



ARRA Increased Federal Research and Development and R&D Plant Obligations by \$19.2 Billion for FY 2009–10

by Michael Yamaner¹

Funding provided by the American Recovery and Reinvestment Act of 2009 (ARRA) increased current-dollar federal obligations for research and development and R&D plant (facilities and fixed equipment) by \$10.1 billion in FY 2009 and an estimated \$9.1 billion in FY 2010.² ARRA funding accounted for 7.4% of the \$137 billion total obligated in FY 2009 by federal agencies for R&D and R&D plant and for an estimated 6.5% of the FY 2010 total (table 1).

Following a \$3.1 billion (2.5%) decrease between FY 2007 and FY 2008, total inflation-adjusted (constant dollars) federal obligations for R&D and R&D plant rose to \$124.1 billion (4.8%) between FY 2008 and FY 2009 (changes in funding across years are in constant dollars unless stated otherwise). If it were not for the funding provided by ARRA, federal R&D and R&D plant would have fallen 2.9% in FY 2009. ARRA funding and a rise in non-ARRA funding were estimated to increase R&D and R&D plant obligations to \$126.3 billion (constant dollars) (1.8%) between FY 2009 and FY 2010. With remaining ARRA funds having been obligated by the end of FY 2010 and a projected decrease in non-ARRA-funded obligations, R&D and R&D

plant would drop 8.5% between FY 2010 and FY 2011 (table 1).

The data presented here are from the National Science Foundation (NSF) Survey of Federal Funds for Research and Development: FY 2009–11. The data reported are actual for FY 2009, preliminary for FY 2010, and projected for FY 2011.

Federal Funding for Research

ARRA funds provided an additional \$7.7 billion (current dollars) in total federal research obligations for FY 2009 and added an estimated \$6.8 billion (current dollars) in FY 2010. ARRA funds accounted for most of the 16.7% rise between FY 2008 and FY 2009. In constant dollars, research obligations were estimated to increase to \$58.6 billion (1.6%) between FY 2009 and FY 2010, and with all the remaining ARRA funding obligated by the end of FY 2010 were projected to decrease to \$53.5 billion (8.7%) between FY 2010 and FY 2011.

The Department of Health and Human Services (HHS) (55.7% of total research obligations and 63.3% of ARRA research obligations), the Department

of Energy (DOE) (11.3% and 10.9%), the Department of Defense (DOD) (10.7% and 0.5%), and the National Science Foundation (NSF) (9.6% and 23.4%) funded the most research in FY 2009. Together, these four agencies accounted for 87.2% of the FY 2009 total in federal research dollars and 98.1% of ARRA-funded research dollars (table 2).

Basic Research

Basic research obligations increased 19.5% to \$29.8 billion from FY 2008 to FY 2009, with ARRA funds accounting for \$4.6 billion. Between FY 2009 and FY 2010 basic research obligations were estimated to decrease 3.2% to \$28.8 billion, with ARRA funds accounting for \$2.9 billion. With all remaining ARRA funds obligated by the end of FY 2010, FY 2011 basic research obligations were projected to decrease 7.4% to \$26.7 billion. Basic research obligations accounted for 24.0% of total R&D and R&D plant in FY 2009 and an estimated 23.0% in FY 2010 and FY 2011 (table 1).

Applied Research

Federal obligations for applied research increased 13.8% between FY 2008 and FY 2009, with ARRA accounting for

TABLE 1. Federal obligations for research and development and R&D plant, by character of work: FY 2007–11

| Character of work | 2007 | 2008 | 2009 | 2010 | 2011 | 2007 | 2008 | 2009 | 2010 | 2011 |
|-----------------------|--------------------|---------|---------|---------|---------|--------------------------|---------|---------|---------|---------|
| | Current \$millions | | | | | Constant 2005 \$millions | | | | |
| All R&D and R&D plant | 129,431 | 129,050 | 136,997 | 140,496 | 130,241 | 121,486 | 118,416 | 124,058 | 126,266 | 115,513 |
| ARRA | na | na | 10,082 | 9,146 | na | na | na | 9,130 | 8,220 | na |
| Non-ARRA | 129,431 r | 129,050 | 126,915 | 131,350 | 130,241 | 121,486 | 118,416 | 114,928 | 118,046 | 115,513 |
| Research | 54,094 | 53,894 | 63,709 | 65,250 | 60,372 | 50,773 | 49,453 | 57,692 | 58,641 | 53,545 |
| ARRA | na | na | 7,727 | 6,776 | na | na | na | 6,997 | 6,090 | na |
| Non-ARRA | 54,094 | 53,894 | 55,982 | 58,474 | 60,372 | 50,773 | 49,453 | 50,695 | 52,551 | 53,545 |
| Basic | 26,866 | 27,154 | 32,878 | 32,052 | 30,083 | 25,217 | 24,916 | 29,773 | 28,805 | 26,681 |
| ARRA | na | na | 5,116 | 3,244 | na | na | na | 4,633 | 2,915 | na |
| Non-ARRA | 26,866 | 27,154 | 27,762 | 28,808 | 30,083 | 25,217 | 24,916 | 25,140 | 25,890 | 26,681 |
| Applied | 27,228 | 26,740 | 30,831 | 33,198 | 30,289 | 25,557 | 24,537 | 27,919 | 29,835 | 26,864 |
| ARRA | na | na | 2,611 | 3,532 | na | na | na | 2,364 | 3,174 | na |
| Non-ARRA | 27,228 | 26,740 | 28,220 | 29,666 | 30,289 | 25,557 | 24,537 | 25,555 | 26,661 | 26,864 |
| Development | 73,169 | 73,212 | 69,640 | 71,176 | 67,414 | 68,677 | 67,179 | 63,063 | 63,967 | 59,791 |
| ARRA | na | na | 987 | 866 | na | na | na | 894 | 778 | na |
| Non-ARRA | 73,169 r | 73,212 | 68,653 | 70,310 | 67,414 | 68,677 | 67,179 | 62,169 | 63,189 | 59,791 |
| R&D plant | 2,168 | 1,944 | 3,648 | 4,070 | 2,455 | 2,035 | 1,784 | 3,304 | 3,658 | 2,177 |
| ARRA | na | na | 1,368 | 1,504 | na | na | na | 1,239 | 1,352 | na |
| Non-ARRA | 2,168 | 1,944 | 2,280 | 2,566 | 2,455 | 2,035 | 1,784 | 2,065 | 2,306 | 2,177 |

na = not applicable. r = data significantly revised; replaces previously published data.

ARRA = American Recovery and Reinvestment Act of 2009.

NOTES: Gross domestic product implicit price deflators for 2005 were used to convert current to constant dollars. Detail may not sum to total due to rounding.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development: FY 2009–11.

\$2.4 billion of the \$27.9 billion total. Between FY 2009 and FY 2010 applied research obligations were estimated to increase by 6.9%, with ARRA accounting for \$3.2 billion of the \$29.8 billion total. Applied research was projected to decrease 10% between FY 2010 and FY 2011 to \$26.9 billion (table 1).

Performers of Research and Development

ARRA provided \$8.7 billion (current dollars) in obligations for R&D performance in FY 2009 and an estimated \$7.6 billion in FY 2010 (these totals exclude R&D plant obligations). ARRA funds made up 6.5% of all R&D obligations to performers in FY 2009 and accounted for an estimated 5.6% in FY 2010.

In FY 2009 industry received 40% of total R&D obligations and 8.0% of ARRA obligations; universities and colleges received, respectively, 23.7% and 58.9%; intramural (agencies of the federal government) 22.8% and 14.7%; federally funded research and development centers (FFRDCs) 7.5% and 7.1%; and other nonprofit institutions (other than educational institutions) 5.3% and 10.9% (table 3).

Data Notes and Availability

Twenty-seven federal agencies report R&D obligations to the NSF Survey of Federal Funds for Research and Development. Data were requested from agencies beginning in early July 2010. Agencies later revise the preliminary data based on actual changes in the funding levels of R&D programs.

Further, agencies may provide changes in prior-year data to reflect program reclassifications or other data corrections.

Definitions of research, development, and R&D plant as used in this InfoBrief are provided in the technical notes that accompany the full set of detailed tables from this survey. For the prior-year report, see <http://www.nsf.gov/statistics/nsf10305/>. The full set of detailed tables from the current survey will be available in the report *Federal Funds for Research and Development: Fiscal Years 2009, 2010, and 2011* at <http://www.nsf.gov/statistics/fedfunds/>. Individual detailed tables from the FY 2009–11 survey may be available in advance of the full report. For more information, please contact the author.

TABLE 2. Federal obligations for research, by agency in FY 2009 rank order: FY 2007–11

| Agency | 2010 | | | | | 2011 | | | | |
|--------------|--------------------|--------|--------|-------------|-----------|--------------------------|--------|--------|-------------|-----------|
| | 2007 | 2008 | 2009 | preliminary | projected | 2007 | 2008 | 2009 | preliminary | projected |
| | Current \$millions | | | | | Constant 2005 \$millions | | | | |
| All agencies | 54,094 | 53,894 | 63,709 | 65,250 | 60,372 | 50,773 | 49,453 | 57,692 | 58,641 | 53,545 |
| ARRA | na | na | 7,727 | 6,776 | na | na | na | 6,997 | 6,090 | na |
| Non-ARRA | 54,094 | 53,894 | 55,982 | 58,474 | 60,372 | 50,773 | 49,453 | 50,695 | 52,551 | 53,545 |
| HHS | 29,211 | 29,459 | 35,489 | 37,109 | 32,559 | 27,418 | 27,032 | 32,137 | 33,351 | 28,877 |
| ARRA | na | na | 4,888 | 5,720 | na | na | na | 4,426 | 5,141 | na |
| Non-ARRA | 29,211 | 29,459 | 30,601 | 31,389 | 32,559 | 27,418 | 27,032 | 27,711 | 28,210 | 28,877 |
| DOE | 5,857 | 6,100 | 7,189 | 7,609 | 7,478 | 5,497 | 5,597 | 6,510 | 6,839 | 6,632 |
| ARRA | na | na | 843 | 665 | na | na | na | 763 | 598 | na |
| Non-ARRA | 5,857 | 6,100 | 6,346 | 6,944 | 7,478 | 5,497 | 5,597 | 5,747 | 6,241 | 6,632 |
| DOD | 6,394 | 6,581 | 6,806 | 6,905 | 6,364 | 6,002 | 6,039 | 6,163 | 6,206 | 5,644 |
| ARRA | na | na | 38 | 43 | na | na | na | 34 | 39 | na |
| Non-ARRA | 6,394 | 6,581 | 6,768 | 6,862 | 6,364 | 6,002 | 6,039 | 6,129 | 6,167 | 5,644 |
| NSF | 3,970 | 4,135 | 6,096 | 4,711 | 5,104 | 3,726 | 3,794 | 5,520 | 4,234 | 4,527 |
| ARRA | na | na | 1,808 | 38 | na | na | na | 1,637 | 34 | na |
| Non-ARRA | 3,970 | 4,135 | 4,288 | 4,673 | 5,104 | 3,726 | 3,794 | 3,883 | 4,200 | 4,527 |
| USDA | 2,068 | 2,020 | 2,078 | 2,436 | 2,387 | 1,941 | 1,854 | 1,882 | 2,189 | 2,117 |
| ARRA | na | na | 0 | 0 | na | na | na | 0 | 0 | na |
| Non-ARRA | 2,068 | 2,020 | 2,078 | 2,436 | 2,387 | 1,941 | 1,854 | 1,882 | 2,189 | 2,117 |
| NASA | 2,132 | 1,406 | 1,703 | 1,700 | 1,753 | 2,001 | 1,290 | 1,543 | 1,527 | 1,555 |
| ARRA | na | na | 25 | 125 | na | na | na | 23 | 112 | na |
| Non-ARRA | 2,132 | 1,406 | 1,678 | 1,575 | 1,753 | 2,001 | 1,290 | 1,520 | 1,415 | 1,555 |
| Other | 4,463 | 4,194 | 4,347 | 4,780 | 4,728 | 4,189 | 3,848 | 3,936 | 4,296 | 4,193 |
| ARRA | na | na | 124 | 185 | na | na | na | 112 | 166 | na |
| Non-ARRA | 4,463 | 4,194 | 4,223 | 4,595 | 4,728 | 4,189 | 3,848 | 3,824 | 4,130 | 4,193 |

na = not applicable.

ARRA = American Recovery and Reinvestment Act of 2009; DOD = Department of Defense; DOE = Department of Energy; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; NSF = National Science Foundation; USDA = U.S. Department of Agriculture.

NOTES: Gross domestic product implicit price deflators for 2005 were used to convert current to constant dollars. Detail may not sum to total due to rounding.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development: FY 2009–11.

TABLE 3. Federal obligations for research and development, by performer: FY 2009–11
(Current dollars in millions)

| Performer | 2009 | | 2010 preliminary | | 2011 |
|------------------------------|-------|----------|------------------|----------|-----------|
| | ARRA | Non-ARRA | ARRA | Non-ARRA | projected |
| All performers | 8,714 | 124,635 | 7,643 | 128,784 | 127,787 |
| Intramural | 1,284 | 29,158 | 1,335 | 30,943 | 32,224 |
| Industry | 695 | 52,609 | 950 | 53,208 | 49,949 |
| Industry FFRDCs | 71 | 3,984 | 113 | 4,113 | 4,061 |
| Universities and colleges | 5,129 | 26,434 | 3,786 | 27,392 | 28,373 |
| University FFRDCs | 246 | 3,117 | 192 | 3,356 | 3,456 |
| Other nonprofit institutions | 952 | 6,096 | 1,005 | 6,384 | 6,392 |
| Nonprofit FFRDCs | 308 | 2,280 | 240 | 2,485 | 2,482 |
| State and local governments | 29 | 361 | 23 | 372 | 366 |
| Foreign | na | 597 | na | 530 | 485 |

na = not applicable.

ARRA = American Recovery and Reinvestment Act of 2009; FFRDC = federally funded research and development center.

NOTE: Detail may not sum to total due to rounding.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of Federal Funds for Research and Development: FY 2009–11.

Notes

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2. Obligations represent the amounts for orders placed, contracts awarded, services received, and similar transactions during a given period, regardless of when the funds were appropriated and when future payment of money is required.

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