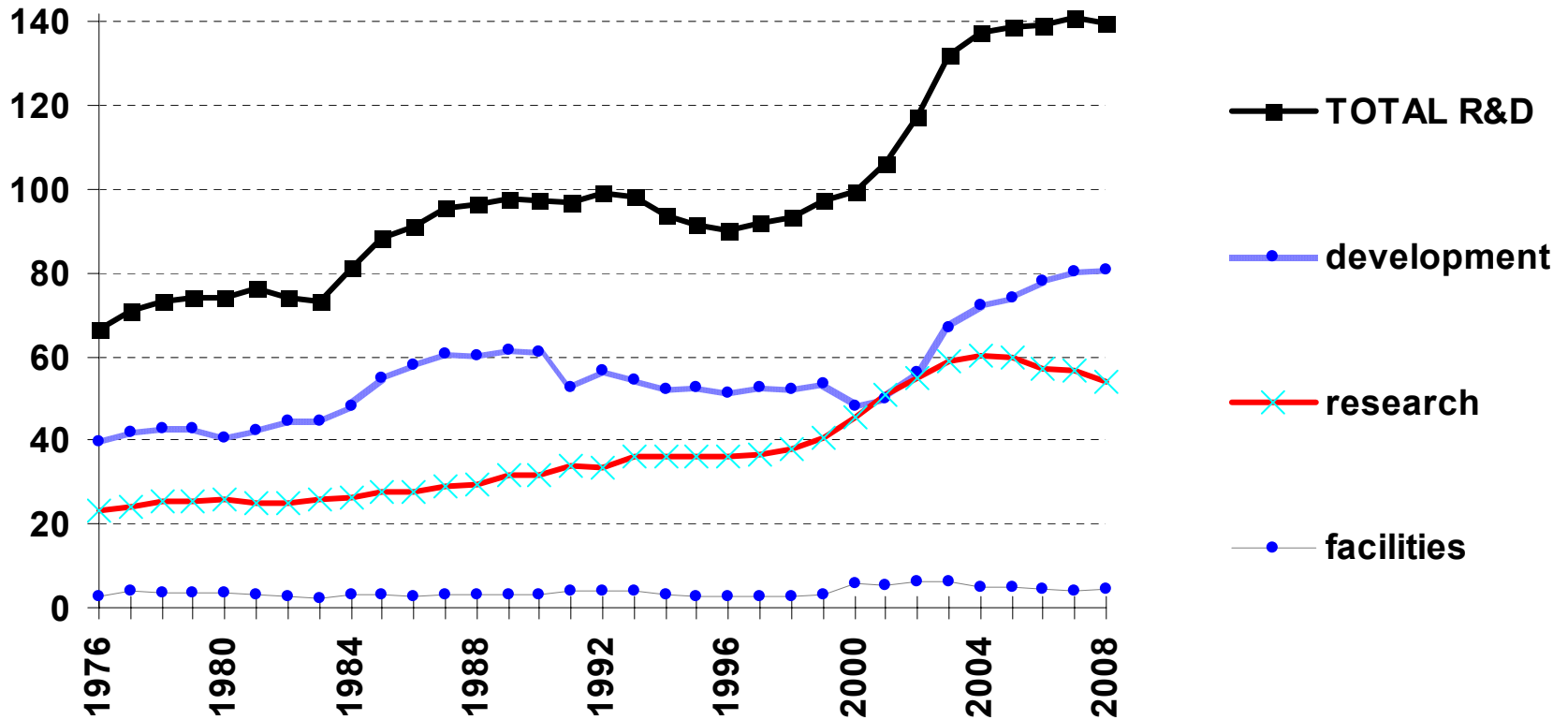
Source: AAAS estimates of R&D in FY 2008 House and Senate appropriations bills.  
 DOD "S&T" = DOD R&D in "6.1" through "6.3" categories plus medical research. \* - The Senate has not acted yet on DOD appropriations.  
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# Trends in Federal R&D, FY 1976-2008 \*

in billions of constant FY 2007 dollars



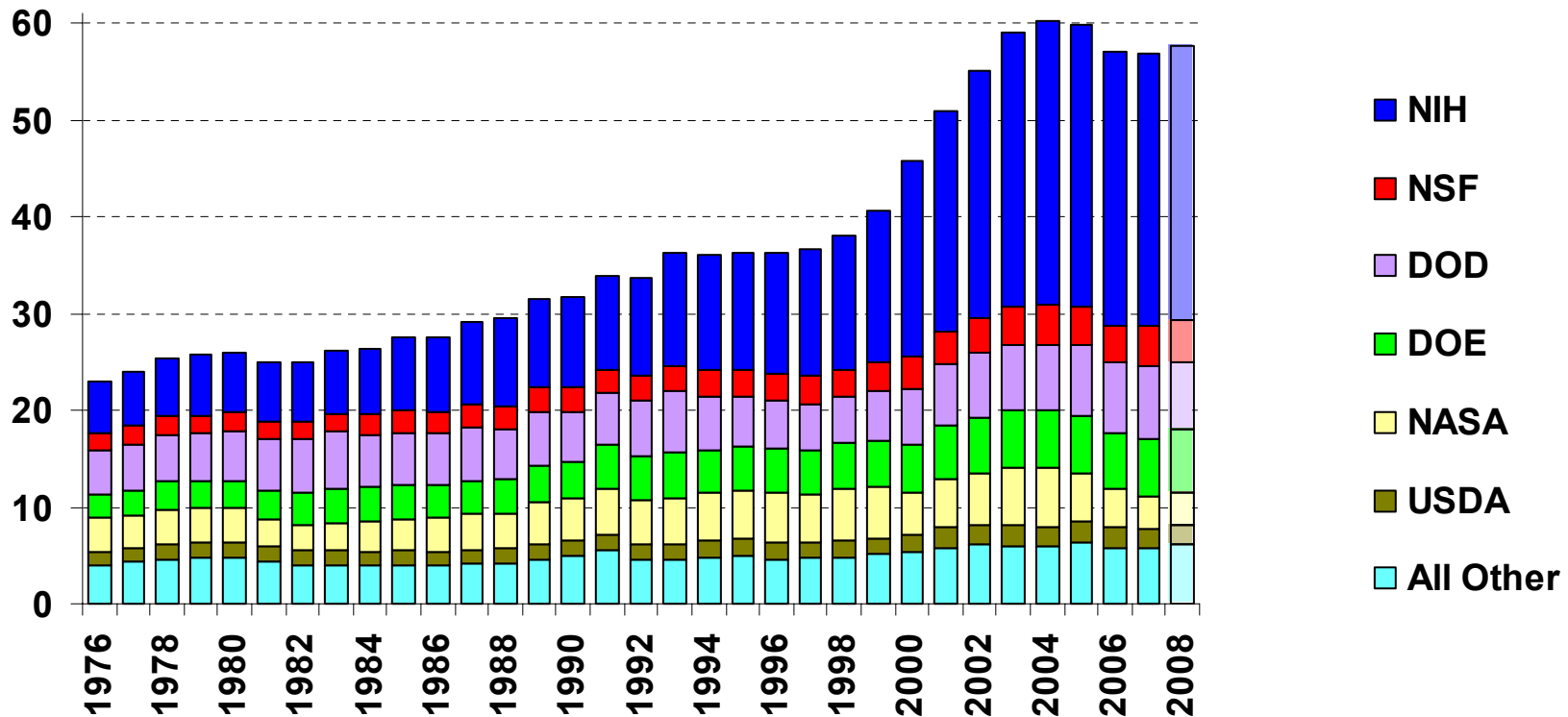
Source: AAAS analyses of R&D in annual AAAS R&D reports.

\* FY 2008 figures are President's request. FY 2007 figures are latest estimates of appropriations. R&D includes conduct of R&D and R&D facilities. Data to 1984 are obligations from the NSF Federal Funds survey. Constant-dollar conversions use GDP deflators from OMB.  
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# Trends in Research by Agency, FY 1976-2008 (Senate)\*

in billions of constant FY 2007 dollars



Source: AAAS analyses of R&D in annual AAAS R&D reports.

\* FY 2008 figures are latest AAAS estimates of FY 2008 Senate appropriations, except DOD (House). Research includes basic research and applied research.

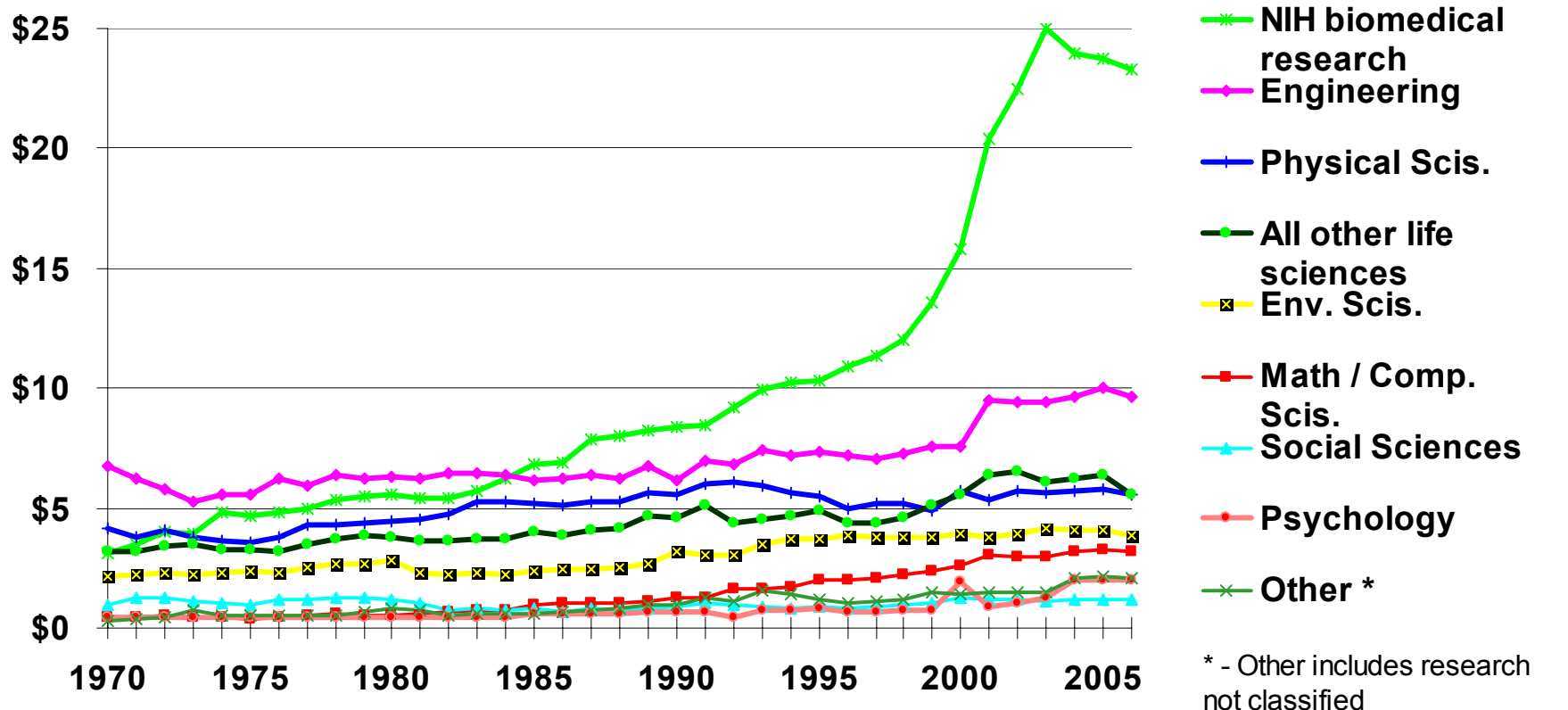
1976-1994 figures are NSF data on obligations in the Federal Funds survey.

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# Trends in Federal Research by Discipline, FY 1970-2006

obligations in billions of constant FY 2007 dollars



\* - Other includes research not classified (includes basic research and applied research; excludes development and R&D facilities)

Life sciences - split into NIH support for biomedical research and all other agencies' support for life sciences.  
 Source: National Science Foundation, *Federal Funds for Research and Development FY 2004, 2005, 2006, 2006*. FY 2005 and 2006 data are preliminary. Constant-dollar conversions based on OMB's GDP deflators. FEB. '07 © 2007 AAAS

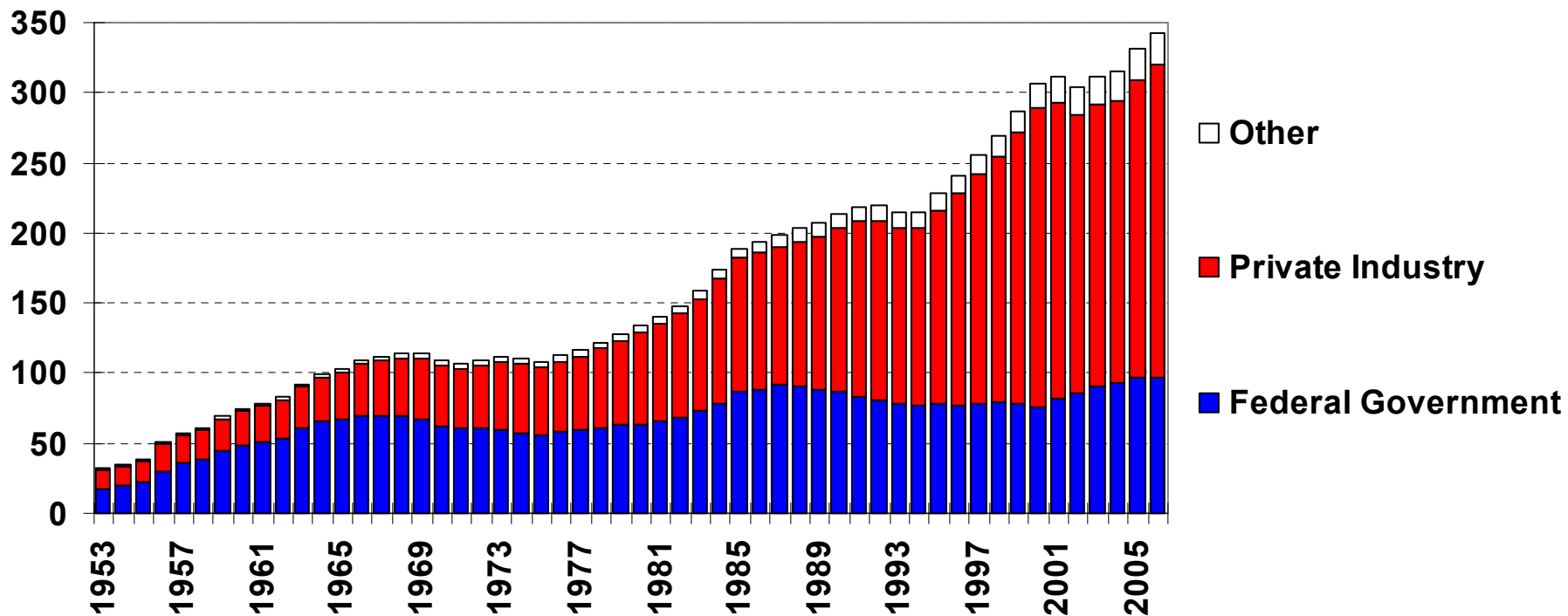


## FEDERAL R&D IN CONTEXT: INDUSTRY AND THE WORLD

- 2/3 of all U.S. R&D is funded by industry, but industry focuses heavily on development; the majority of U.S. research is funded by the federal government.
- The U.S. compares favorably with other nations in R&D spending, but many Asian nations are dramatically increasing their R&D investments.

# U.S. R&D Funding by Source, 1953-2006

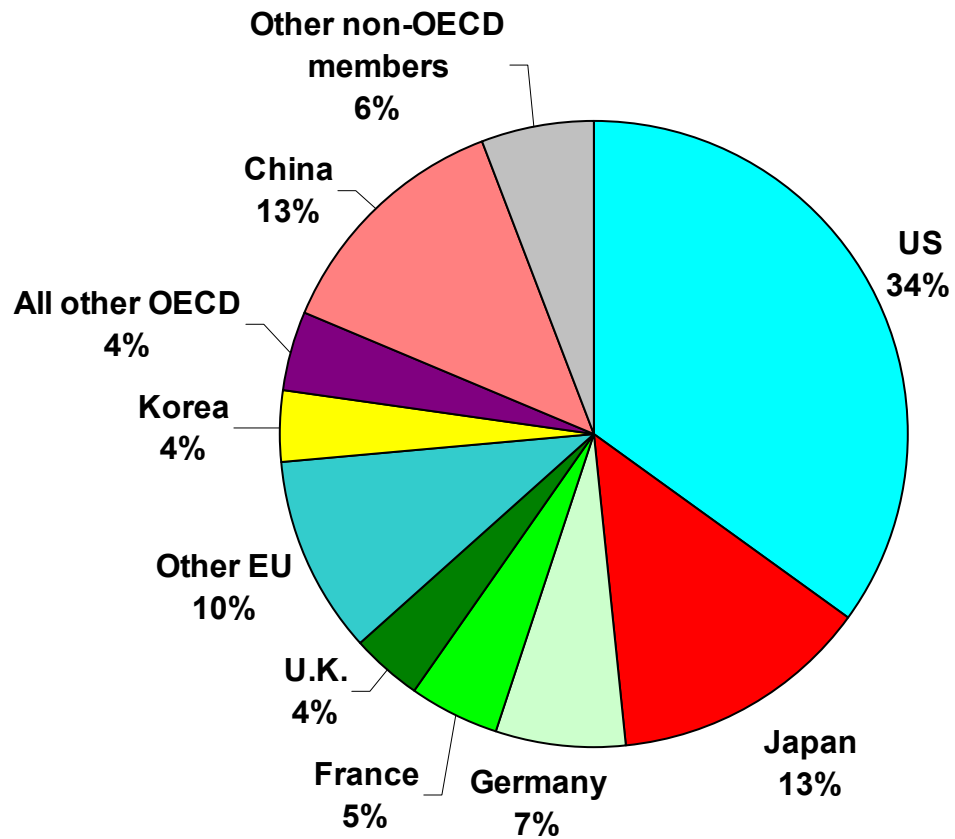
expenditures in billions of constant 2006 dollars



Source: NSF, Division of Science Resources Statistics. (Data for 2005 and 2006 are preliminary.)  
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# Shares of Total World\* R&D, 2005



**Total World\* R&D =  
U.S. \$893 billion\*\***

\* World = OECD members plus Argentina, China, Romania, Israel, Russia, Singapore, Slovenia, South Africa, Taiwan

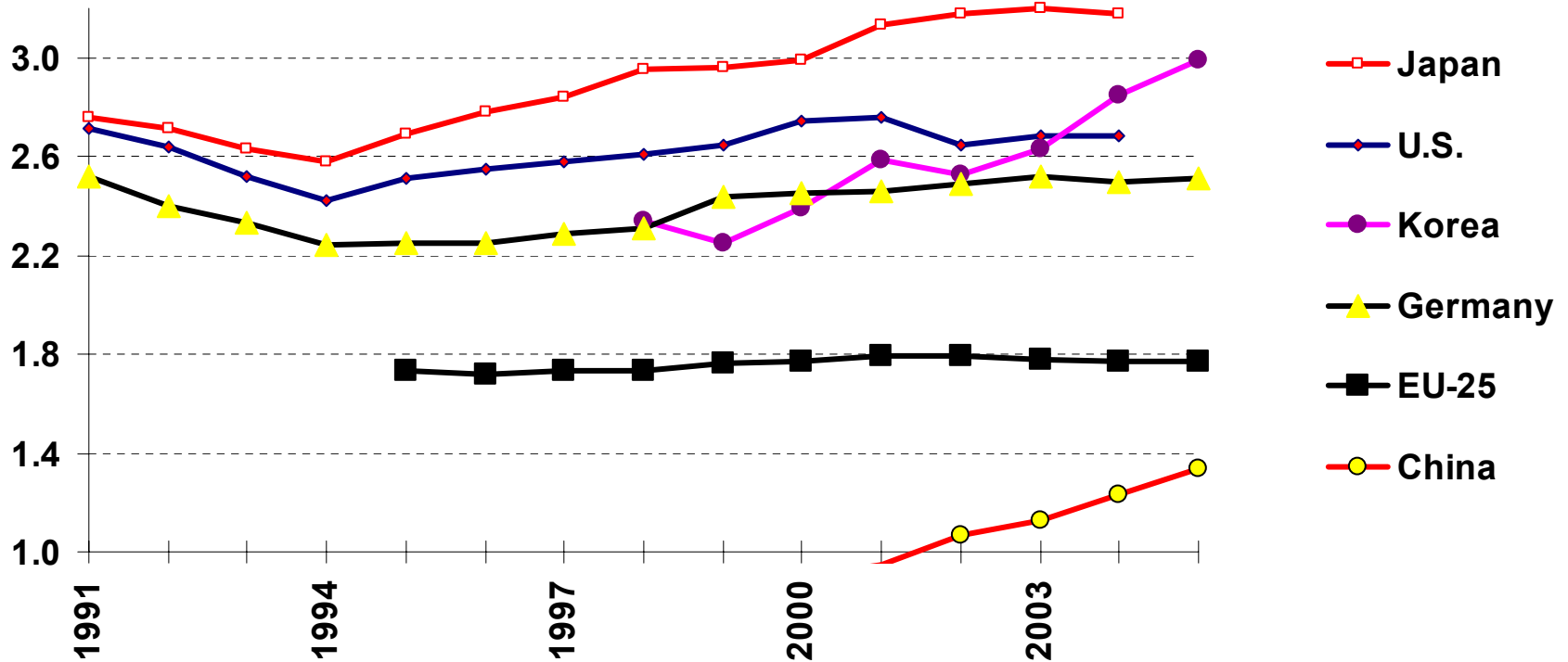
Source: OECD, Main Science and Technology Indicators, 2006.  
2005 data or latest year available.

\*\* - calculated using purchasing power parities.

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## Total National R&D as % of GDP, 1991-2005



Source: National Science Foundation, National Patterns of R&D Resources and OECD, Main Science and Technology Indicators. Data not available for all nations for all years. MAY '07 © 2007 AAAS

## WHAT'S NEXT?

The House and Senate still have to agree on the final versions of the 12 appropriations bills.

- President Bush has threatened to veto any bills that exceed his request. Most of them will do so.
- All federal agencies are operating temporarily at 2007 funding levels under a continuing resolution (CRs) through Nov. 16.
- An omnibus appropriations bill is likely in late fall, maybe even winter. (The 2007 budget was finalized Feb. 15.)
- House and Senate increases could evaporate if vetoes force Congress to give up additional domestic funds. The disputes between President Bush and Congress could mean the difference between declining or increasing federal support for research.



## THE OUTLOOK FOR INNOVATION

The America COMPETES Act is now law, but its programs still need 2008 and future appropriations.

The law authorizes numerous science and math education and S&E career programs, but many of them still haven't been funded.

- R&D funding programs such as ARPA-E and the new TIP also haven't received appropriations yet.
- The broader innovation policy agenda of patent reform, immigration reform, tax law changes, and policies to encourage private-sector innovation are not under consideration right now.

**FOR MORE INFORMATION...**

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

**AAAS REPORT XXXII**  
Research & Development FY 2008

Intersociety Working Group

