



State Research and Development Expenditures Total \$1.2 Billion in FY 2009

by Michael Yamaner¹

State agency expenditures for research and development totaled \$1.2 billion in FY 2009.² This represents an increase of 7% over the FY 2007 total of \$1.1 billion.³ Expenditures on R&D facilities (construction projects, major building renovations, land and building acquisitions intended primarily for R&D use) totaled \$103 million (table 1), a 2% increase over the \$101 million reported in FY 2007. This InfoBrief presents summary statistics from the FY 2009 Survey of State Government R&D Expenditures, sponsored by the National Science Foundation (NSF).

The FY 2009 survey is the most recent NSF survey of R&D activities performed and funded by state government agencies in each of the 50 states and the District of Columbia. For the first time, NSF is publishing survey data by individual state agency. Previously only state totals were published. This survey also marked the first time NSF asked state agencies to classify their R&D according to the following five types:

- Agriculture: animal health; aquaculture; crop management; food and commodities; forestry
- Environment and Natural Resources: air and water quality; fish, game,

TABLE 1. State agency expenditures for R&D and R&D facilities: FY 2009
(Thousands of dollars)

| Characteristic | Expenditures |
|---|--------------|
| All R&D and R&D facilities expenditures | 1,312,728 |
| R&D facilities | 102,614 |
| R&D | 1,210,114 |
| Source of funds | |
| Federal government | 298,111 |
| State and other sources | 912,002 |
| Performer | |
| State agency | 318,264 |
| Academic institutions | 530,354 |
| Companies and individuals | 255,889 |
| Other | 105,606 |
| Character of work | |
| Basic research | 275,566 |
| Applied R&D | 934,547 |
| Type | |
| Agriculture | 66,749 |
| Environment and natural resources | 318,359 |
| Health | 284,145 |
| Transportation | 243,798 |
| Other ^a | 297,062 |

^a Includes R&D in other areas, such as corrections, education, energy, labor, public safety, and social services.

NOTE: Detail may not add to total because of rounding.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of State Government R&D, FY 2009.

and wildlife; marine and aquatic environments; geological survey; parks and preserves; soil and water conservation

- Health: biomedical research; mental health and addiction; public health

- Transportation: highways, roads, and bridges; ports and waterways; public transportation; rail and freight; aviation

- Other: R&D in other areas, such as corrections, education, energy,

labor, public safety, and social services

Nationwide Totals

In addition to the \$1.2 billion on R&D, state agencies also expended \$103 million on R&D facilities, for a total of \$1.3 billion in FY 2009. State or other nonfederal sources funded 75% of this R&D; federal sources funded 25%. The majority of the states' R&D expenditures (74%) went to external performers, primarily to academic institutions (\$530 million). State agencies internally performed 26% of all state agency R&D in FY 2009 (table 1).

Of the \$1.2 billion that state agencies expended on R&D in FY 2009, 77% (\$935 million) went to applied R&D (applied research plus development) and 23% (\$276 million) supported basic research. The share expended on each type of R&D varied considerably by state. Further, state agencies reported that environment and natural resource R&D projects accounted for most (26%) of their expenditures, followed by health (23%), transportation (20%), and agriculture (6%). All other projects combined accounted for 25% of total R&D expenditures (table 1).

State-by-State Reporting

The level of R&D expenditures reported by state agencies ranged from \$0.5 million in the District of Columbia to \$147 million in California. Five states (California, New York, Ohio, Pennsylvania, and Florida) accounted for 47% of all state agency R&D expenditures (table 2). These states also topped the list in FY 2007.⁴

North Carolina and New York reported the greatest amount of funding for internal state agency R&D (\$42 million and \$35 million, respectively). These two states accounted for 24% of

TABLE 2. State agency expenditures for R&D, by state and performer: FY 2009
(Thousands of dollars)

| State | All R&D expenditures | Internal performers | % of total | External performers | % of total | State | All R&D expenditures | Internal performers | % of total | External performers | % of total |
|----------------------|----------------------|---------------------|------------|---------------------|------------|----------------|----------------------|---------------------|------------|---------------------|------------|
| United States | 1,210,114 | 318,264 | 26 | 891,849 | 74 | Montana | 7,200 | 1,305 | 18 | 5,896 | 82 |
| Alabama | 12,929 | 9,139 | 71 | 3,790 | 29 | Nebraska | 4,475 | 125 | 3 | 4,350 | 97 |
| Alaska | 7,741 | 6,387 | 83 | 1,354 | 17 | Nevada | 1,511 | 343 | 23 | 1,168 | 77 |
| Arizona | 21,483 | 7,373 | 34 | 14,110 | 66 | New Hampshire | 2,187 | 1,022 | 47 | 1,164 | 53 |
| Arkansas | 11,766 | 768 | 7 | 10,997 | 93 | New Jersey | 15,147 | 4,278 | 28 | 10,869 | 72 |
| California | 146,793 | 25,144 | 17 | 121,649 | 83 | New Mexico | 1,656 | 536 | 32 | 1,120 | 68 |
| Colorado | 14,850 | 9,396 | 63 | 5,454 | 37 | New York | 126,122 | 35,114 | 28 | 91,008 | 72 |
| Connecticut | 27,088 | 12,663 | 47 | 14,425 | 53 | North Carolina | 51,404 | 42,451 | 83 | 8,953 | 17 |
| Delaware | 2,067 | 1,021 | 49 | 1,045 | 51 | North Dakota | 16,423 | 576 | 4 | 15,848 | 96 |
| District of Columbia | 487 | 0 | 0 | 487 | 100 | Ohio | 121,852 | 4,310 | 4 | 117,542 | 96 |
| Florida | 66,514 | 10,356 | 16 | 56,157 | 84 | Oklahoma | 15,931 | 2,710 | 17 | 13,221 | 83 |
| Georgia | 6,663 | 3,500 | 53 | 3,163 | 47 | Oregon | 12,429 | 6,390 | 51 | 6,039 | 49 |
| Hawaii | 13,976 | 3,268 | 23 | 10,708 | 77 | Pennsylvania | 102,958 | 2,992 | 3 | 99,966 | 97 |
| Idaho | 6,052 | 1,897 | 31 | 4,155 | 69 | Rhode Island | 1,383 | 0 | 0 | 1,383 | 100 |
| Illinois | 19,656 | 5,446 | 28 | 14,211 | 72 | South Carolina | 28,600 | 24,162 | 84 | 4,438 | 16 |
| Indiana | 47,550 | 942 | 2 | 46,608 | 98 | South Dakota | 4,607 | 424 | 9 | 4,183 | 91 |
| Iowa | 11,285 | 954 | 8 | 10,331 | 92 | Tennessee | 3,882 | 129 | 3 | 3,753 | 97 |
| Kansas | 12,305 | 1,598 | 13 | 10,707 | 87 | Texas | 49,381 | 4,764 | 10 | 44,617 | 90 |
| Kentucky | 13,939 | 6,242 | 45 | 7,697 | 55 | Utah | 26,443 | 10,716 | 41 | 15,727 | 59 |
| Louisiana | 8,427 | 5,021 | 60 | 3,406 | 40 | Vermont | 739 | 739 | 100 | 0 | 0 |
| Maine | 6,400 | 1,567 | 24 | 4,833 | 76 | Virginia | 17,930 | 8,759 | 49 | 9,170 | 51 |
| Maryland | 21,093 | 5,683 | 27 | 15,410 | 73 | Washington | 14,529 | 6,941 | 48 | 7,588 | 52 |
| Massachusetts | 4,358 | 1,113 | 26 | 3,245 | 74 | West Virginia | 10,357 | 2,555 | 25 | 7,802 | 75 |
| Michigan | 14,951 | 7,851 | 53 | 7,100 | 47 | Wisconsin | 24,942 | 5,329 | 21 | 19,613 | 79 |
| Minnesota | 16,656 | 1,975 | 12 | 14,681 | 88 | Wyoming | 7,195 | 4,670 | 65 | 2,525 | 35 |
| Mississippi | 9,732 | 8,216 | 84 | 1,516 | 16 | | | | | | |
| Missouri | 16,070 | 9,406 | 59 | 6,665 | 41 | | | | | | |

NOTES: Internal performers include department/agency's own employees and services performed by others in support of internal R&D projects. External performers include academic institutions, companies and individuals, and other non-internal performers. Detail may not add to total because of rounding. Survey of State Government R&D includes the District of Columbia.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of State Government R&D, FY 2009.

internal state agency R&D performance (\$318 million) in FY 2009. State agencies in California (\$122 million) and Ohio (\$118 million) reported the largest levels of funding for external R&D performance, accounting for 27% of all state agency R&D expenditures (\$892 million) to external performers in FY 2009 (table 2).

State Agency Shares

The top five states in order of their total R&D expenditures in FY 2009 are California, New York, Ohio, Pennsylvania, and Florida (table 3). In California and New York, agencies involved with energy spent the most on R&D in FY 2009, accounting for 60% and 33%, respectively, of their

state totals. In Ohio, the Department of Development, which has multiple programmatic responsibilities, spent \$111 million on R&D (\$0.8 million on environment and natural resources, \$41 million on health, \$6 million on transportation, and \$63 million on other), which accounted for 91% of the state's total R&D expenditures in FY

TABLE 3. R&D expenditures for selected states, by department, state, and type of R&D: FY 2009 (Dollars)

| State and department or agency | All R&D expenditures | Agriculture | Environment and natural resources | Health | Transportation | Other ^a |
|--|----------------------|-------------|-----------------------------------|-------------|----------------|--------------------|
| United States | 1,210,113,524 | 66,748,642 | 318,359,498 | 284,144,944 | 243,798,130 | 297,062,310 |
| California | 146,793,247 | 6,235,149 | 23,701,098 | 0 | 40,057,000 | 76,800,000 |
| Energy Commission | 88,700,000 | 0 | 11,900,000 | 0 | 0 | 76,800,000 |
| Food and Agriculture, Department of | 7,587,842 | 5,485,149 | 2,102,693 | 0 | 0 | 0 |
| Transportation, Department of | 40,057,000 | 0 | 0 | 0 | 40,057,000 | 0 |
| Water Resources, Department of | 10,448,405 | 750,000 | 9,698,405 | 0 | 0 | 0 |
| New York | 126,122,333 | 1,869,720 | 22,642,345 | 46,038,312 | 12,445,993 | 43,125,963 |
| Agriculture and Markets, Department of | 3,487,006 | 987,006 | 0 | 2,500,000 | 0 | 0 |
| Energy Research and Development Authority | 42,170,407 | 774,714 | 13,025,991 | 330,312 | 7,796,776 | 20,242,614 |
| Environmental Conservation, Department of | 5,851,093 | 108,000 | 5,635,093 | 108,000 | 0 | 0 |
| Health, Department of | 32,200,000 | 0 | 0 | 32,200,000 | 0 | 0 |
| Science, Technology and Innovation, Foundation for | 35,283,349 | 0 | 1,500,000 | 10,900,000 | 0 | 22,883,349 |
| Transportation, Department of | 7,130,478 | 0 | 2,481,261 | 0 | 4,649,217 | 0 |
| Ohio | 121,851,617 | 0 | 6,306,109 | 41,320,535 | 10,308,223 | 63,916,750 |
| Air Quality Development Authority | 3,503,551 | 0 | 3,503,551 | 0 | 0 | 0 |
| Development, Department of | 111,125,353 | 0 | 765,000 | 41,320,535 | 5,702,500 | 63,337,318 |
| Education, Department of | 456,654 | 0 | 0 | 0 | 0 | 456,654 |
| Natural Resources, Department of | 2,160,336 | 0 | 2,037,558 | 0 | 0 | 122,778 |
| Transportation, Department of | 4,605,723 | 0 | 0 | 0 | 4,605,723 | 0 |
| Pennsylvania | 102,958,404 | 852,734 | 9,395,553 | 73,403,595 | 5,815,684 | 13,490,838 |
| Agriculture, Department of | 852,734 | 852,734 | 0 | 0 | 0 | 0 |
| Community and Economic Development, Department of | 17,755,250 | 0 | 2,600,000 | 3,955,000 | 0 | 11,200,250 |
| Conservation and Natural Resources, Department of | 4,613,826 | 0 | 4,613,826 | 0 | 0 | 0 |
| Environmental Protection, Department of | 2,938,656 | 0 | 523,068 | 0 | 125,000 | 2,290,588 |
| Fish and Boat Commission | 60,901 | 0 | 60,901 | 0 | 0 | 0 |
| Game Commission | 1,597,758 | 0 | 1,597,758 | 0 | 0 | 0 |
| Health, Department of | 69,448,595 | 0 | 0 | 69,448,595 | 0 | 0 |
| Transportation, Department of | 5,690,684 | 0 | 0 | 0 | 5,690,684 | 0 |
| Florida | 66,513,756 | 19,410,440 | 17,934,886 | 18,478,377 | 9,830,053 | 860,000 |
| Agriculture and Consumer Services, Department of | 9,346,686 | 6,758,977 | 2,587,709 | 0 | 0 | 0 |
| Citrus, Department of | 12,171,000 | 12,171,000 | 0 | 0 | 0 | 0 |
| Environmental Protection, Department of | 8,237,640 | 480,463 | 7,057,177 | 0 | 0 | 700,000 |
| Fish and Wildlife Conservation Commission | 8,290,000 | 0 | 8,290,000 | 0 | 0 | 0 |
| Health, Department of | 18,180,877 | 0 | 0 | 18,180,877 | 0 | 0 |
| Space Florida | 457,500 | 0 | 0 | 297,500 | 0 | 160,000 |
| Transportation, Department of | 9,830,053 | 0 | 0 | 0 | 9,830,053 | 0 |

^a Includes R&D in other areas, such as corrections, education, energy, labor, public safety, and social services.

SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Survey of State Government R&D, FY 2009.

2009. The Departments of Health in Pennsylvania and Florida accounted for the largest shares of those states' total R&D expenditures (67% and 27%, respectively).

Data Notes and Availability

All 50 states and the District of Columbia participated in the FY 2009 survey, and 422 of the agencies surveyed (96%) responded. (Puerto Rico reported to the FY 2007 survey but was unable to identify a state coordinator in time to respond to the FY 2009 survey.) The U.S. Census Bureau collected the data for the FY 2009 survey.

The amounts reported through this survey are for R&D expenditures that flow through state agency budgets; they do not include direct appropriations from state legislatures to universities, colleges, and private organizations. As a result, the \$530 million in expenditures reported by state agencies to support R&D performance by academic institutions (table 1) differs from the figure reported by universities and colleges in FY 2009 (\$3.6 billion) for expenditures on R&D activities that were funded from state and local government sources.⁵ This difference is largely attributable to the funding provided by direct appropriations from state legislatures to state-run universities, which is reported in the NSF Survey of Research and Development Expenditures at Universities

and Colleges but not in the Survey of State Government R&D Expenditures. Another likely reason for the difference is the exclusion of R&D at agricultural experiment stations from the totals reported by state agencies.

The data reported through this survey focus exclusively on R&D expenditures by state departments, agencies, commissions, and dependent entities, with the exception of state-run colleges and universities. Several industry-specific state commissions, which are generally chartered by state legislatures but are administered independently, were considered state agencies and included in the survey. Universities, colleges, or other higher education entities surveyed under the Academic R&D Expenditures Survey were considered out of scope as respondents for this effort, as were laboratories and experiment stations controlled by state universities and entities determined to be nonprofit or private organizations, as classified by the Census Bureau's Government Finance and Employment Classification Manual.

A full set of detailed tables from this survey will be available in the report *State Government Research and Development: Fiscal Year 2009* at <http://www.nsf.gov/statistics/staterd/>. For further information, please contact the author.

Notes

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2. The terms "state" and "state agencies," used for brevity in this report, include activities and organizations within the 50 states and the District of Columbia.
3. Data for 2007 in this report are from the most recently completed survey cycle. When completing the current-year survey, survey respondents may revise their prior-year data.
4. Bennof R. 2009. *Ten States Account for More than 60% of State Agencies' FY 2007 R&D Expenditures*. InfoBrief NSF 10-306. Arlington, VA: National Science Foundation, National Center for Science and Engineering Statistics. Available at <http://www.nsf.gov/statistics/infbrief/nsf10306/>.
5. National Science Foundation, National Center for Science and Engineering Statistics. 2011. *Academic Research and Development Expenditures: Fiscal Year 2009*. Detailed Statistical Tables NSF 11-313. Arlington, VA. Available at <http://www.nsf.gov/statistics/nsf11313/>.

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