



## State Government R&D Expenditures Increase 11.3% from FY 2010 to FY 2011

by Christopher Pece<sup>1</sup>

State government agency expenditures for research and development totaled \$1.404 billion in FY 2011, an 11.3% increase over the \$1.261 billion reported in FY 2010. Expenditures for R&D facilities (construction projects, major building renovations, and land and building acquisitions intended primarily for R&D use) totaled \$109 million in FY 2011, a 1.7% increase over the \$107 million reported in FY 2010. This InfoBrief presents summary statistics from the FY 2010 and FY 2011 Survey of State Government Research and Development, sponsored by the National Science Foundation (NSF).

The FY 2010 and FY 2011 survey presents the most recent NSF statistics of R&D activities performed and funded by state government agencies in each of the 50 states, the District of Columbia, and Puerto Rico. Survey data are available by state and by individual state agency. For the first time, NSF collected two fiscal years of data from state governments as part of a single survey operation. In addition, a new category was added to this survey, so state agencies were given the option to separately classify their energy-related R&D expenditures. Other R&D categories include agriculture, environment

and natural resources, health, transportation, and other.<sup>2</sup>

### National Totals

State government agency R&D expenditures for FY 2011 totaled \$1.404 billion, of which 71% came from state and other nonfederal sources (table 1). The majority of the states' R&D expenditures (\$942 million in FY 2011) went to external R&D performers. Academic institutions were the primary recipients (\$477 million, excluding direct state appropriations to colleges and universities), followed by companies and individuals (\$388 million). These amounts represent increases of 4.3% and 24.9%, respectively, from FY 2010 funding totals. Internal performers, the state agencies, performed \$462 million of R&D in FY 2011, a 10.9% increase from FY 2010. Of the total R&D expenditures, state governments contributed \$322 million to basic research in FY 2011. Basic research constituted approximately 23% of total state R&D expenditures, although the share of basic research varied considerably by state.

The largest share of state agencies' R&D expenditures (24%) were for projects related to environment and natural resources (4.4% increase from

FY 2010). Energy-related R&D projects accounted for 18% of total R&D expenditures (18.4% increase from FY 2010). Health, transportation, agriculture, and all other related projects shares of total R&D expenditures in FY 2011 were 22%, 19%, 5%, and 11%, respectively. Other R&D had the largest increase between FY 2010 and FY 2011 at 46.0%. This category includes a variety of different activities, from education, to forensic science and criminal justice related projects, to labor and social service related projects.

### State Government Shares of R&D

Individual state government expenditures on R&D in FY 2011 varied widely, ranging from \$1.2 million in the District of Columbia to nearly \$183 million in New York (table 2). Five state governments (New York, Ohio, Florida, California, and Pennsylvania) accounted for 51% of all state government R&D in both FY 2010 and FY 2011. All five of these state governments were in the top five in both FY 2007 and FY 2009 as well (no survey was conducted for FY 2008).<sup>3</sup>

The largest levels of internal R&D performance in FY 2011 were reported

TABLE 1. State agency R&D and R&D facilities expenditures: FYs 2010–11

(Thousands of current dollars)

Characteristic	FY 2010	FY 2011	% change
All R&D and R&D facilities expenditures	1,368,710	1,512,941	10.5
All R&D facilities expenditures	107,343	109,125	1.7
All R&D expenditures	1,261,367	1,403,816	11.3
Source of funds			
Federal government	375,655	403,300	7.4
State government and other sources	885,712	1,000,517	13.0
Performer			
Internal <sup>a</sup>	416,097	461,506	10.9
External	845,270	942,310	11.5
Academic institutions	457,528	477,128	4.3
Companies and individuals	310,795	388,054	24.9
Other	76,947	77,128	0.2
Basic research	292,540	321,639	9.9
Non-basic R&D	968,827	1,082,177	11.7
Type of R&D project			
Agriculture	73,057	74,502	2.0
Energy	216,408	256,200	18.4
Environment and natural resources	322,546	336,803	4.4
Health	294,731	314,200	6.6
Transportation	247,321	265,500	7.4
Other	107,303	156,612	46.0

<sup>a</sup> Internal performers include employees within the same state department or agency and services performed by others in support of internal R&D projects.

NOTES: Puerto Rico is not included in these U.S. totals due to its classification as a U.S. territory. Detail may not add to total because of rounding.

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, FY 2010 and FY 2011 Survey of State Government R&D.

by state agencies in New York (\$108 million), Florida (\$48 million), and South Carolina (\$43 million). Together these three states accounted for 43% of all state agencies' internal R&D performance (\$462 million). The largest levels of funding for external R&D performance were reported by state agencies in Ohio (\$157 million), California (\$111 million), and Florida (\$102 million). Together, these three states accounted for 39% of all state agencies' external R&D performance (\$942 million) (table 2).

### Types of State Agency R&D Projects

New York, Ohio, Florida, California, and Pennsylvania reported a broad mix of R&D projects, although generally these states concentrated their activities in either energy or health. State government agencies in New York, Florida, and Pennsylvania had the largest share of their R&D investments in health-related projects. In FY 2011 these three states alone spent a combined \$191 million on health R&D, or 61% of all state government expenditures on these

types of projects. California and Ohio's largest shares of R&D expenditures were in energy projects. In FY 2011, California spent \$96 million (37% of the U.S. total) and Ohio spent \$47 million (18% of the U.S. total) on these types of projects (table 3).

### Data Source and Limitations

Data presented in this InfoBrief are in current dollars and have not been adjusted for inflation. All 50 states, the District of Columbia, and Puerto Rico participated in the FY 2010 and FY 2011 survey, and 470 of the 472 selected agencies (99.6%) responded to the survey. State government agencies are selected for the survey by a State Coordinator who is identified by the governor's office. The State Coordinator selects agencies that are most likely to perform or fund R&D. Data for the FY 2010 and FY 2011 survey were collected by the U.S. Census Bureau.

Most states and the territory of Puerto Rico have a fiscal year period that begins on 1 July and ends the following 30 June. For example, FY 2011 begins on 1 July 2010 and ends on 30 June 2011. There are, however, four exceptions to the June 30 fiscal year end: New York (ends 31 March), Texas (ends 31 August), and Alabama and Michigan (end 30 September). For comparability these four states are surveyed with the other 46 states that end on 30 June. The District of Columbia follows the federal government fiscal year, which ends 30 September.

Use of terms such as state, state government, and state agencies have equivalent meaning and are used interchangeably throughout this report. The amounts reported here are for R&D

TABLE 2. State agency expenditures for R&D, by state and performer: FY 2011

(Thousands of current dollars)

State	All R&D expenditures		Internal performers <sup>a</sup>		External performers <sup>b</sup>		State	All R&D expenditures		Internal performers <sup>a</sup>		External performers <sup>b</sup>	
		Number	Percent	Number	Percent			Number	Percent	Number	Percent	Number	Percent
United States <sup>c</sup>	1,403,816	461,506	32.9	942,310	67.1	Missouri	13,659	7,547	55.3	6,112	44.7		
Alabama	19,684	14,250	72.4	5,434	27.6	Montana	6,474	1,695	26.2	4,780	73.8		
Alaska	11,349	9,005	79.3	2,345	20.7	Nebraska	4,062	320	7.9	3,741	92.1		
Arizona	18,627	7,410	39.8	11,216	60.2	Nevada	1,869	429	23.0	1,440	77.0		
Arkansas	14,705	6,078	41.3	8,627	58.7	New Hampshire	1,921	592	30.8	1,330	69.2		
California	149,812	38,370	25.6	111,441	74.4	New Jersey	17,069	2,981	17.5	14,088	82.5		
Colorado	18,142	6,943	38.3	11,199	61.7	New Mexico	1,822	494	27.1	1,327	72.8		
Connecticut	39,192	23,574	60.2	15,618	39.8	New York	182,736	108,094	59.2	74,643	40.8		
Delaware	2,610	2,049	78.5	561	21.5	North Carolina	29,612	19,479	65.8	10,133	34.2		
District of Columbia	1,221	221	18.1	1,000	81.9	North Dakota	8,072	366	4.5	7,706	95.5		
Florida	150,764	48,328	32.1	102,437	67.9	Ohio	159,322	2,645	1.7	156,677	98.3		
Georgia	11,691	3,600	30.8	8,091	69.2	Oklahoma	20,305	10	0.0	20,295	100.0		
Hawaii	13,104	3,667	28.0	9,437	72.0	Oregon	20,001	17,063	85.3	2,938	14.7		
Idaho	9,366	4,430	47.3	4,936	52.7	Pennsylvania	71,098	5,827	8.2	65,271	91.8		
Illinois	17,207	2,050	12.0	15,157	88.0	Rhode Island	1,948	80	4.1	1,868	95.9		
Indiana	6,983	975	14.0	6,008	86.0	South Carolina	47,795	42,533	89.0	5,263	11.0		
Iowa	36,992	1,261	3.4	35,731	96.6	South Dakota	3,629	652	18.0	2,977	82.0		
Kansas	6,636	1,501	22.6	5,134	77.4	Tennessee	3,607	20	0.6	3,587	99.4		
Kentucky	20,499	2,137	10.4	18,361	89.6	Texas	47,372	9,823	20.7	37,549	79.3		
Louisiana	9,204	7,254	78.8	1,950	21.2	Utah	34,419	10,362	30.1	24,057	69.9		
Maine	9,919	1,883	19.0	8,036	81.0	Vermont	1,712	1,544	90.2	168	9.8		
Maryland	20,085	1,929	9.6	18,156	90.4	Virginia	17,242	6,568	38.1	10,674	61.9		
Massachusetts	4,879	786	16.1	4,093	83.9	Washington	24,500	10,246	41.8	14,255	58.2		
Michigan	9,803	1,509	15.4	8,294	84.6	West Virginia	35,475	8,131	22.9	27,345	77.1		
Minnesota	11,653	1,510	13.0	10,144	87.1	Wisconsin	21,129	6,126	29.0	15,003	71.0		
Mississippi	7,421	4,028	54.3	3,393	45.7	Wyoming	5,419	3,134	57.8	2,285	42.2		
						Puerto Rico <sup>d</sup>	538	400	74.3	138	25.7		

<sup>a</sup> Internal performers include employees within the same state department or agency and services performed by others in support of internal R&D projects.

<sup>b</sup> External performers include academic institutions, companies and individuals, and other non-internal performers.

<sup>c</sup> U.S. total reflects all 50 states and the District of Columbia.

<sup>d</sup> Puerto Rico is not included in U.S. total due to its classification as a U.S. territory.

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

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, FY 2010 and FY 2011 Survey of State Government R&D.

expenditures that flow through state agencies' budgets and do not include direct appropriations from state legislatures to universities, colleges, and private organizations. As a result, the \$477 million in FY 2011 expenditures reported by state agencies to support R&D performance by academic institutions differs from the figure reported by universities and colleges in FY 2011 (\$3.8 billion) for expenditures on R&D activities that were funded from state and local government sources. (See National Science Foundation, National

Center for Science and Engineering Statistics. 2013. *Higher Education Research and Development: Fiscal Year 2011*. Detailed Statistical Tables NSF 13-325. Arlington VA. Available at <http://www.nsf.gov/statistics/nsf13325/>.) This difference is largely attributable to the funding provided by direct appropriations from state legislatures to state-run universities, which is included in the Higher Education R&D Survey but not in the Survey of State Government R&D. Another likely factor for the difference is the exclusion of R&D

at agricultural experiment stations from the totals reported by state agencies. (Note that agricultural experiment stations in Connecticut are in the population of interest for the Survey of State Government R&D because they are organized as state agencies and not affiliated with any university system.)

The data reported here focus exclusively on R&D expenditures of state government departments, agencies, public authorities, institutions, and other dependent entities that operate sepa-

TABLE 3. State agency expenditures for R&D, by state and type of R&D, for the 10 states with the highest levels of R&D expenditures: FY 2011

(Thousands of current dollars)

State	Total	Agriculture	Energy	Environment and natural resources	Health	Transportation	Other
United States <sup>a</sup>	1,403,816	74,502	256,200	336,803	314,200	265,500	156,612
New York	182,736	1,779	45,401	8,926	70,940	12,191	43,500
Ohio	159,322	0	47,150	38,596	13,231	17,282	43,063
Florida	150,764	15,991	4,159	47,437	65,571	15,645	1,962
California	149,811	1,227	95,975	15,130	0	37,445	33
Pennsylvania	71,098	641	0	7,749	54,789	3,919	4,000
South Carolina	47,795	92	115	45,163	844	1,581	0
Texas	47,372	2,878	0	4,805	15,838	23,851	0
Connecticut	39,192	3,327	554	12,517	18,783	4,012	0
Iowa	36,992	0	26,591	3,640	0	6,050	711
West Virginia	35,475	151	2,737	1,874	0	5,583	25,130
All others	483,259	48,416	33,518	150,966	74,204	137,941	38,213
Puerto Rico <sup>b</sup>	538	0	0	0	0	0	538

<sup>a</sup> U.S. total reflects all 50 states and the District of Columbia.

<sup>b</sup> Puerto Rico is not included in U.S. total due to its classification as a U.S. territory.

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

SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, FY 2010 and FY 2011 Survey of State Government R&D.

rately or somewhat autonomously from the central state government, although the state government maintains administrative or fiscal control over their activities. Several industry-specific state commissions, which are generally chartered by state legislatures but are administered independently, are considered state agencies as defined by the U.S. Census Bureau government classification and thus are included in the survey. Excluded are state-

run colleges and universities, as are laboratories and experiment stations controlled by state universities and colleges and entities determined to be nonprofit or private organizations, as defined by the U.S. Census Bureau government classification.

The full set of detailed tables from this survey will be available in the report *State Government Research and Development: FY 2010 and FY*

2011, at <http://www.nsf.gov/statistics/staterd/>. Individual detailed tables from the FY 2010 and FY 2011 survey may be available in advance of the full report. For further information, contact the author.

## Notes

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2. Prior to the FY 2010 and FY 2011 survey, energy-related R&D expenditures should have been reported in the “other” R&D projects category; however, in some instances it may have been reported in additional categories.

3. Yamaner M. 2012. *State Research and Development Expenditures Total \$1.2 Billion in FY 2009*. InfoBrief NSF 12-324. Arlington, VA: National Science Foundation, National Center for Science and Engineering Statistics. Available at <http://www.nsf.gov/statistics/infbrief/nsf12324/>.

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