The Federal R&D Funding Outlook for FY 2009

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AAAS R&D Budget and Policy Program

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

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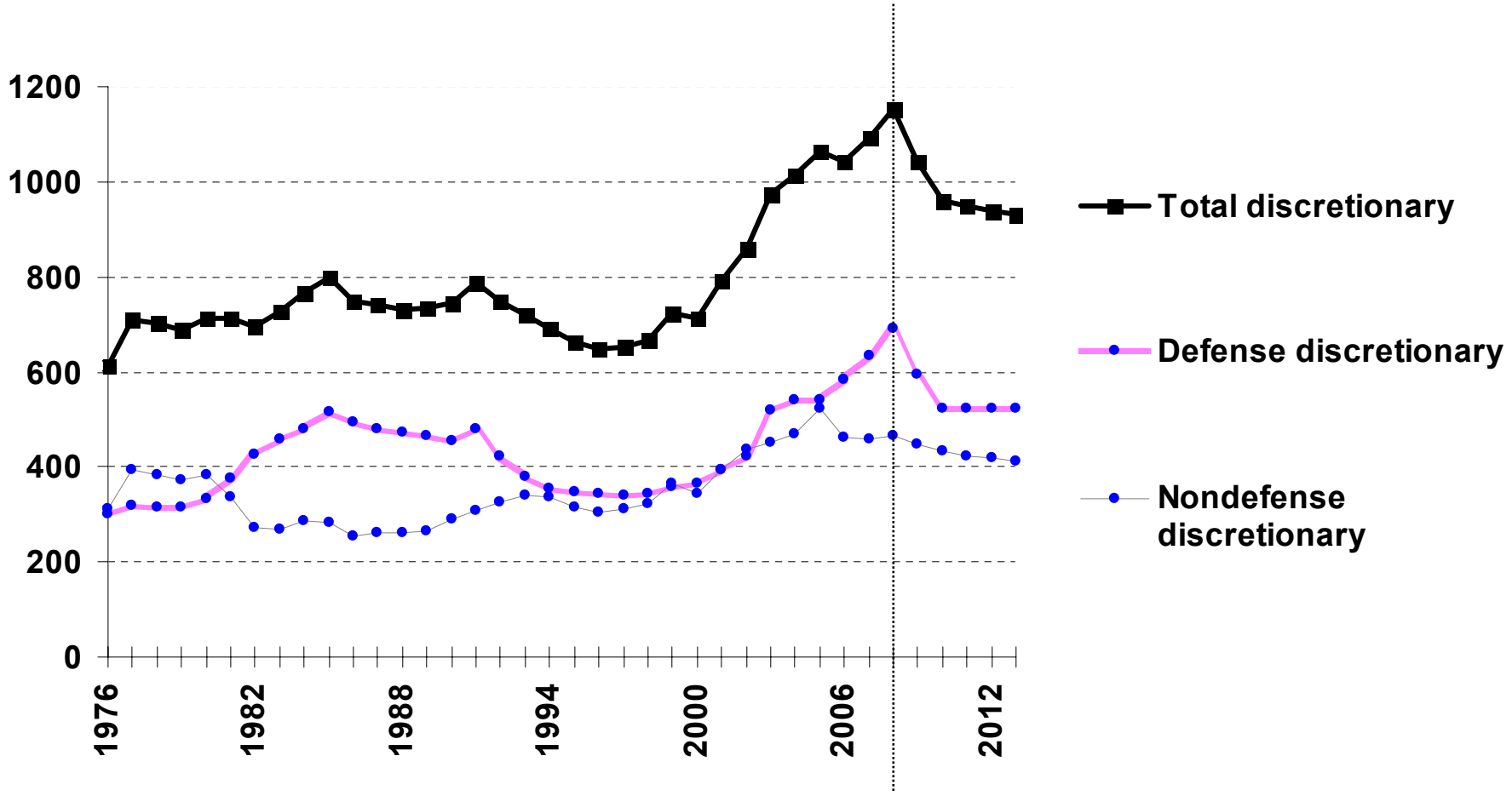
THE FY 2009 BUDGET SITUATION

- The start of FY 2009 is just two weeks away, but the FY 2009 budget is far from finished.
- To help control the deficit, the President proposes to keep domestic appropriations flat in 2009. The congressional budget allows domestic appropriations to keep pace with inflation. The President has threatened vetoes of any appropriations bills that exceed his request.
- The $21 billion difference between the two sides has resulted in a budget stalemate.
- Domestic appropriations barely kept pace with inflation in 2006, 2007, and 2008.
- Historically, federal R&D investments have closely tracked trends in discretionary spending.

Trends in Discretionary Spending, FY 1976-2013

in billions of constant FY 2008 dollars



Data in fiscal years. Source: *Budget of the United States Government, FY 2009.* FY 2008 data are estimates. FY 2009-2013 data are budget projections. FY 2009-2013 figures exclude Iraq and Afghanistan military costs.

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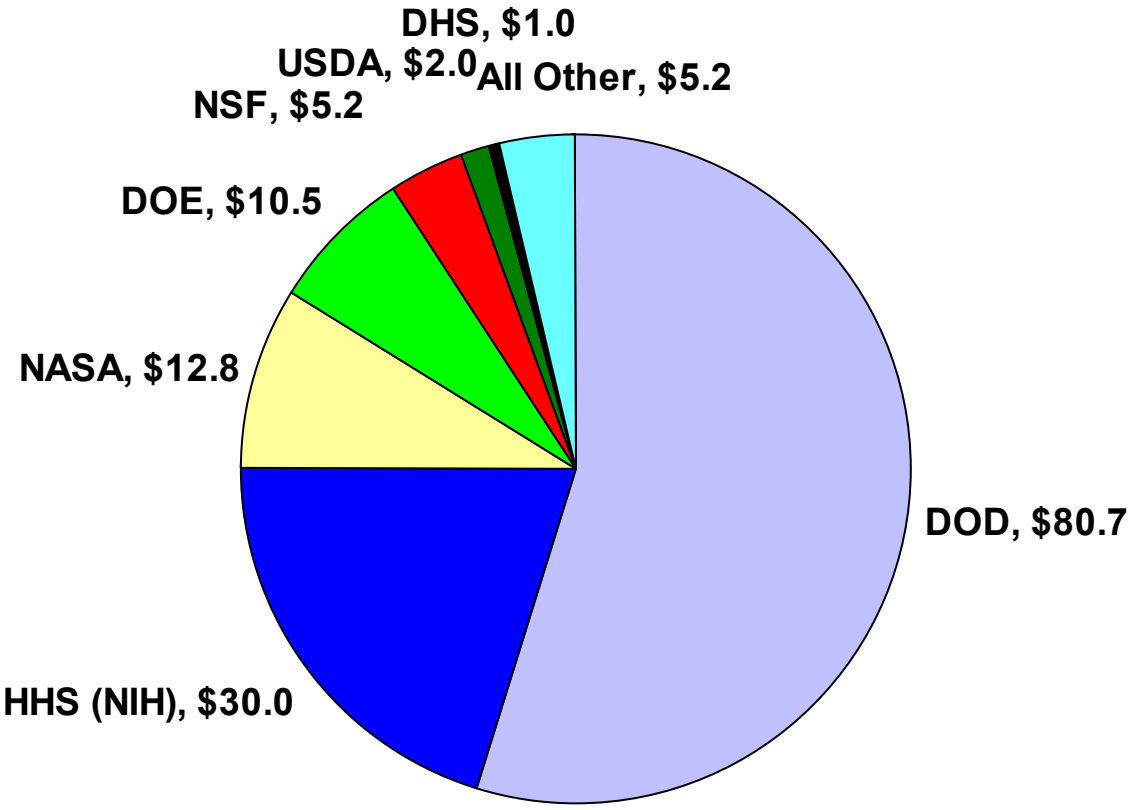
THEMES IN THE BUDGET FOR R&D: INNOVATION AND COMPETITIVENESS

- In response to the "Gathering Storm" report and others, President Bush announced the American Competitiveness Initiative (ACI) in his 2006 State of the Union address.
- There are also several congressional responses, culminating in the America COMPETES Act of August 2007, an authorization bill.
- For R&D investments, the ACI and COMPETES try to boost federal support for basic research in the physical sciences (broadly defined).
- The plan: Doubling the budgets of NSF, DOE Office of Science, and the NIST laboratories over 7 to 10 years. But 2007 and 2008 appropriations leave the plan off track despite COMPETES.

Total R&D by Agency: FY 2009 Proposed

Budget Authority in billions of dollars



Total R&D = $147.4 billion (revised)

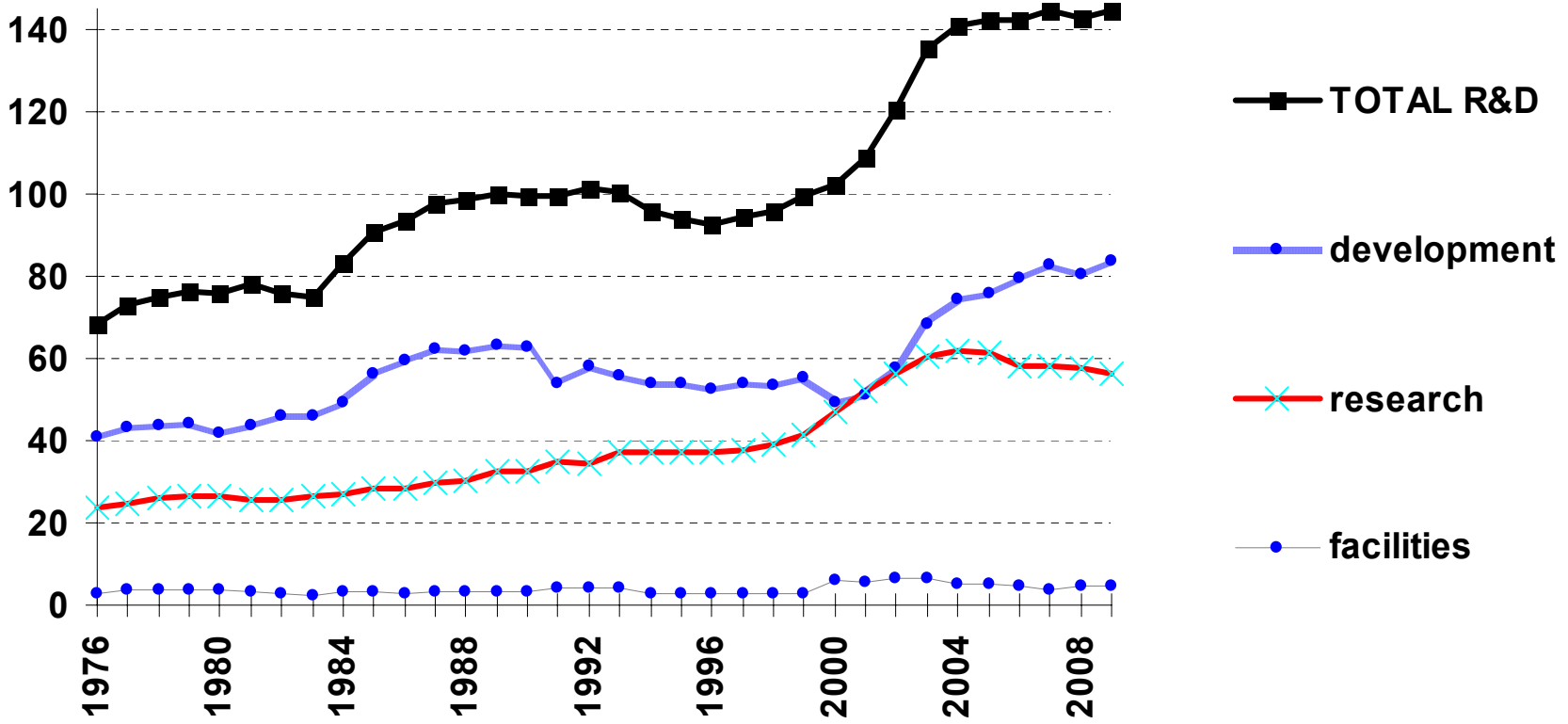
Source: AAAS, based on OMB R&D Budget Data and agency estimates for FY 2009.

THE 2009 BUDGET FOR R&D

- The ACI continues for a third year, with large increases for NSF, DOE Science, and the NIST labs to catch up to a 10-year doubling track.
- Again, there would be large increases for DOD weapons and NASA spacecraft development, but also increases for most R&D programs.
- The NIH budget would be flat, agricultural and environmental R&D agencies would decline.
- Congress has a long way to go in finalizing 2009 appropriations, but is hoping to add money to the request, with particular attention to energy R&D, climate change research, and biomedical research.

Trends in Federal R&D, FY 1976-2009 *

in billions of constant FY 2008 dollars



Source: AAAS analyses of R&D in annual AAAS R&D reports. * FY 2009 figures are latest AAAS estimates of FY 2009 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 2009.

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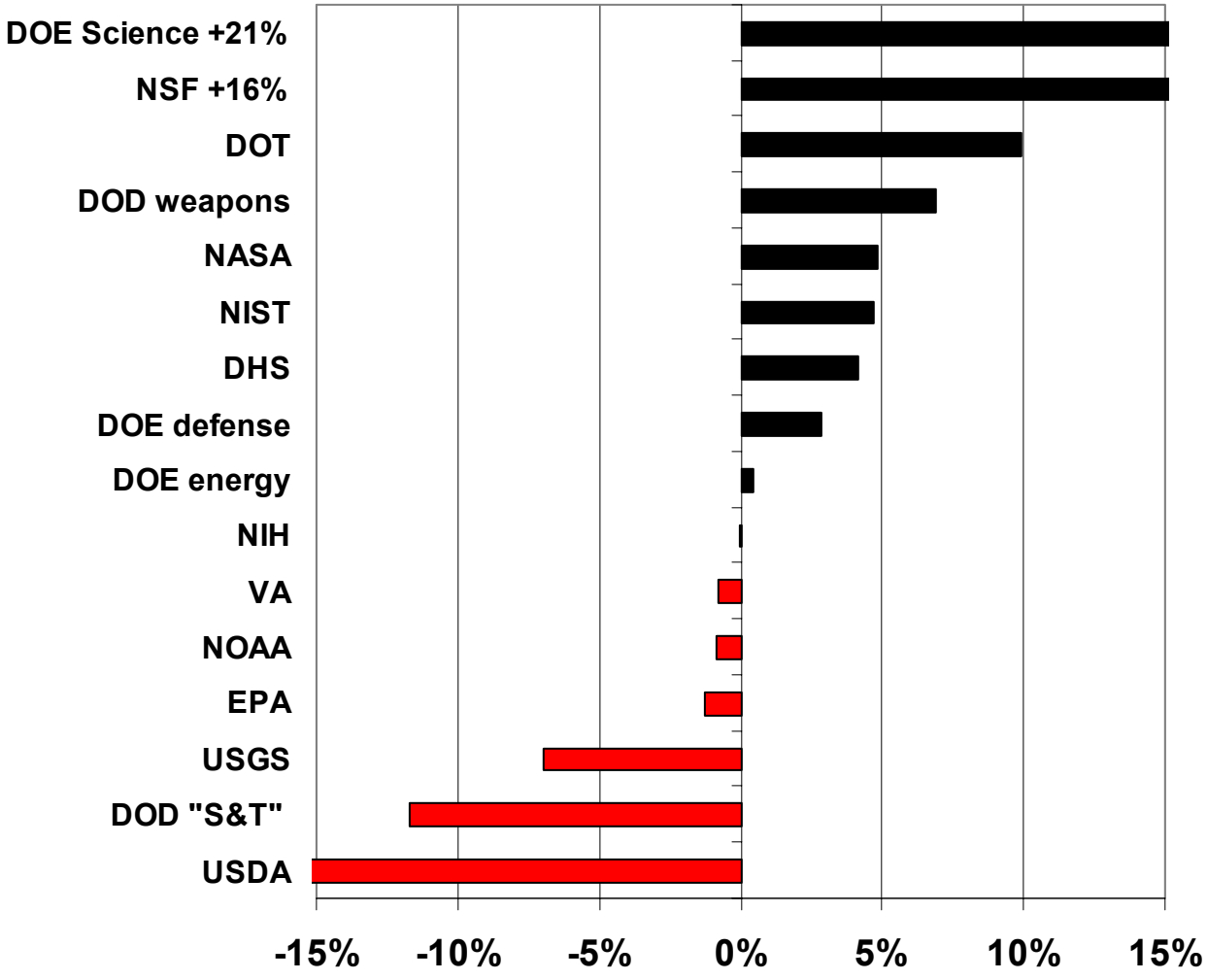
FY 2009 R&D Request

Percent Change from FY 2008



Source: AAAS, based on OMB R&D data and agency estimates for FY 2009.
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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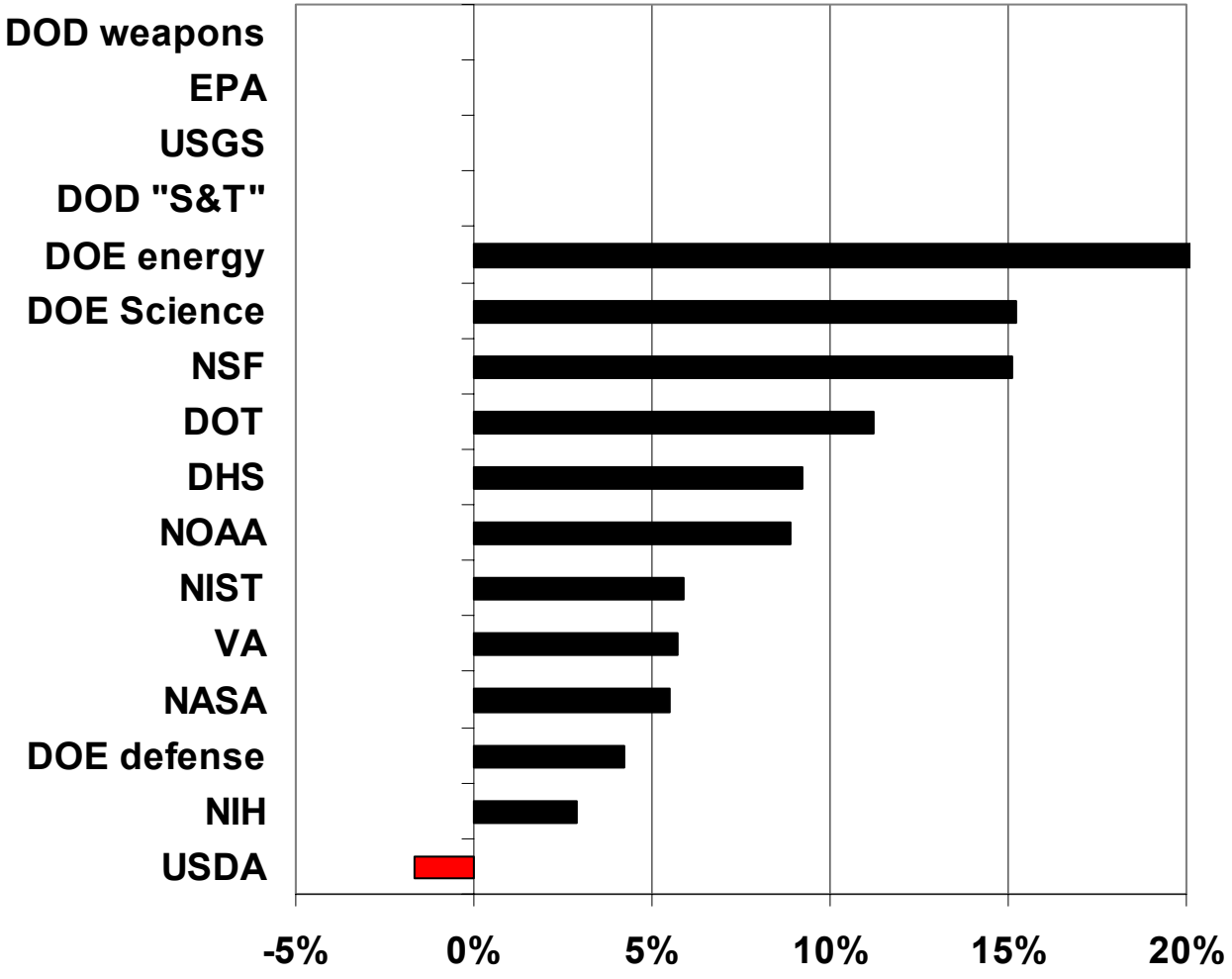
FY 2009 R&D Appropriations (Senate)

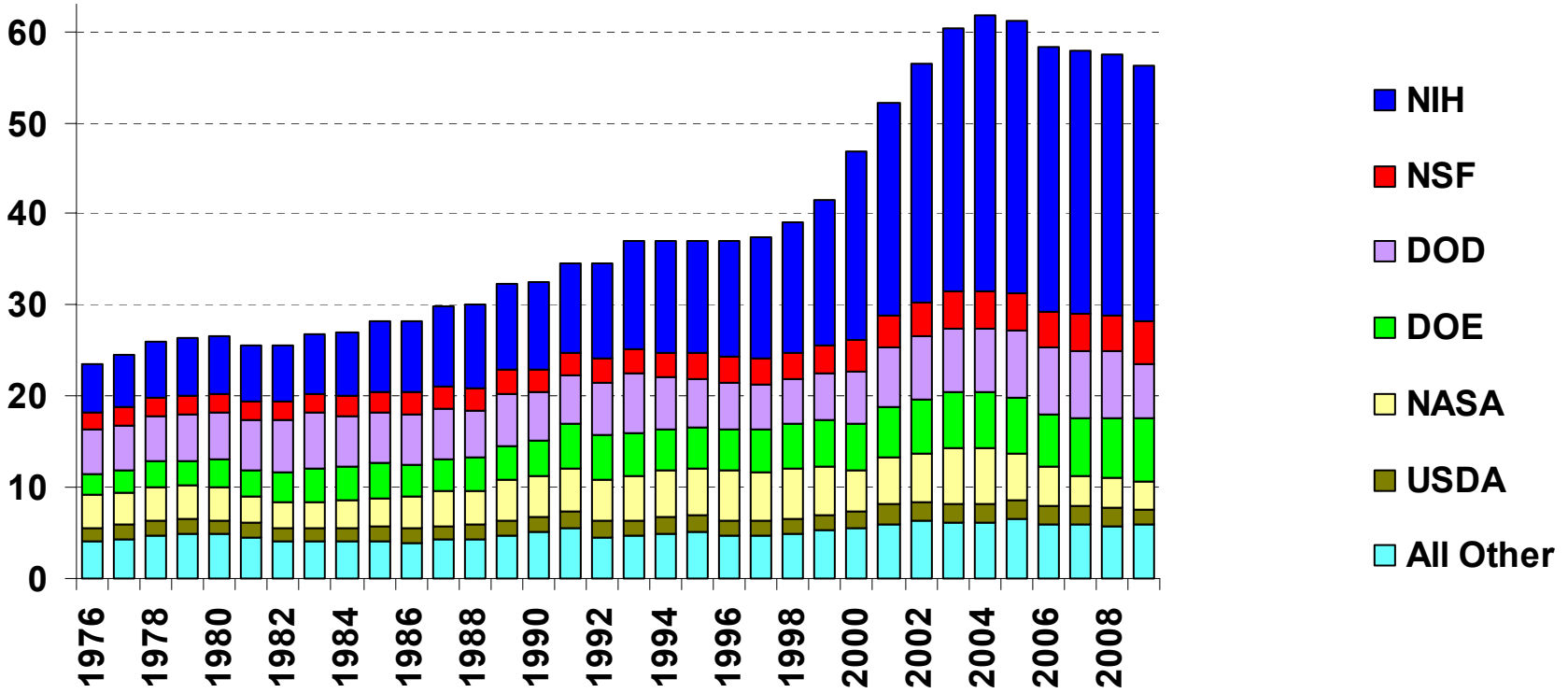
Percent Change from FY 2008 (as of AUGUST '08)



Source: AAAS estimates of R&D in FY 2009 appropriations bills.
DOD "S&T" = DOD R&D in "6.1" through "6.3" categories plus medical research.

Trends in Research by Agency, FY 1976-2009 *

in billions of constant FY 2008 dollars



Source: AAAS analyses of R&D in annual AAAS R&D reports.
* FY 2009 figures are latest AAAS estimates of FY 2009 request. Research includes basic research and applied research. 1976-1994 figures are NSF data on obligations in the Federal Funds survey.
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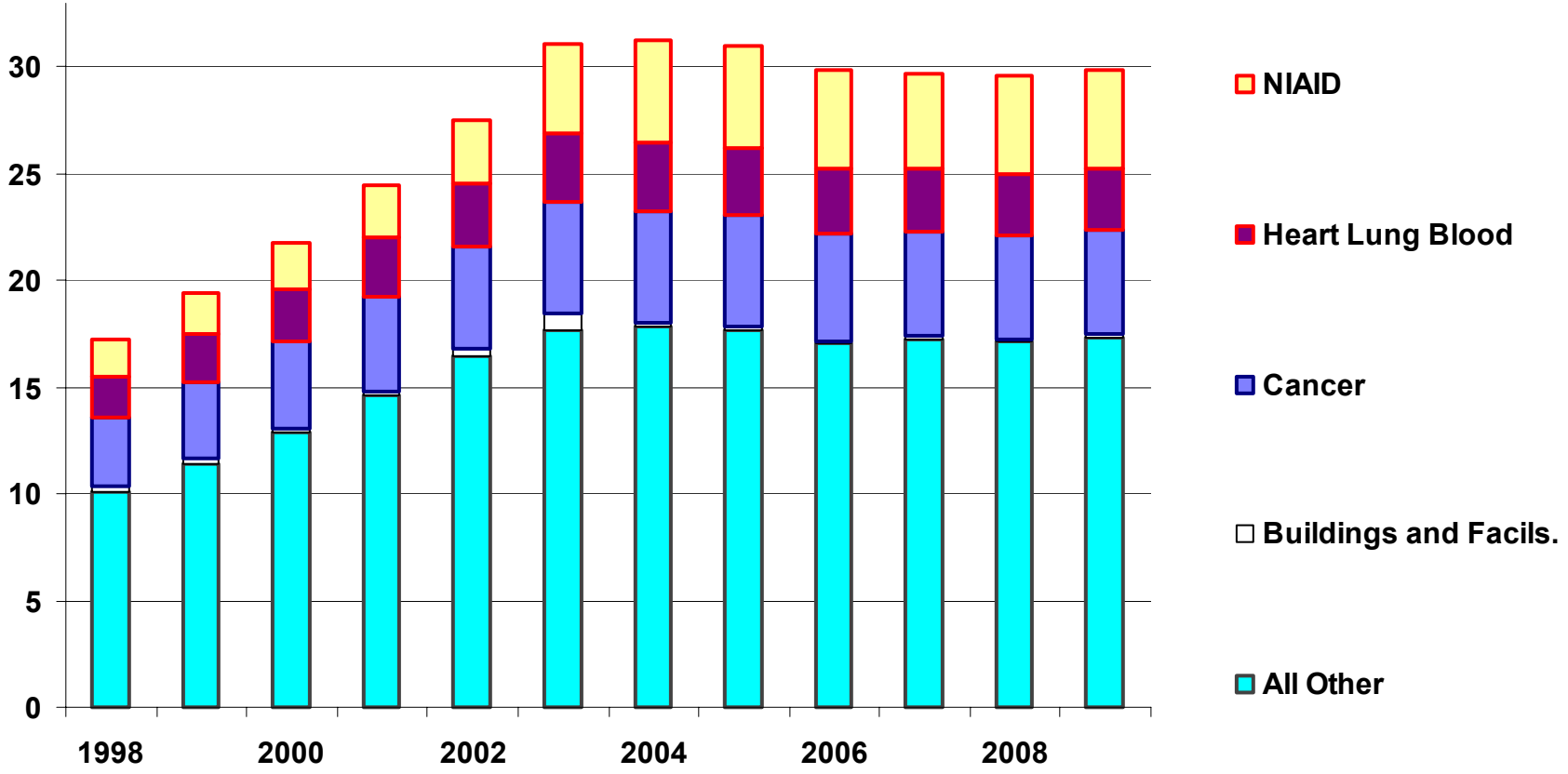
National Institutes of Health Budget by Institute, 1998-2009 (Senate)*

(budget authority in billions of constant FY 2008 dollars)



Source: AAAS R&D reports from NIH budget documents 1996-2008. * 2009 figures are latest AAAS estimates of 2009 Senate appropriations. Adjusted for inflation using OMB's GDP deflators.

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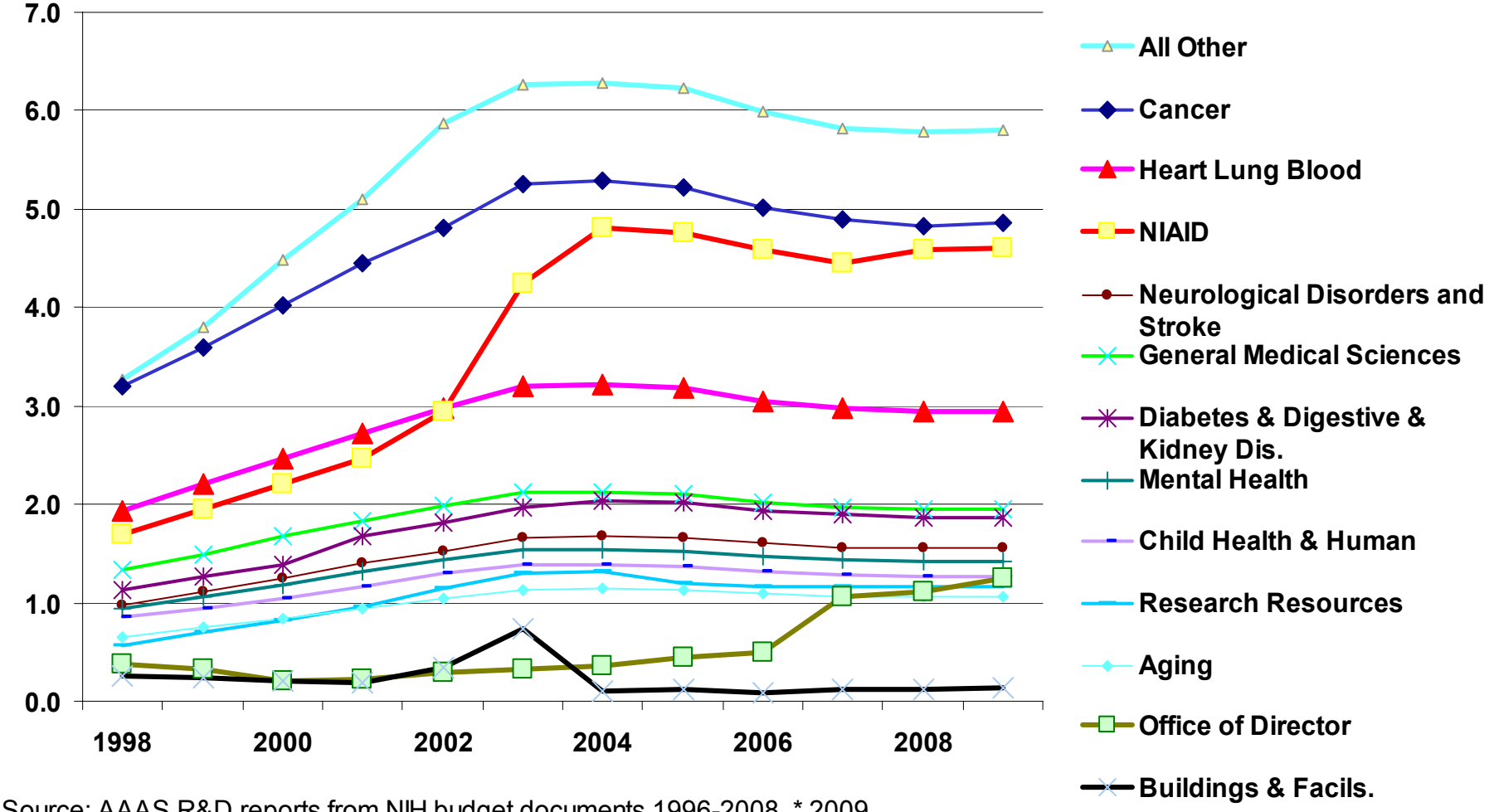
NIH Budget by Institute, 1998-2009 (Senate) *

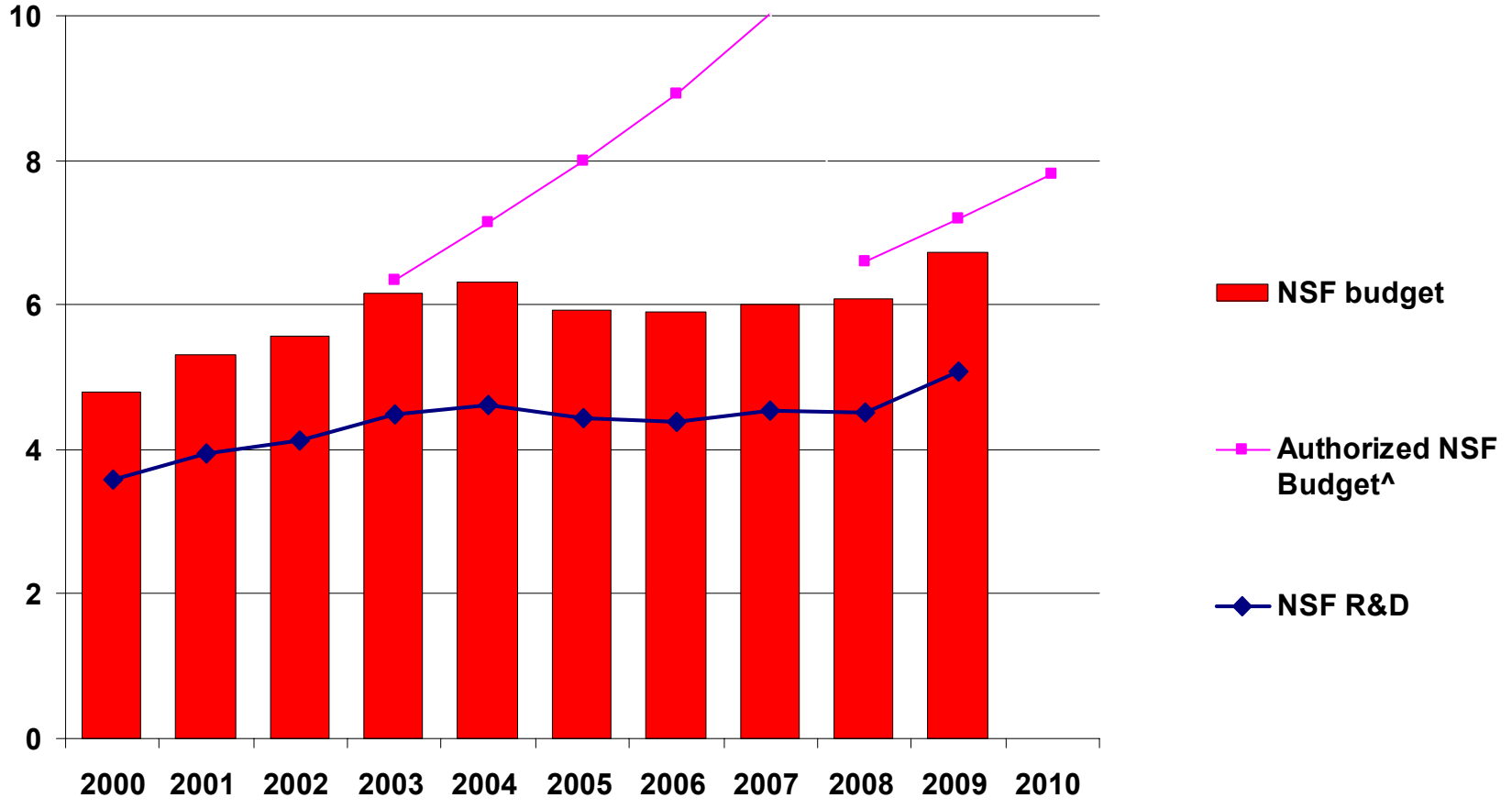
(budget authority in billions of constant FY 2008 dollars)



Source: AAAS R&D reports from NIH budget documents 1996-2008. * 2009 figures are latest AAAS estimates of 2009 Senate appropriations. Adjusted for inflation using OMB's GDP deflators.

National Science Foundation Budget, FY 2000-2009 (Senate) *

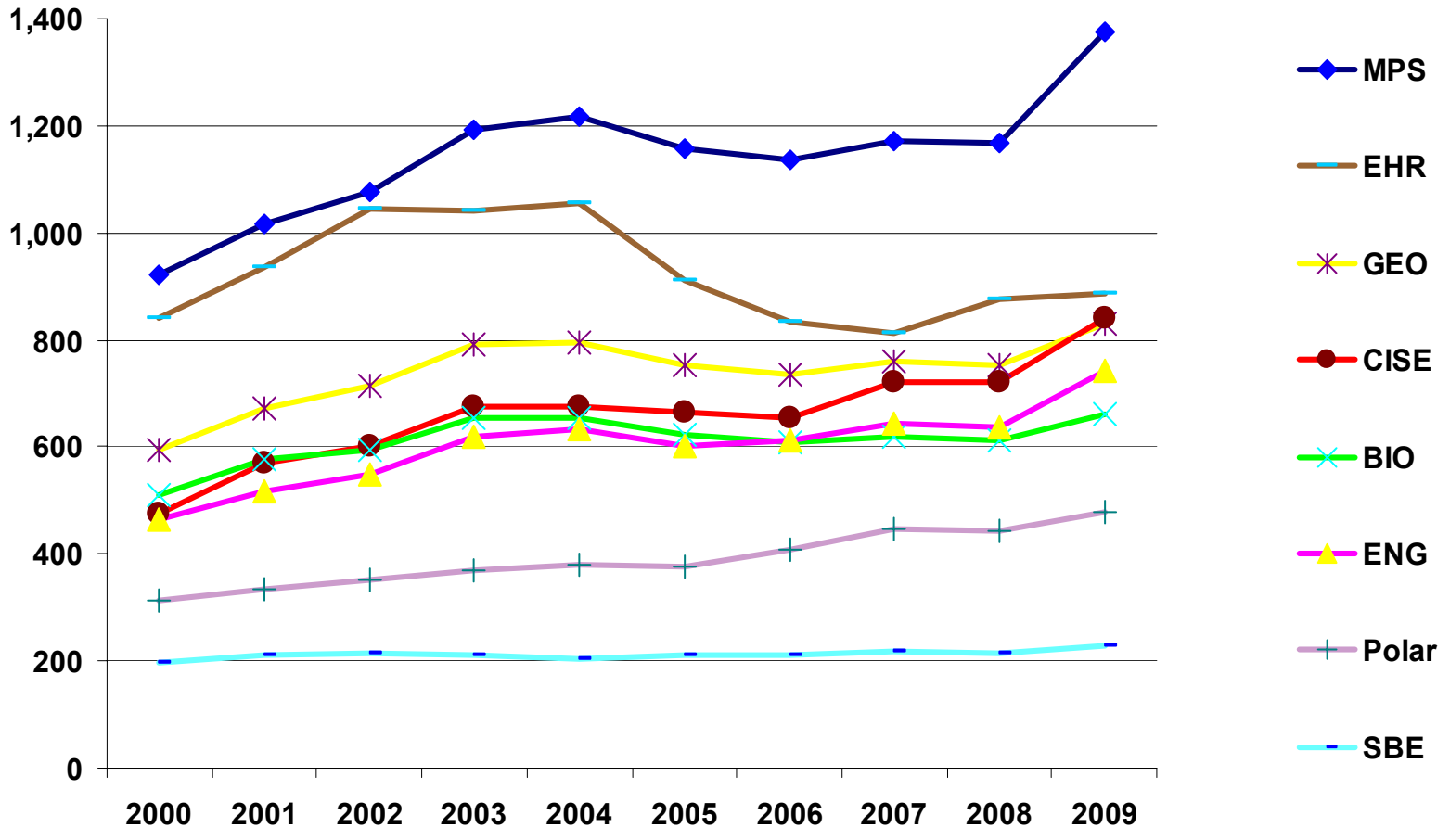
(budget authority in billions of constant FY 2008 dollars)



Source: National Science Foundation, AAAS, and Public Law 107-368, and * - latest AAAS estimates of FY 2009 appropriations. ^ - Authorizations in Public Law 107-368 (2002) and America COMPETES Act.

NSF by Directorate, FY 2000-2009 (Senate) *

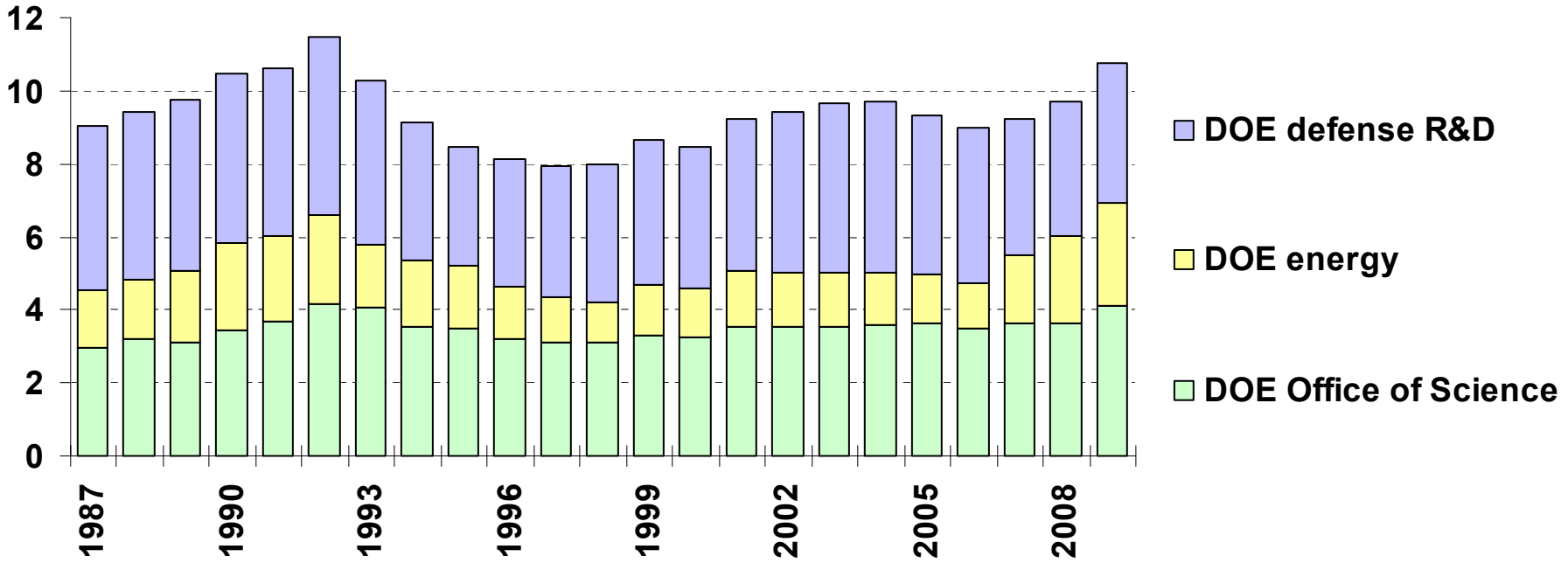
(budget authority in millions of constant FY 2008 dollars)



Source: National Science Foundation data. * - FY 2009 figures are AAAS etsimates of latest FY 2009 appropriations. CISE includes new Office of Cyberinfrastructure.
R&D and non-R&D components included in directorate budgets.

Trends in DOE R&D, FY 1987- 2009 (Senate)*

in billions of constant FY 2008 dollars



Source: AAAS analyses of R&D in *AAAS Reports VIII-XXXIII.* * FY 2009 figures are latest AAAS estimates of FY 2009 Senate appropriations.
R&D includes conduct of R&D and R&D facilities.

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DETOUR: WHAT IS A CR?

A continuing resolution (CR) is a temporary appropriations bill allowing federal programs to keep spending money in the new fiscal year without an enacted appropriations bill.

- For FY 2009, a CR may cover all 12 appropriations bills until January or later.
- In most CRs, programs are allowed to keep spending at the previous year's rate.
- There could be a different formula, or a different formula for specific programs. For example, there's a push to give NIH an increase in the CR.
- A CR can be as short as 1 page, BUT it can also be a vehicle for other legislation (this year: offshore oil drilling? Loans to Big 3 automakers? Second stimulus package?) and that could create problems.

THE ENTIRE TEXT OF the 3rd FY 2008 CR

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That Public Law 110-92 is further amended by striking the date specified in section 106(3) and inserting `December 21, 2007'.

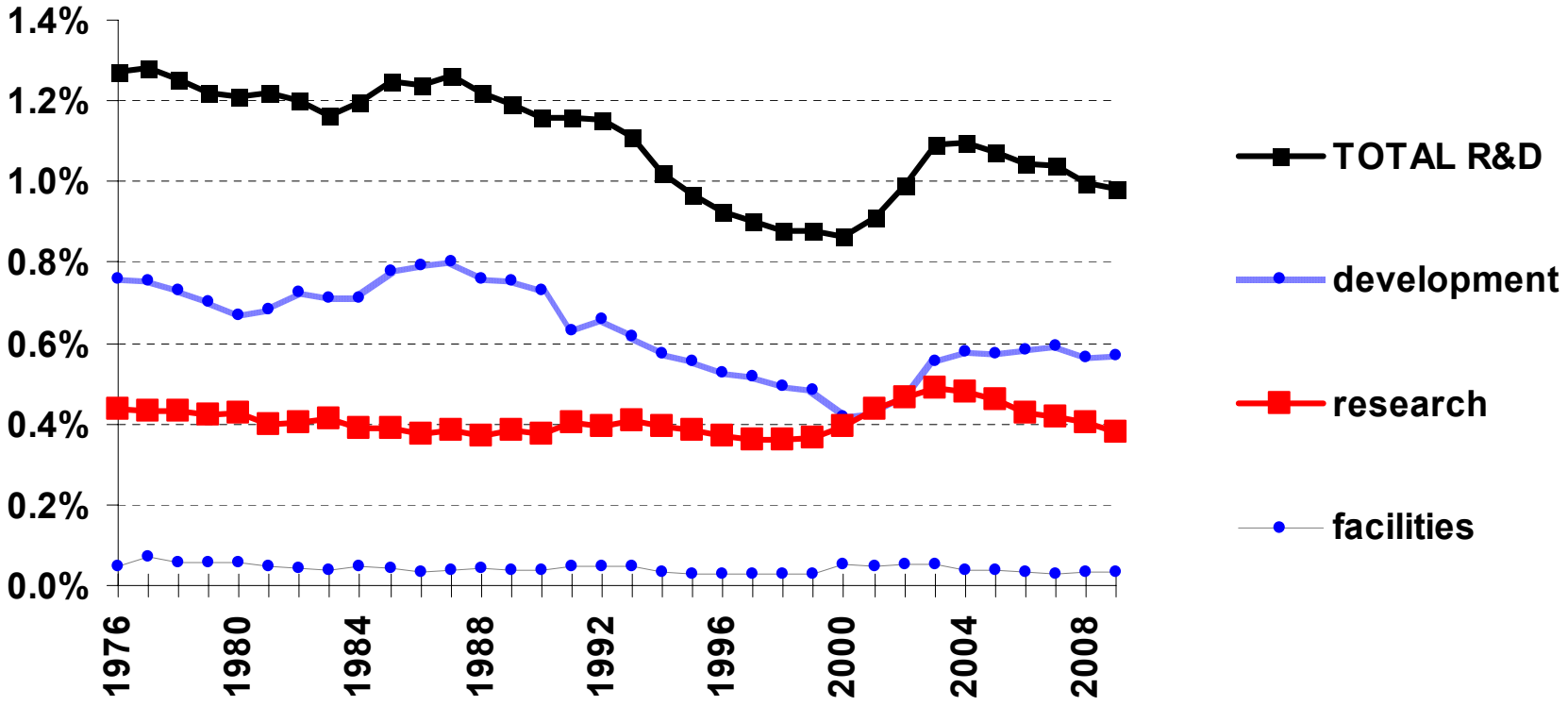
OTHER FUNDING ISSUES

- BARDA R&D could more than double, but a CR could keep funding at the 2008 level for months.
- The SBIR / STTR programs need to be reauthorized. Funding is a set percentage of agencies' EXTERNAL R&D, and that percentage could change.
- Science and math education increases are authorized in America COMPETES, but funding depends on NSF and other agency appropriations.

FEDERAL R&D IN CONTEXT

- 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 while federal support is dropping.

Trends in Federal R&D as % of GDP, FY 1976-2009 *



Source: AAAS analyses of R&D in annual AAAS R&D reports. * FY 2009 figures are latest AAAS estimates of FY 2009 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 2009.

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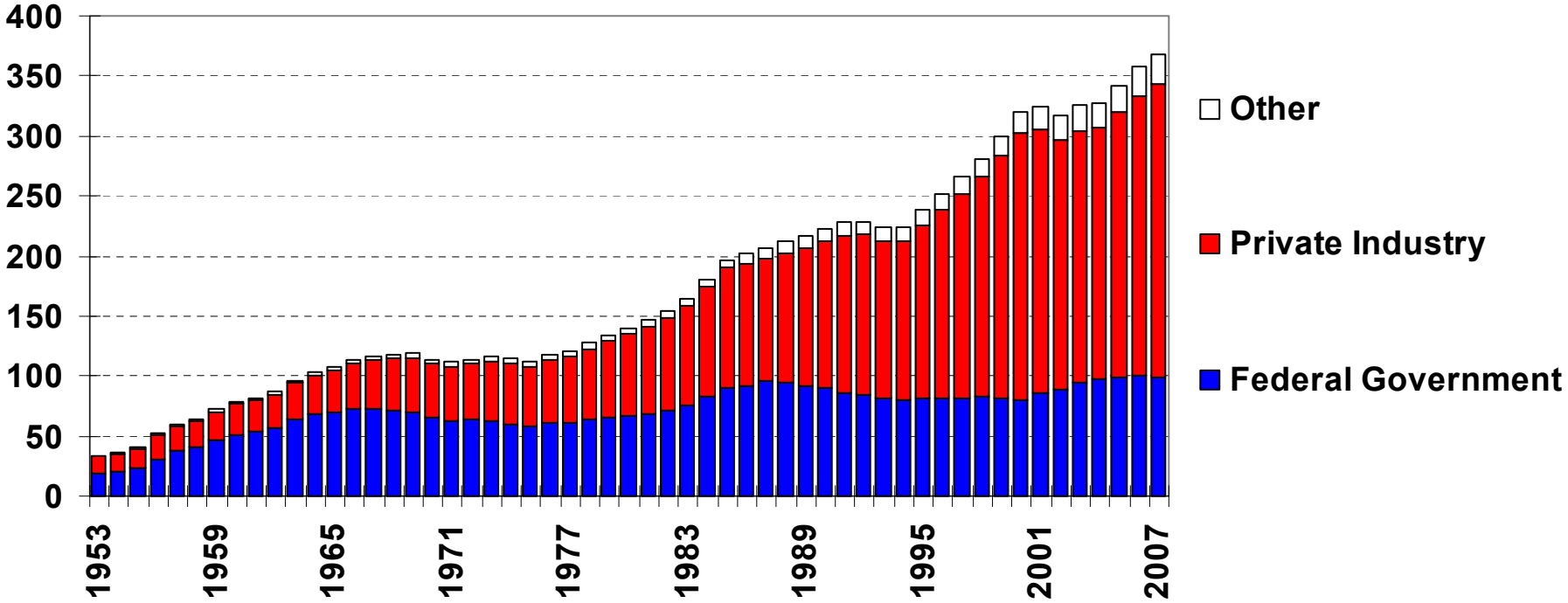
U.S. R&D Funding by Source, 1953-2007

expenditures in billions of constant 2007 dollars

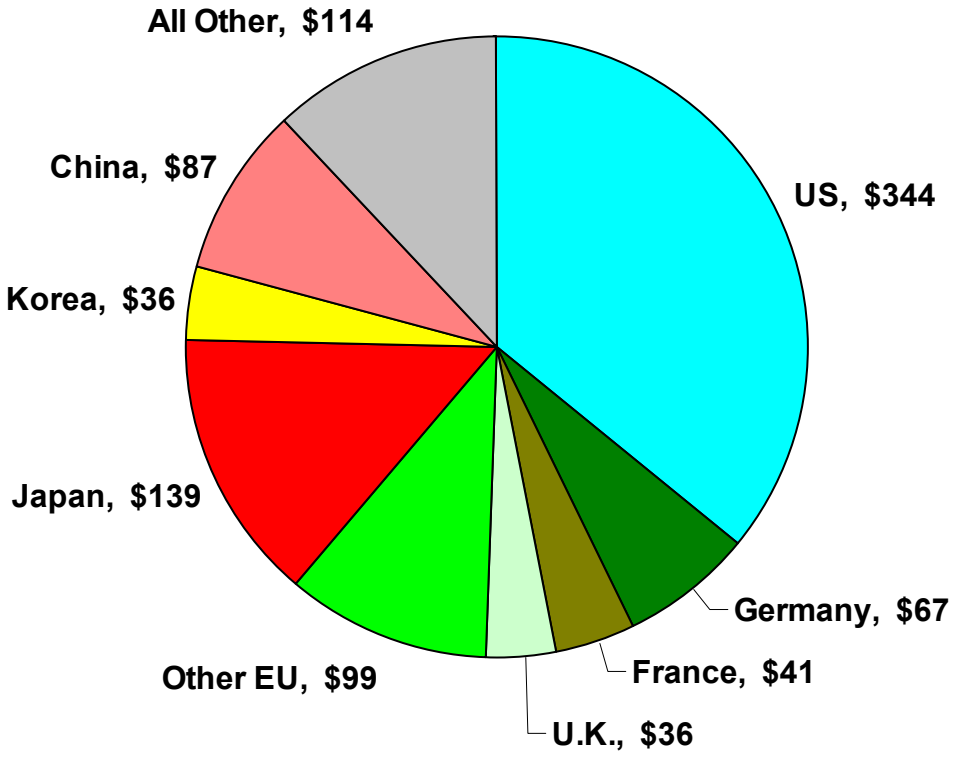


Source: NSF, Division of Science Resources Statistics. (Data for 2007 are preliminary.)

HOW DOES THE U.S. COMPARE?

- The U.S. is still the leading science and technology superpower in R&D investments, but the lead is shrinking.
- The U.S. R&D / GDP ratio compares favorably with other nations, but defense development is a big factor in the U.S.
- Other nations:
  - EU – A plan to reach 3% of EU GDP by 2010, but it won't happen.
  - Korea – R&D growing by 10%+ a year, R&D/GDP ratio surpasses U.S. ratio in 2004 and hits 3%.
  - China – R&D spending grew 20% in 2004 and 25% in 2005; basic research still small, but expanding rapidly.
  - India – Not big in R&D spending yet, but there are plans to boost its R&D capabilities to compete in high-tech industries.

Shares of Total World R&D, 2007*

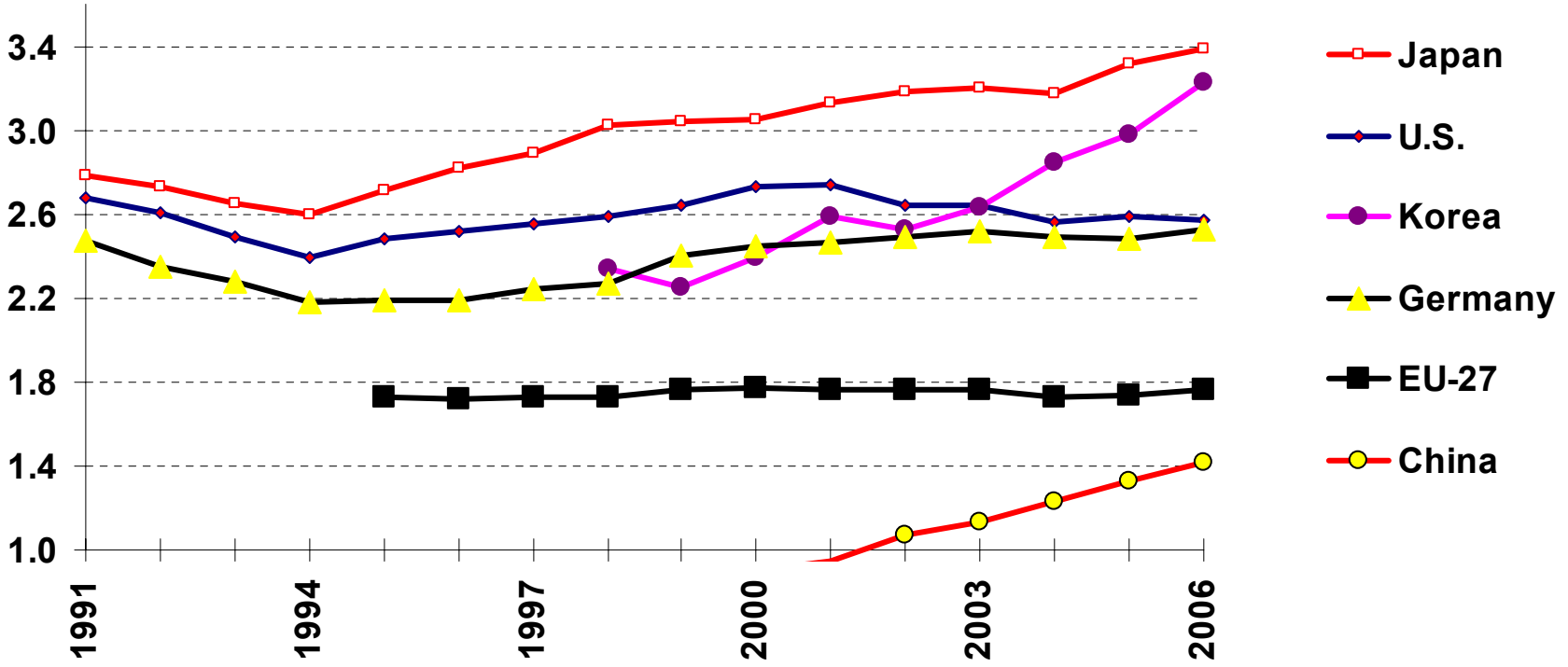


Total World R&D = U.S. $962 billion**

* World = OECD members plus Argentina, China, Romania, Israel, Russia, Singapore, Slovenia, South Africa, Taiwan. 2007 or most recent year available.

Source: OECD, Main Science and Technology Indicators, 2008.
2007 data or latest year available.
* *- calculated using purchasing power parities.

Total National R&D as % of GDP, 1991-2006



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. AUGUST '08 © 2008 AAAS

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WHERE IS FEDERAL R&D FUNDING HEADED?

- Congress is way behind schedule in finishing the 12 FY 2009 appropriations bills. After the election? After the inauguration?
- The big budget battle between the President and Congress is over how much to spend on domestic discretionary programs.
- Even at a time when policymakers are concerned about U.S. leadership in science and technology eroding, and when proposed R&D increases are authorized in the America COMPETES Act and other legislation, the problem remains how to find the resources.
- Because many 2009 appropriations bills haven't even been drafted, this fall is still a key time for deciding the fate of R&D funding.

FOR MORE INFORMATION…

The AAAS R&D web site is

www.aaas.org/spp/rd