

Final Stimulus Bill Provides \$21.5 Billion for Federal R&D

AAAS R&D Funding Update on the 2009 Stimulus Appropriations Bill

(This analysis is an update on progress of the FY 2009 budget through Congress, and also an update of 2008 and 2009 appropriations. This analysis provides details on the final version of the FY 2009 economic stimulus appropriations bill. **This February 16 analysis is updated from the February 10, January 28 and January 16 versions, with information on the final version of the stimulus bill.** More tables and continually updated supplemental materials on R&D in the FY 2009 budget can be found on the AAAS R&D Web site at <http://www.aaas.org/spp/rd>.)

Highlights

- AAAS estimates that the final version of the 2009 economic stimulus appropriations bill contains **\$21.5 billion in federal research and development (R&D) funding, \$18.0 billion for the conduct of R&D and \$3.5 billion for R&D facilities and capital equipment (see Table).** The final bill contains far more in R&D funding than the **\$13.2 billion in the House or the \$17.8 billion in the Senate versions of the bill.** President Obama is expected to sign the bill into law on February 17.

- **Basic competitiveness-related research, biomedical research, energy R&D, and climate change programs would be high priorities in the final economic recovery bill.** The National Science Foundation (NSF), the Department of Energy Office of Science (DOE OS), and the National Institute of Standards and Technology (NIST), the three agencies highlighted in the America COMPETES Act of 2007 and President Bush's American Competitiveness Initiative (ACI), would all receive significant boosts to their budgets. The final bill would give NIH \$10.4 billion in stimulus funding as proposed by the Senate. The final bill provides \$3.5 billion for energy R&D at the Department of Energy (DOE) and would fund climate change-related projects in the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA).

R&D in the Final FY 2009 Stimulus Appropriations Bill

Late at night on February 12, House and Senate negotiators reached agreement on a final, compromise version of the long-awaited and much-negotiated American Recovery and Reinvestment Act of 2009 (HR 1), a \$789 billion economic stimulus package to deal with the current economic crisis. On February 13, the House and Senate each gave final approval to the bill, and President Obama is expected to sign the bill into law on February 17. The final bill contains \$311 billion in appropriations, down sharply from \$358 billion in House bill but up from the Senate version (the remainder of the bill would be tax cuts and mandatory (entitlement) spending).

The AAAS analysis of the final stimulus bill estimates that the bill contains \$21.5 billion in federal research and development (R&D) funding (see Table). Although the earlier House and Senate versions started out with less for R&D (\$13.2 billion in the House and \$17.8 billion in the Senate), in almost every case when the House and Senate had different numbers for R&D funding agencies, in House-Senate conference negotiators chose the higher number (see Figure 1). **The final stimulus would allocate \$18.0 billion for the conduct of R&D and \$3.5 billion for R&D facilities and large research equipment (see Table).** There is also additional money for non-R&D but science and technology-related programs, higher education construction and other education spending of interest to academia.

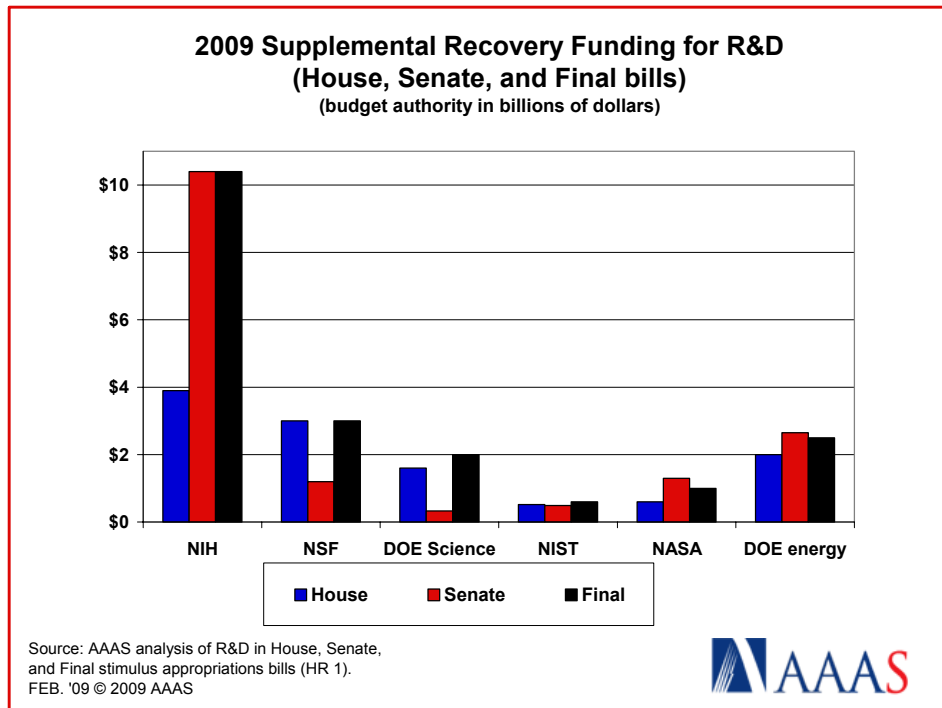


Figure 1. (click on image for full-size PDF)

The three agencies highlighted for their support of economic competitiveness-related basic research in the America COMPETES Act of 2007 and President Bush’s American Competitiveness Initiative (ACI) would receive \$5.2 billion in the final stimulus bill. The National Science Foundation (NSF) would receive \$3.0 billion; the Department of Energy’s Office of Science (DOE OS) would receive \$1.6 billion; and Commerce’s National Institute of Standards and Technology (NIST) would receive \$600 million; nearly all of these supplementals are for R&D activities. Stimulus appropriations for these three agencies would finally put all three budgets on track to double over the next 7 to 10 years as envisioned in the ACI, America COMPETES, and Obama campaign promises. In addition, the stimulus bill provides \$400 million to DOE for the Advanced Research Projects Agency – Energy (ARPA-E), a new research agency authorized in the America COMPETES Act but never funded until now.

The final stimulus gives the National Institutes of Health (NIH) \$10.4 billion as proposed earlier by the Senate, pushing NIH’s total budget near \$40 billion in FY 2009. The stimulus funding would turn around a NIH budget that has been in decline since 2004, and could boost the total NIH budget to \$40 billion depending on the outcome of NIH’s regular FY 2009 appropriations. The Department of Energy’s (DOE) energy programs would also be a winner with \$3.5 billion for R&D and related activities in renewable energy, energy conservation, and fossil energy, part of nearly \$40 billion total for DOE in weatherization, loan guarantee, clean energy demonstration, and other energy program funds. And the National Aeronautics and Space Administration (NASA) would receive \$1.0 billion with an emphasis on climate change-related satellite missions.

The final stimulus bill provides billions of dollars for universities to construct or renovate laboratories and to buy research equipment, as well as money for federal labs to address their infrastructure needs. The bill provides \$3.5 billion for R&D facilities and capital equipment, to pay for the repair, maintenance, and construction of scientific laboratories as well as large research equipment and instrumentation. Considering that R&D facilities funding totaled \$4.5 billion in FY 2008, half of which went to just one laboratory (the International Space Station), the \$3.5 billion supplemental will be an enormous boost in the federal government’s spending on scientific facilities. The final bill provides \$1.4 billion for extramural, competitively selected R&D facilities projects, nearly entirely at universities, through programs in NIH (\$1.0 billion), NSF (\$200 million), and NIST (\$180 million) that received no

federal money in FY 2008. In addition, NIH would receive \$300 million and NSF \$300 million for large research equipment needs in academia through competitive awards. The remaining R&D facilities and equipment funds would go to intramural laboratory repair and renovation at NIH, DOE Science, U.S. Department of Agriculture, and NIST laboratories. And other agencies such as the U.S. Geological Survey (USGS), NASA, the Centers for Disease Control and Prevention (CDC), and NOAA are set to receive stimulus funding for construction and maintenance, which while not technically R&D facilities funding will be used partially to renovate existing laboratories or construct new ones.

The final stimulus bill provides a big boost to the fortunes of federal research in FY 2009 with its \$18.0 billion for the conduct of R&D (basic and applied research, plus development). The bill's support of conduct of R&D is heavily weighted toward basic research, with some applied research funding but relatively little development funding. For a federal research portfolio that has been declining in real terms since FY 2004, **the final stimulus bill provides an immediate boost that allows federal research funding to see a real increase for the first time five years.** Under the current CR and the few completed FY 2009 appropriations, the federal research portfolio stands at \$58.3 billion in FY 2009, up just 0.3 percent and thus short of inflation, but after the stimulus bill and assuming final FY 2009 appropriations are at least at CR levels the federal research portfolio could jump to nearly \$75 billion.

The final stimulus bill challenges the major R&D funding agencies to spend these large stimulus appropriations quickly, while at the same time spending them well. The final stimulus bill does not contain provisions in earlier versions of the bill requiring nearly all of the funding to be awarded within 120 days of when the President signs the bill into law, but the intent remains to spend the money as quickly as possible to provide immediate economic stimulus. Nearly all of the money is designated as FY 2009 money, and most agencies are now allowed to obligate funds until the end of September 2010, and spend out the money even after that if necessary. But there will be intense political pressure to spend all the money in the stimulus bill quickly, and there will be unusual scrutiny of how and how fast the money will be spent. The scrutiny will be made possible by extensive accountability and transparency mandates in the bill, including separate appropriations for agency inspectors general and the Government Accountability Office (GAO) to monitor stimulus spending. And there will also be a recovery.gov web site to provide detailed public disclosure of how stimulus funds are allocated and spent, so that the American public can also monitor in real time where and when stimulus monies are spent.

In a highly unusual move, this stimulus appropriations bill, technically an emergency supplemental appropriations bill, appears before an FY 2009 omnibus appropriations bill to provide federal agencies with their final, regular FY 2009 budgets. 9 out of the 12 FY 2009 appropriations bills remain unfinished, meaning only the Departments of Defense (DOD), Homeland Security (DHS), and Veterans Affairs (VA) have their final FY 2009 budgets. All other federal agencies are temporarily operating at or below FY 2008 funding levels under a continuing resolution (CR) through March 6.

The accompanying Table lists key R&D and other science and technology-related items in the final stimulus appropriations bill. Key R&D funding agency highlights of the bills include:

National Science Foundation (NSF) - \$3.0 billion (see Table. Note: FY 2008 total budget \$6.1 billion). Within Research and Related Activities (R&RA), NSF's core research account, \$2.0 billion would go to research grants distributed through NSF's regular peer review process. The bill would also provide \$300 million to the Major Research Instrumentation program (FY 08: \$94 million) of competitively awarded instrumentation grants for university researchers, and \$200 million to restart the Academic Research Infrastructure program, dormant since FY 1996, for competitively awarded laboratory construction grants, primarily for universities. The \$100 million education and human resources (EHR) appropriation would provide \$60 million to the Noyce Teacher Scholarship Program (FY 08: \$11 million), \$25 million to the Math and Science Partnerships program (FY 08: \$49 million), and \$15 million to a new Professional Masters Science Program authorized in the America COMPETES Act. Major Research Equipment and Facilities Construction (MREFC) spending of \$400 million (FY 08: \$205 million) would accelerate the construction of major research facilities with unique capabilities at the cutting edge of science. Depending

on final FY 2009 appropriations, the stimulus puts NSF well ahead of the \$7.3 billion authorized for FY 2009 in the America COMPETES Act of 2007 and thus on track to double over a decade.

National Institutes of Health (NIH) - \$10.4 billion (see Figure 1; FY 08: \$29.6 billion). The final bill allocates \$7.4 billion to be distributed proportionally among the NIH's institutes and centers (ICs) through the Office of the Director (OD) to fund intramural and extramural research. With NIH success rates running below 20 percent for grant competitions, the hope is for NIH to distribute these funds through regular, already scheduled grant review cycles without sacrificing quality. Another \$800 million would remain in the Office of the Director, with priority given for 2-year, short-term special research grants to be awarded competitively. NIH also receives \$500 million for intramural construction in the Buildings and Facilities account, and \$1.0 billion for competitively awarded extramural grants through a dormant National Center for Research Resources (NCRR) program that last received \$30 million in FY 2005, exclusively for the repair and modernization of existing academic research facilities. Another \$300 million for NCRR would provide competitive awards for instrumentation and other capital equipment for research. And the final stimulus bill also gives NIH \$400 million to be transferred from the Agency for Healthcare Research and Quality (AHRQ) for 'health care comparative effectiveness research.' **The enormous stimulus appropriation would give NIH a total FY 2009 budget of \$39.9 billion**, a total that could go even higher in final FY 2009 appropriations. Most NIH institutes and centers (ICs) would enjoy record-breaking budgets in FY 2009.

Department of Energy (DOE) Office of Science – There would be \$1.6 billion (FY 08: \$4.0 billion) for a mix of extramural basic research, DOE laboratory research, facilities upgrades and construction, and advanced scientific computing. The stimulus appropriation combined with the regular appropriation could leave DOE OS with a FY 2009 budget of \$6.0 billion or higher, well above the \$5.3 billion authorized for FY 2009 in the America COMPETES Act of 2007 and thus on a track to double over a decade. In addition to the Science funding, the stimulus bill also provides \$400 million to start up the ARPA-E (Advanced Research Projects Agency - Energy), authorized in the America COMPETES Act of 2007 but never appropriated until now.

NIST - \$600 million in the final stimulus bill (FY 08: \$737 million). There would be \$220 million for NIST laboratory research (FY 08: \$441 million), \$180 million for NIST laboratory construction, and \$180 million for a competitively awarded extramural construction grants program that was congressionally initiated a few years ago but only received \$30 million for one year and was able to make only three awards out of 90 applications. Left out of the final bill are House proposals to spend \$70 million for the Technology Innovation Program (formerly the ATP) and \$30 million for the Manufacturing Extension Partnership, NIST's two extramural programs. The stimulus appropriations combined with a regular appropriation could leave NIST with a FY 2009 budget of \$1.3 billion or higher, well above the \$882 million authorized for FY 2009 in the America COMPETES Act of 2007 and thus on a track to double over a decade.

Department of Energy (DOE) energy programs – The stimulus bill provides \$2.5 billion for energy efficiency and renewable research, development, demonstration, and deployment projects, of which \$800 million is set aside for biomass (FY 08: \$198 million) and \$400 million for geothermal energy (FY 08: \$20 million). There would also be \$1.0 billion specifically for R&D programs within a \$3.4 billion total Fossil Energy appropriation, which will fund R&D related to cleaner coal, oil, and gas technologies, including research on carbon sequestration.

NASA - \$1.0 billion in the final stimulus bill (FY 08: \$17.2 billion). The bill provides \$400 million for the Science portfolio of earth science, planetary science, heliophysics, and astrophysics, to accelerate the development and launch of key earth science climate research missions highlighted in a 2007 National Academies Decadal Study as being critical to future U.S. climate research and requiring extra funds to stay on track. There would also be \$150 million in stimulus funding for aeronautics research, and funding (\$50 million) to reimburse NASA for construction and repair costs associated with 2008 natural disasters. The final bill also contains \$400 million in development funding to Constellation Systems to narrow the

looming gap in U.S. human space flight capabilities between the 2010 retirement of the Space Shuttle and the 2015 launch of its replacement.

Department of Defense (DOD) – There would be \$200 million for energy-related R&D at DOD, which already has its final FY 2009 budget.

Other R&D funding agencies receiving funding in the stimulus bills include: the U.S. Department of Agriculture's (USDA) Agricultural Research Service (ARS), \$176 million for deferred maintenance work at USDA laboratories; the National Oceanic and Atmospheric Administration (NOAA) in Commerce, \$830 million for (non-R&D) habitat and fisheries restoration projects and (non-R&D) acquisition and development of NOAA satellites and sensors, although some of these satellites will eventually be used for climate research and climate modeling; the U.S. Geological Survey (USGS) in Interior, \$140 million for repair and restoration of science facilities and laboratory equipment for USGS' nationwide network of federal laboratories; the Agency for Healthcare Research and Quality (AHRQ), \$1.1 billion in both the House and Senate for health care comparative effectiveness research divided between a \$400 million transfer to NIH (already included in NIH totals above), a \$400 million transfer to the Office of the HHS Secretary, and \$300 million for AHRQ.

Next Steps and Possible Impacts

President Obama intends to sign HR 1 into law on February 17. For the science and engineering community, the stimulus bill represents a welcome acknowledgement from policymakers that scientific research, often regarded as long-term and future-oriented, also has a role to play in short-term economic recovery, and also represents a dramatic turnaround from the flat or declining research funding trends of recent years. But the real challenges of the stimulus are just beginning: now it is up to the research funding agencies and the entire science and engineering community to spend these funds quickly and wisely, and to demonstrate the impacts of federal R&D funding not only on the economic health of the nation but also on the long-term foundation for achieving important national goals in competitiveness, energy, climate, and health.

(More materials on R&D in the FY 2009 budget, historical data and charts, and more information on *AAAS Report XXXIII: Research and Development FY 2009*, can be found on the AAAS R&D Web site at <http://www.aaas.org/spp/rd>.)

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AAAS R&D Budget and Policy Program

(202) 326-6607

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AAAS Analysis of R&D in FY 2009 Stimulus Appropriations

Table. R&D and Other S&T Funding in FY 2009 Economic Recovery Act Appropriations

(budget authority in millions of dollars)

	FY 2009 House	FY 2009 Senate *	FY 2009 FINAL	FY 2008 Total
National Institutes of Health	3,900	10,400	10,400	29,607
<i>Natl. Ctr. for Research Resources</i>	1,500	300	1,300	1,149
<i>Office of the Director</i>	1,500	9,200	8,200	1,109
<i>Buildings and Facilities</i>	500	500	500	119
<i>Transfer from AHRQ 2/</i>	400	400	400	0
National Science Foundation	3,000	1,200	3,000	6,055
<i>Academic Research Infrastructure</i>	200	0	200	0
<i>Major Research Instrumentation</i>	300	0	300	94
<i>Other Res. & Related Activities</i>	2,000	1,000	2,000	4,827
<i>Education and Human Resources 3/</i>	100	50	100	726
<i>Major Res. Equip & Facil. Constr.</i>	400	150	400	205
Dept. of Energy Office of Science	1,600	330	1,600	4,036
ARPA-E (Adv. Research Projects Agency - Energy)	400	0	400	0
DOE Energy Efficiency & Renewables 1/	2,000	2,648	2,500	1,238
DOE Fossil Energy 1/	0	200	1,000	576
DOE Weapons Activities 1/	0	500	0	2,742
National Aeronautics & Space Admin.	600	1,300	1,000	17,179
<i>Science</i>	400	450	400	4,706
<i>Aeronautics</i>	150	200	150	512
<i>Cross-Agency Support Programs 3/</i>	50	200	50	3,243
<i>Exploration</i>	0	450	400	3,143
Department of Defense R&D Programs 1/	350	200	200	79,347
Natl. Inst. of Standards and Technology	520	495	600	737
<i>Scientific and Tech. Res. And Services</i>	100	168	220	441
<i>Technology Innovation Program</i>	70	0	0	46
<i>Manufacturing Extension Partnership 3/</i>	30	0	0	90
<i>Construction of Research Facilities</i>	300	307	360	160
<i>Transfer for Health IT to STRS</i>	20	20	20	0
Natl. Oceanic and Atmospheric Admin. 3/	1,000	1,022	830	3,896
U.S. Geological Survey facilities 3/	200	135	140	100
USDA CSREES Agri. and Food Res. Initiative	0	50	0	191
USDA ARS Buildings and Facilities	209	0	176	47
HHS Agency for Healthcare Res. And Quality 2/	300	300	300	0
HHS Office of the Secretary AHRQ transfer 2/	400	400	400	0
HHS Centers for Disease Control buildings 3/	462	412	0	55
HHS Office of Sec. pandemic flu 3/	420	0	0	75
HHS Office of Sec. Biodefense countermeasures	430	0	0	102
				Government wide:
AAAS estimates of R&D in items above:	13,209	17,773	21,506	144,354
<i>Conduct of R&D</i>	9,529	15,786	18,000	139,878
<i>R&D facilities and capital equipment</i>	3,680	1,987	3,506	4,476

AAAS estimates of R&D and related items in FY 2009 House, Senate, and conference stimulus bills (HR 1).

Most programs in this table are a mix of R&D and non-R&D items, except as noted.

* - Reflects Senate-approved amendments to the original Senate bill.

1/ R&D items only. Excludes non-R&D spending.

2/ For health care comparative effectiveness research.

3/ Non-R&D items.

AAAS - February 12, 2009 REVISED to reflect House-Senate conference report.