

# Science and Technology Policy in 2010: The Stimulus and Beyond

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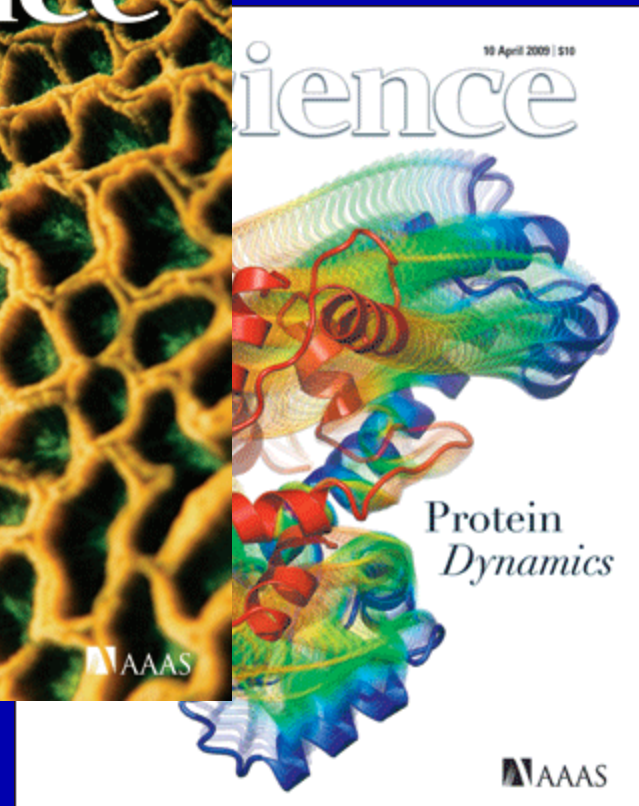
## Presentation Outline

- A few words about AAAS
- Background: Science in the 2008 campaign
- Obama science policy initiatives
- Budget & priorities
  - FY 2009-10 & stimulus
  - FY 2011 budget
- What comes next?

- A few words about AAAS

## A Few Words About AAAS

- World's largest multidisciplinary scientific society (includes all fields) – independent, not part of government
- \$90 million budget - income from dues, advertising, grants
- Founded in 1848; membership of 125,000
- “Voice of science” to government, society – but not a lobby
- Publisher of the weekly journal *SCIENCE* (over one million readers) + 2 new journals
- Programs in policy, education, science diplomacy . . .



- A few words about AAAS
- Background: science in the 2008 campaign

## Science in the 2008 Campaign

- Science not one of the top issues, but received more attention than usual
- Scientists very interested, science organizations followed campaign closely
- Proposal for “Science Debate 2008”
- Candidates formed “brain trusts”
- AAAS candidates’ forum

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## Science and Technology in the 2008 Presidential Election



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### Candidate S&T Positions

These profiles represent the S&T platforms of each candidate for president during the 2008 campaign. For each candidate, we compiled a summary of the positions and/or platforms on key science and technology (S&T) issues across five thematic areas: Competitiveness & Innovation; STEM Education & Workforce; Better Health for Americans; Energy & Environment; and National & Homeland Security. The material provided was collected from official campaign websites and other resources as noted. We've retained these profiles as a means of referencing the positions and intentions each candidate expressed during the campaign.

#### Republicans



**John McCain**

Senator John McCain is the senior Senator for Arizona, representing the state since 1986, and was the Republican nominee for president. Senator McCain's running mate was Governor Sarah Palin of Alaska.

#### Democrats



**Barack Obama**

President-Elect Barack Obama is the junior Senator for the state of Illinois elected in 2005. Senator Obama's Vice-President-Elect is Senator Joseph Biden of Delaware. Senator Biden's campaign profile is listed with the former candidates.



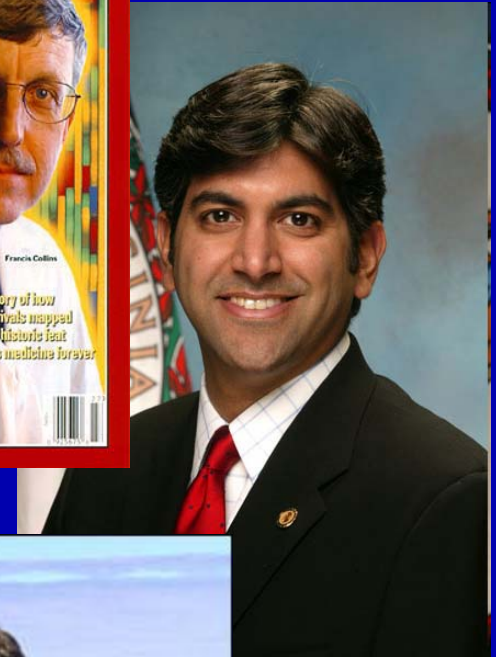
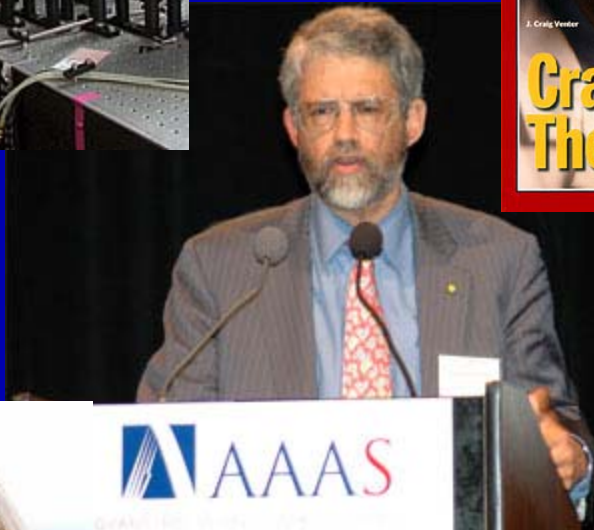
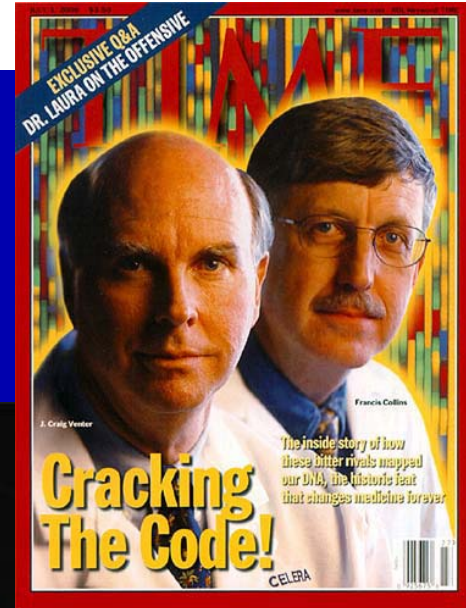
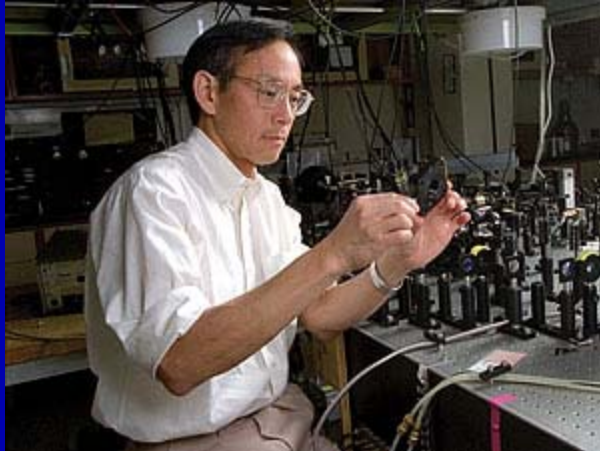
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- Obama science policy initiatives

# Obama's emphasis on science and innovation

- Inaugural Address: “. . . restore science to its rightful place”
- Signing of Recovery Act at Denver Museum of Science & Nature (February 17)
- Early actions:
  - Climate change plan (February 26)
  - Executive Order on stem cell research (March 9)
  - Memo on scientific integrity (March 9)
- Speech at National Academy of Sciences (April 27)
- Innovation strategy speech (September 21)
- Energy speech at MIT (October 23)

## An Unusually Strong Science Team

- Steven Chu (Nobel laureate) → DOE
- John Holdren (climate change expert) → OSTP
- Jane Lubchenco (marine ecologist) → NOAA
- Aneesh Chopra (tech policy) → CTO
- Francis Collins (geneticist) → NIH
- Margaret Hamburg (public health) → FDA
- Marcia McNutt (geophysics) → USGS
- Steven Koonin (physics) → DOE (Under Sec'y)



Jane Lubchenco

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## The Budget and Government Priorities

- Budget is the key to policy
- Complex budget process decides how government's money is spent
- Federal budget has major impact on health of U.S. science & technology (esp. basic res.)
- Government spends ~\$150 billion on R&D
- Federal funds support 60% of university R&D (also fellowships, loans, etc.)
- R&D funding decisions part of budget process

## Priority-Setting for R&D

- No “R&D Budget” – federal R&D not a fixed pie or a zero-sum game (e.g., SSC)
- R&D priorities reflect national priorities
- Administration and Congress often differ on priorities
- Different areas of R&D (e.g., biomedical, aerospace, agriculture) connect to different constituencies

## 2009: A Very Unusual Year

- ARRA, the stimulus bill, signed Feb. 17, before regular FY 2009 appropriations were final
- A huge supplement to the budget passed BEFORE most of the original budget
- ARRA contains over \$18 billion for R&D
- Unprecedented increase for some science agencies – e.g., NIH (36%)
- Conference committee chose higher of House & Senate, or even more

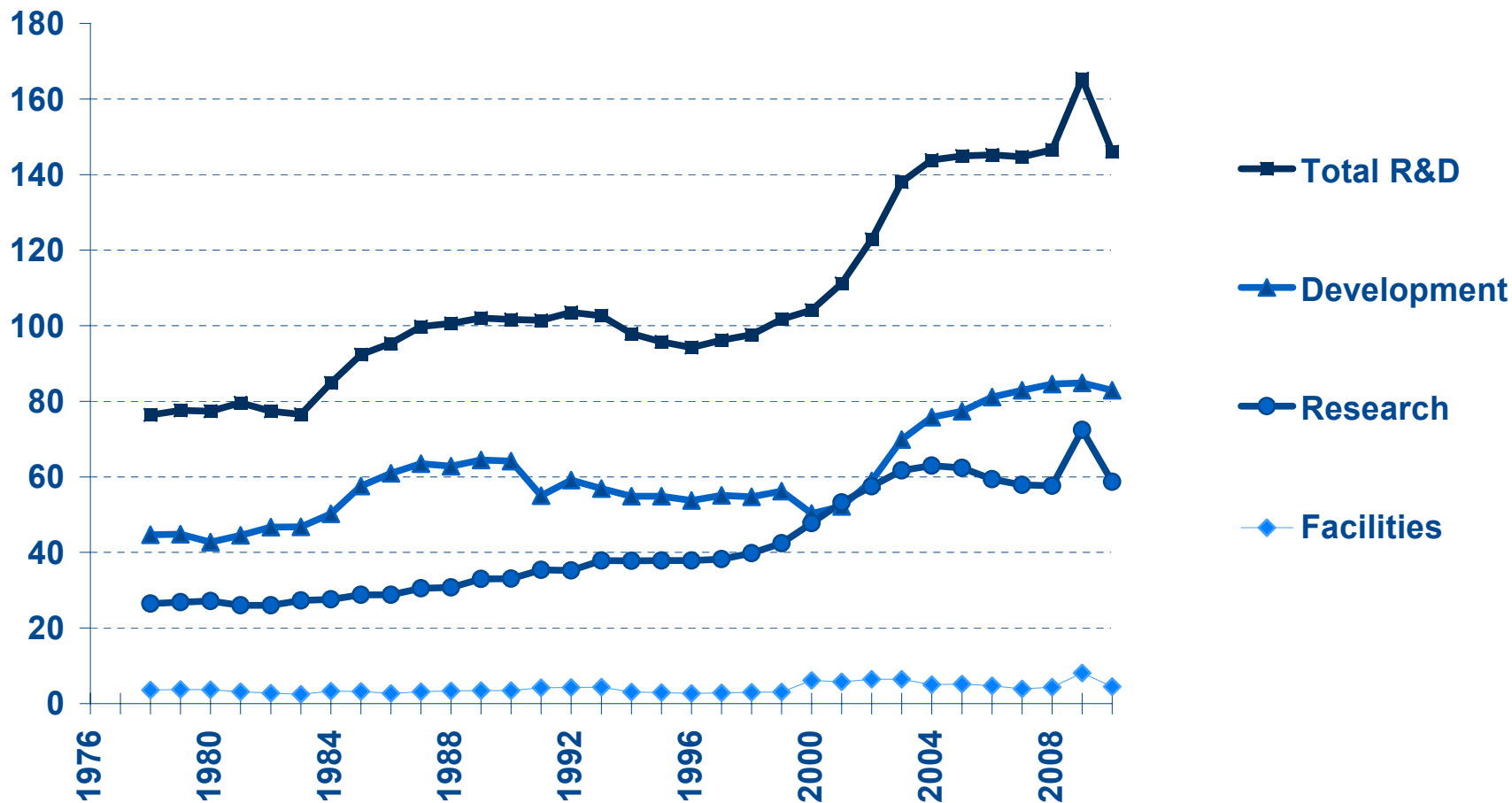


## R&D in ARRA (“The Stimulus Bill”)

- Four major R&D priorities: innovation & competitiveness-related basic research, biomedical research, energy R&D, climate change
- Basic competitiveness research: NSF, DOE science, and NIST on track to double over 7 to 10 years, as promised in Obama campaign and America COMPETES Act
- Energy & climate also high priorities: \$3.5 B for DOE energy R&D, \$400 M for NASA climate, \$830 M for NOAA
- Agencies got FY 2009 money, can obligate the funds through September 2010, but goal is to spend the money quickly

# Trends in Federal R&D, FY 1976-2010

in billions of constant FY 2009 dollars

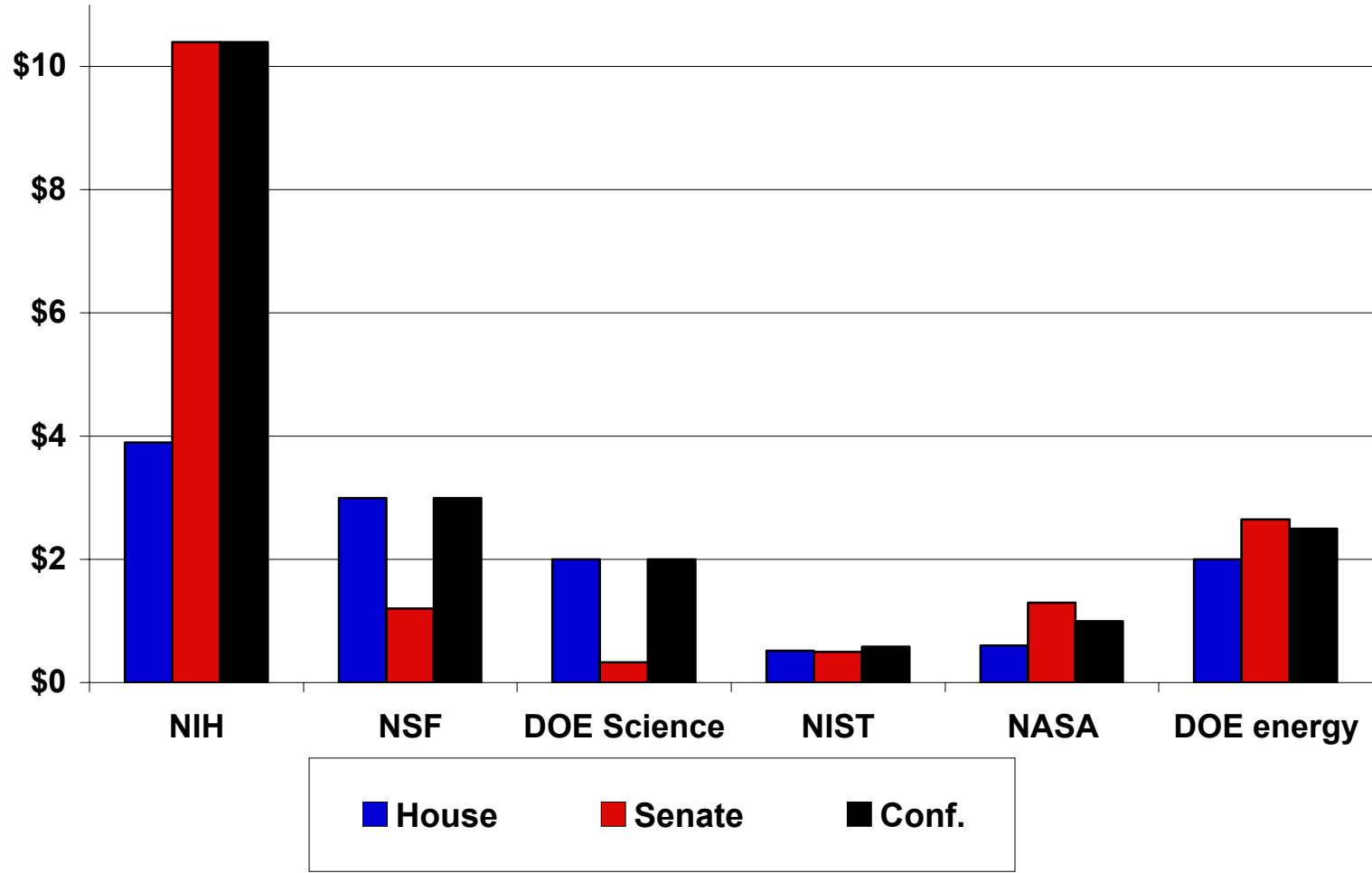


Source: AAAS analyses of R&D in annual AAAS R&D reports.  
FY 2010 figures are latest AAAS estimates of FY 2010 request.  
R&D includes conduct of R&D and R&D facilities.  
1976-1994 figures are NSF data on obligations in the Federal Funds survey.

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# 2009 Supplemental Recovery Funding for R&D (House, Senate, and Final bills) (budget authority in billions of dollars)



Source: AAAS analysis of R&D in House and Senate stimulus appropriations bills.  
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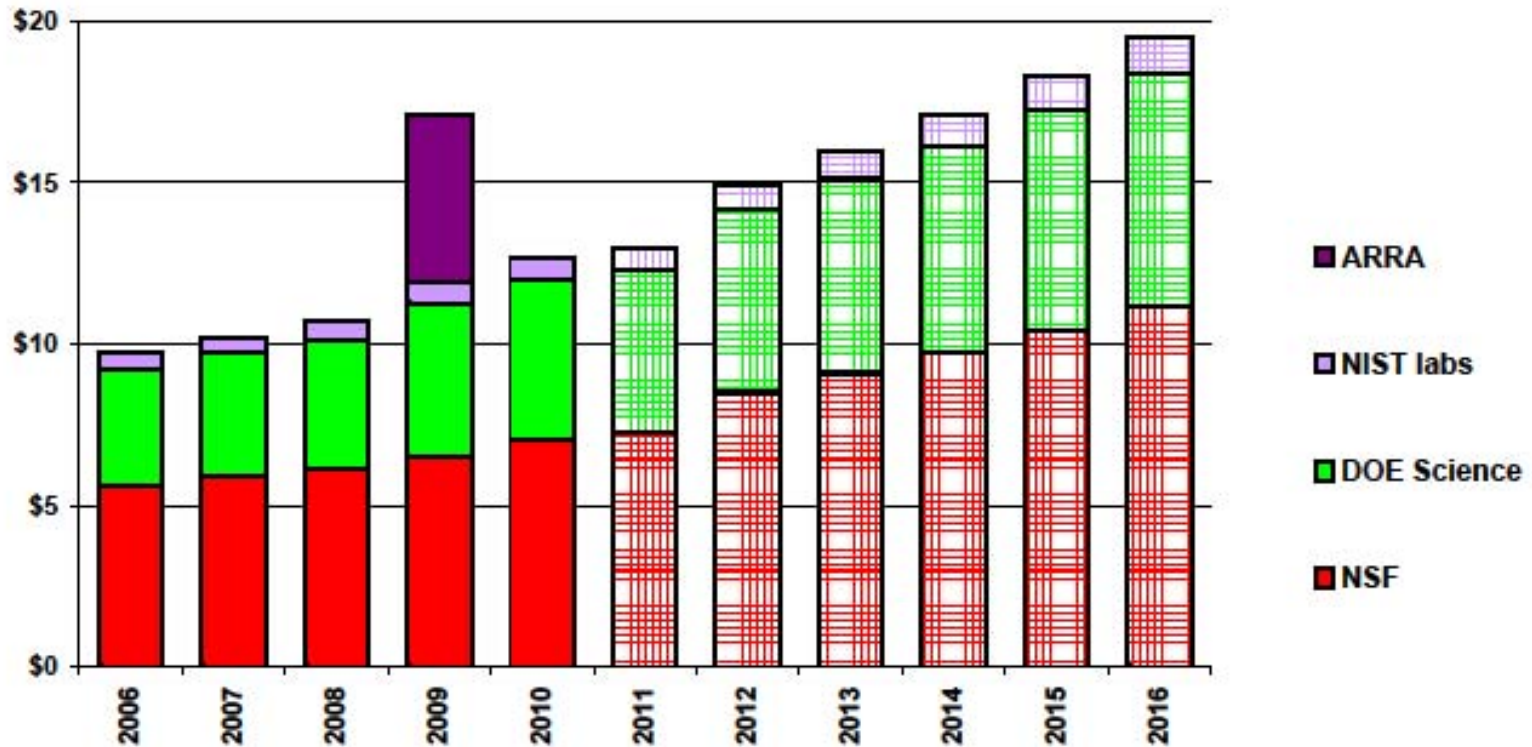


## The Federal R&D Investment for FY 2010

- Same four R&D investment priorities as in stimulus
- On track to double funding for basic research agencies
- Small increase from FY 2009 to FY 2010, but ARRA has had a major impact
- Final congressional action on R&D more or less mirrors President's budget

# President's Plan for Science and Innovation, FY 2006-2016 (basic research doubling)

(budget authority in billions of current dollars)



2006-2009 figures are enacted budget authority; 2011- 2016 figures are projections in the 2010 budget.

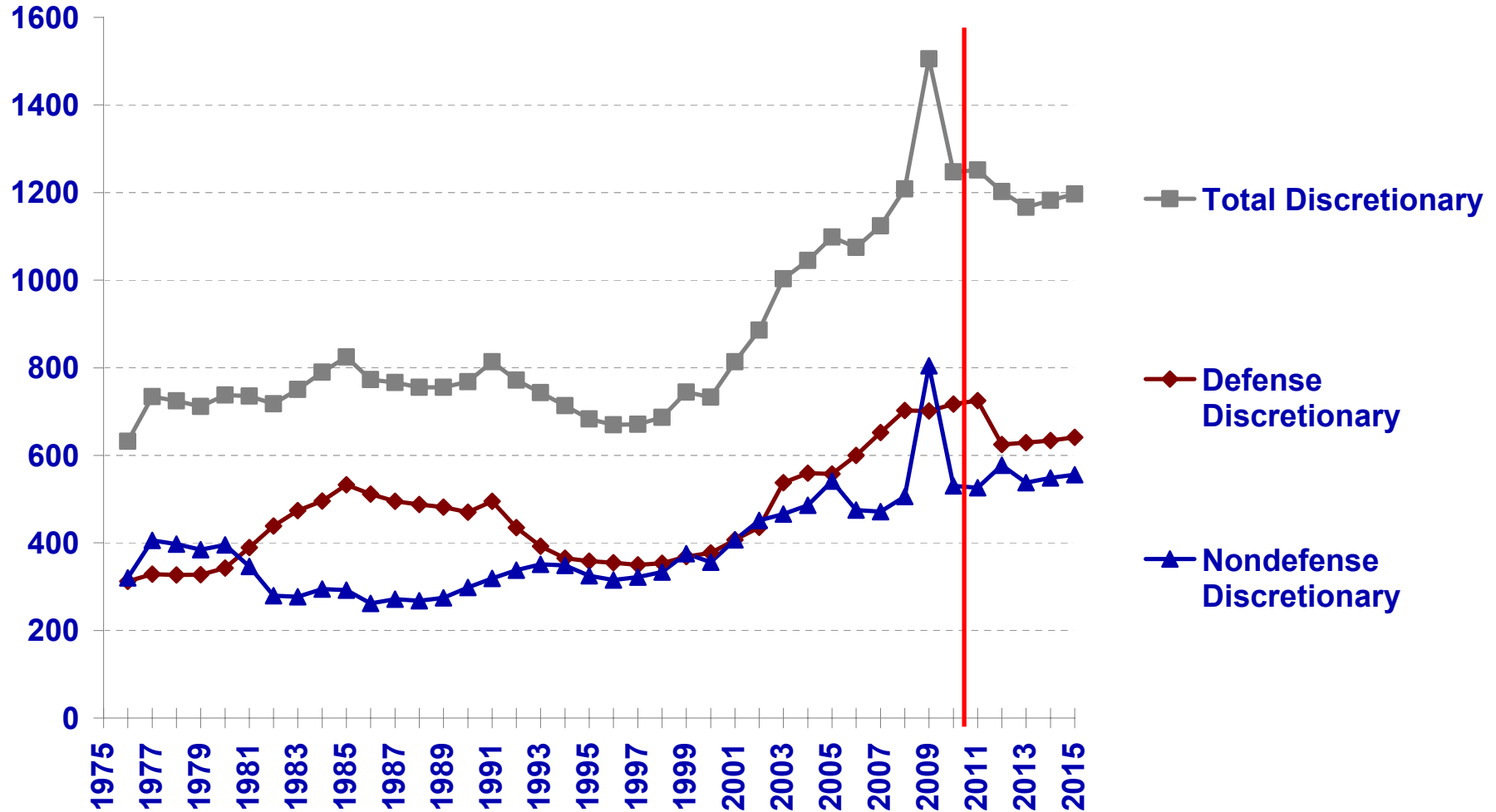
MAY '09 OSTP

## The FY 2011 Budget: Back to Reality?

- \$3.8 trillion total budget, \$1.3 trillion unified deficit
- \$1.4 trillion discretionary spending (0.5% increase)
  - \$671 billion nondefense spending (3.4% decrease)
- 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

# Trends in Discretionary Spending

outlays in billions of constant FY 2010 dollars



Source: *Budget of the United States Government, FY 2011.*

FY 2010-2015 data are budget projections.

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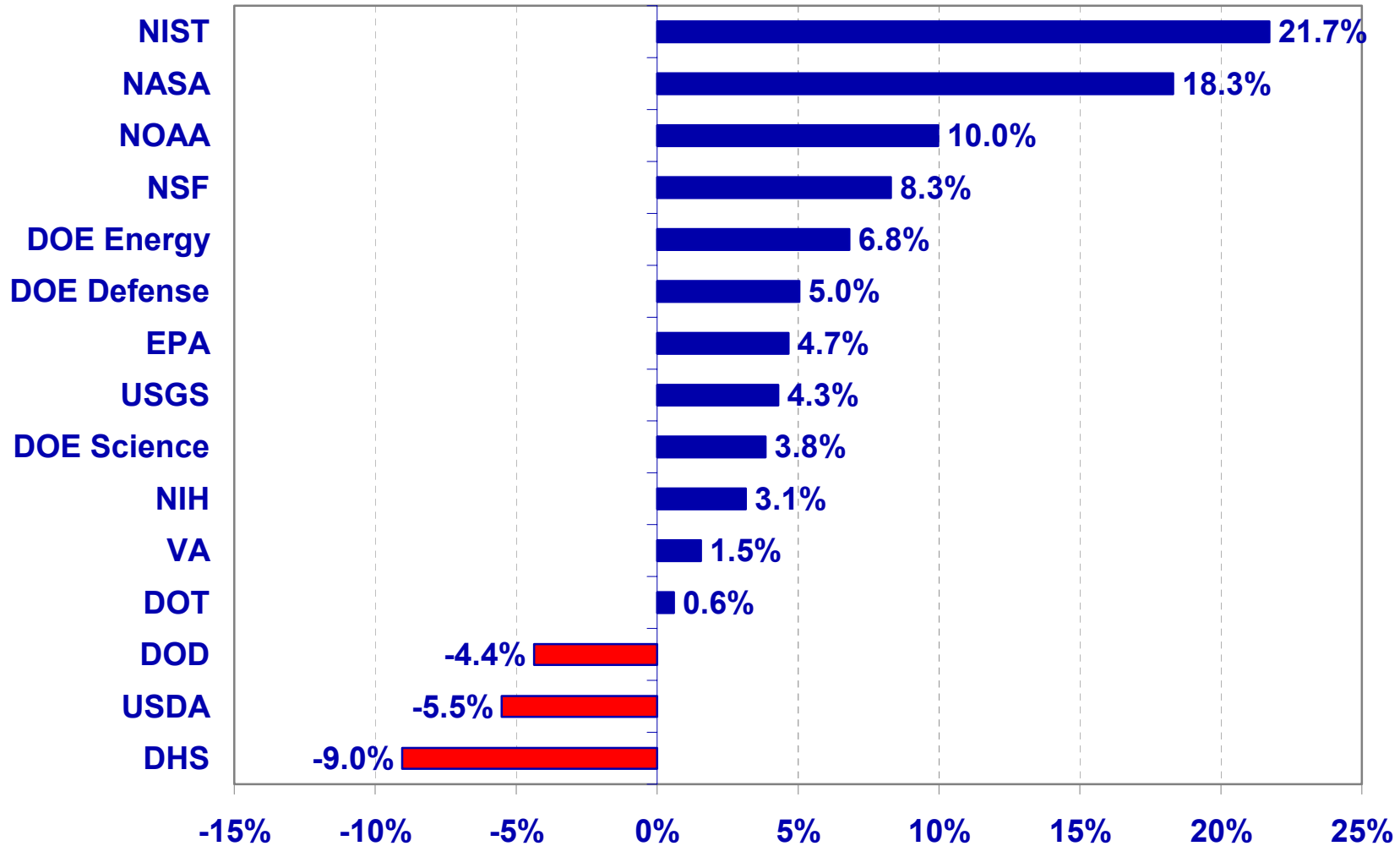
## The FY 2011 Federal R&D Investment

- \$147.7 billion, 0.2% increase from FY 2010
  - Basic Research – \$31.3 billion, 4.3% increase
  - Applied Research – \$30.3 billion, 6.9% increase
  - Development – \$81.5 billion, 3.5% decrease
  - Equipment and Facilities – \$4.6 billion, 0.6% decrease
- \$81.7 billion for defense R&D, 3.9% decrease
- \$66.0 billion for non-defense R&D, 5.8% increase
- 0.8% decrease in constant dollars from FY 2010



# FY 2011 R&D Budget Request

Percent Change from FY 2010



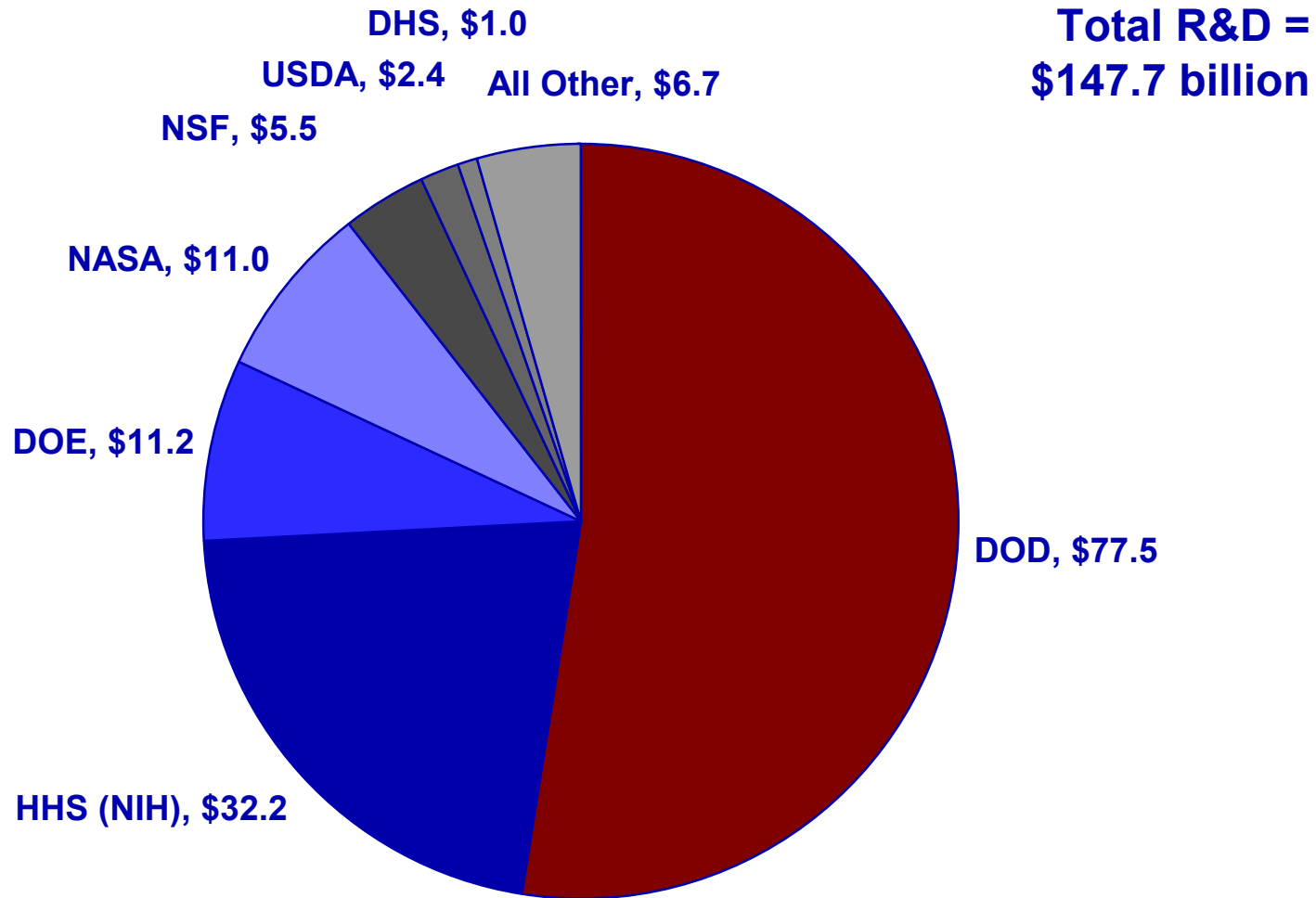
Source: OMB R&D budget data, agency budget justifications, and other agency documents.

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# Total R&D by Agency, FY 2011

budget authority in billions of dollars



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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## R&D Funding Shifts in FY 2011

- Defense (−\$3.3b) to Nondefense (+3.6b)
  - Development (−\$2.9b) to Research (+\$3.2b)
- 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)
- Dept of Energy: Fossil (−\$53m) and Nuclear (−\$122m) to EERE (+\$35m), Grid (+\$22m), and Science (+\$172m)

# Doubling Funding for Basic Research

- National Science Foundation
  - 8.0% increase to \$7.4 billion
  - R&D – 8.3% increase to \$5.5 billion
- DOE Office of Science
  - 4.6% increase to \$5.1 billion
  - R&D – 3.8% increase to \$4.6 billion
- National Institute of Standards and Technology
  - 7.3% increase to \$919 million
  - R&D – 21.7% increase to \$706 million

## R&D Investment Priorities in FY 2011

- 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

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## What Comes Next?

- Congress currently holding agency budget hearings
- Congress will pass a budget resolution and determine 302(a) and (b) allocations
- Twelve appropriation bills need to be written into law, ideally by Sept. 30, the end of FY 2010
- Hasn't happened for years. . .
- Election year politics important

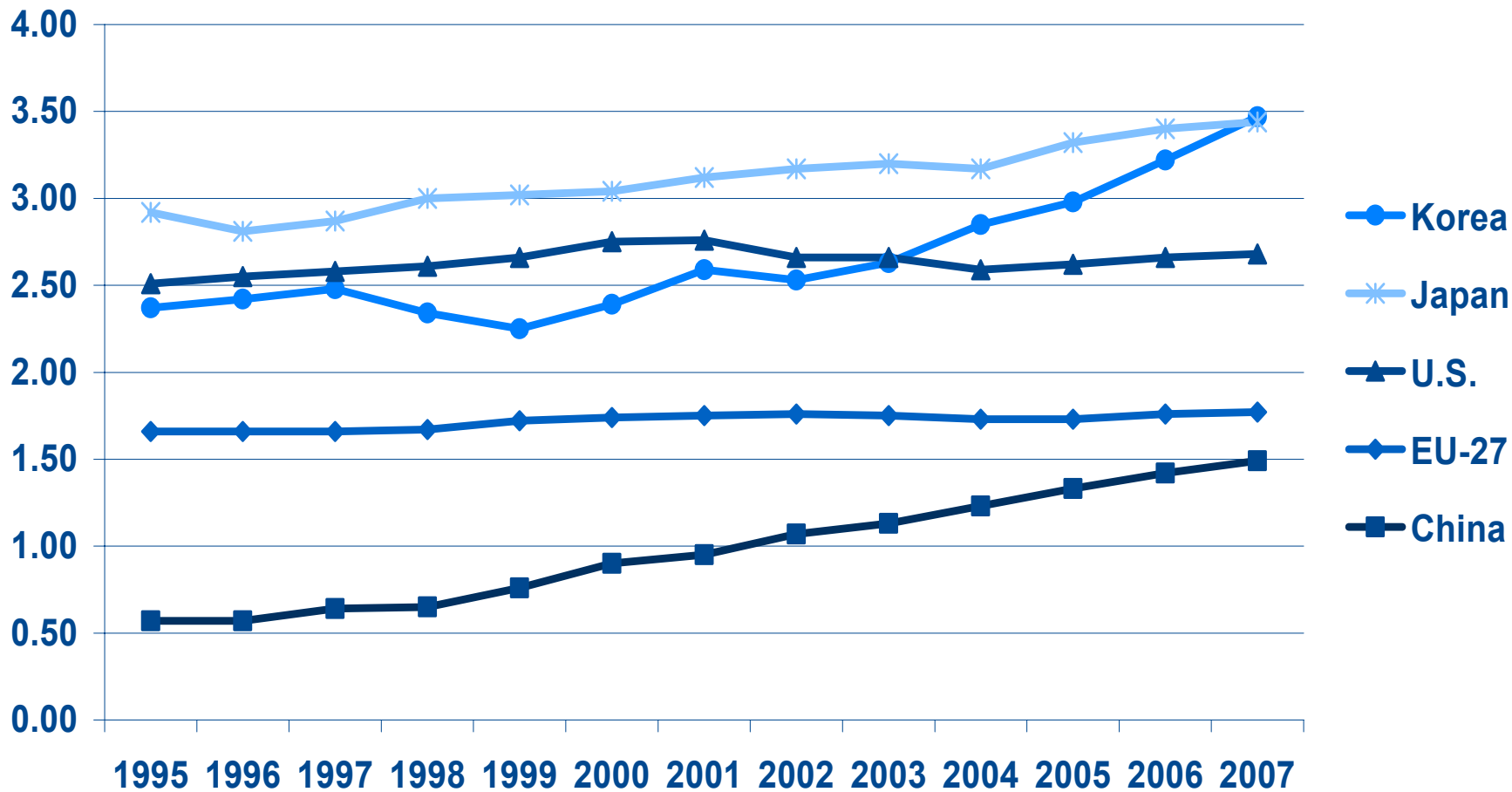
## Questions About the Future

- How quickly and effectively will R&D stimulus funding be spent? Accountability?
- How will the S&T communit(ies) adjust to the end of the stimulus money?
- What is the long term outlook for R&D funding?
- What is the future of human space flight?
- Will Obama continue to give special attention to science & technology?



- President's April 27 speech at the National Academy of Sciences set goal of 3% R&D/GDP
- Can it be met?
- Will the U.S. be able to keep its lead in science and technology?

# National R&D Investment as % of GDP, 1995-2007

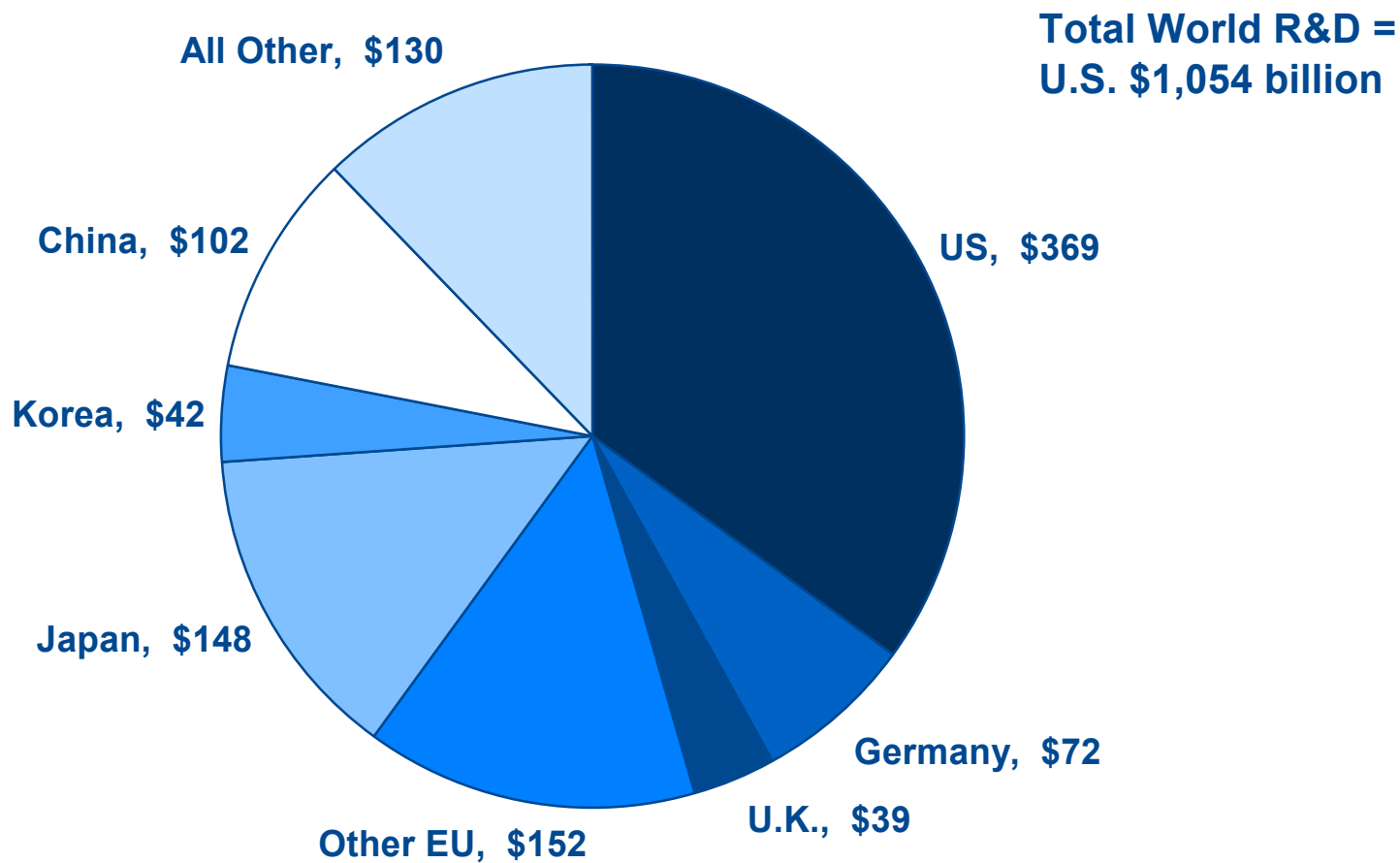


Source: OECD, Main Science and Technology Indicators, May 2009.

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## Shares of Total World R&D, 2007

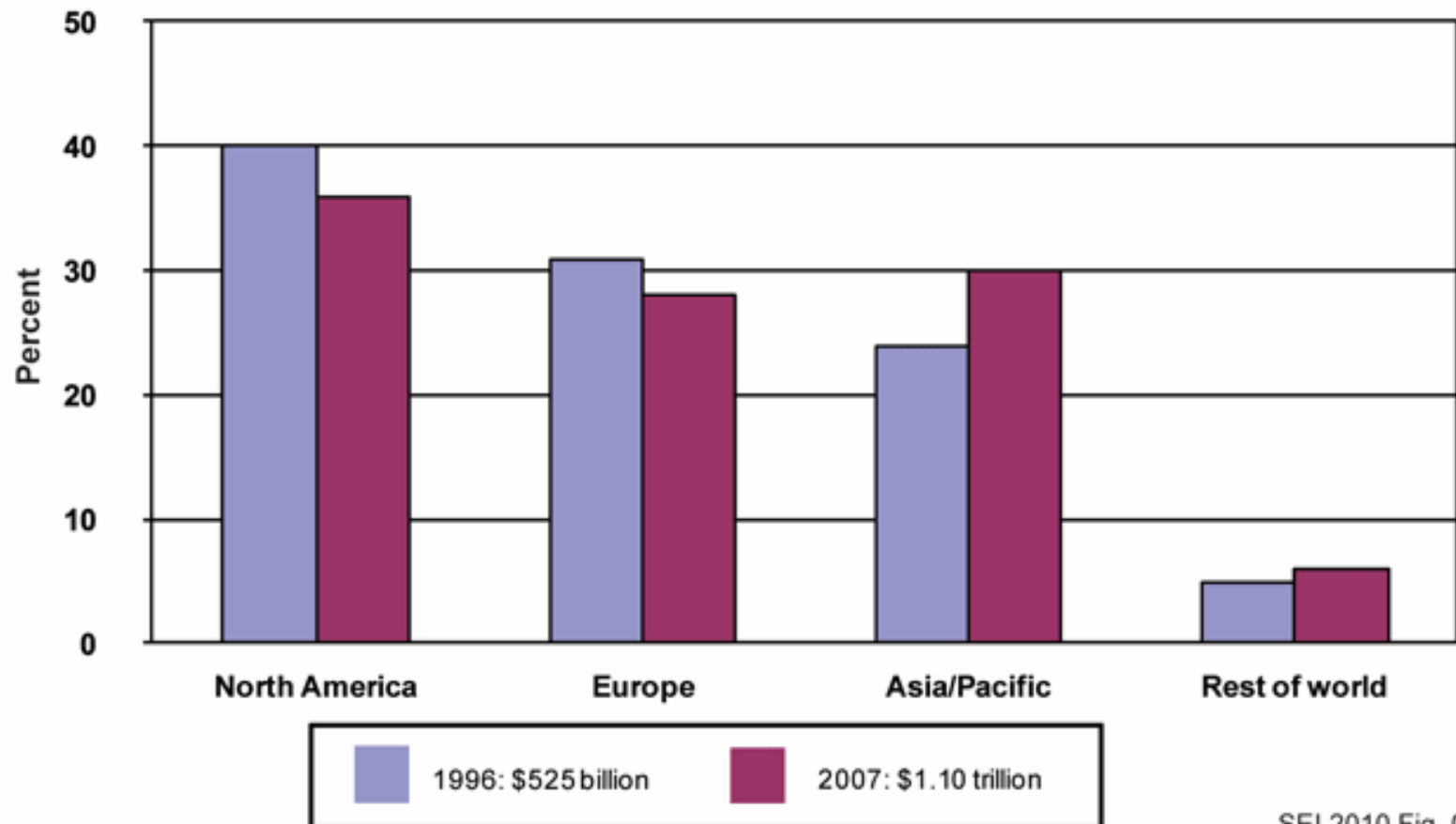


Source: OECD, Main Science and Technology Indicators, May 2009.  
World = OECD members plus Argentina, China, Israel, Romania,  
Russian Federation, Singapore, Slovenia, South Africa, Taiwan.  
Calculated using purchasing power parities.

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**Figure 1: Location of Estimated Worldwide R&D Expenditures: 1996 and 2007**





Thank you for your attention!

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