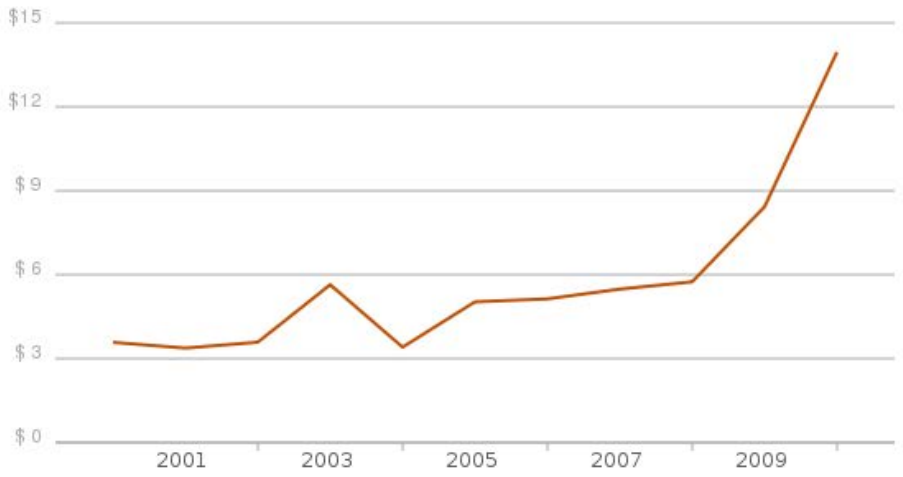
Direct Expenditures in the Science, Space, and Technology Sector

Grants in the Science, Space, and Technology Sector

The federal government spent approximately $14.0 billion[1] in fiscal year 2010 on grant programs that may provide a subsidy to the Science, Space, and Technology sector. This funding, administered by seven agencies[2] across more than 25 active programs (Table 1), accounted for almost 2 percent of all government grants made that year ($822.6 billion).[3]

Subsidyscope reports the total amount spent on grants and contracts that are most likely to contain any subsidy. Since not all the spending in these programs would properly be counted as a subsidy, the spending estimates presented here constitute the upper bound of government subsidies in a sector. For example, there is a distinction between *spending* on grants and contracts and the *subsidies* conveyed through that spending. Not all of the money obligated to a grant or contract ends up subsidizing the sector. Some funds are devoted to administering the grants or other activities that do not affect supply or prices. However, little data are available that would help estimate just the subsidy portion of spending on grants and contracts.

Figure 1: Expenditures on Grant Programs in the Science, Space, and Technology Sector, Fiscal Years 2000-2010 ($ billions)



Source: Subsidyscope analysis of data from USASpending.gov. Estimates are in nominal dollars and reflect the data as they appear in USASpending.gov at the time of this analysis.

Note: Data presented are obligations to programs that Subsidyscope deems likely to contain a subsidy. All grant programs in

Subsidyscope's definition of the Science, Space, and Technology sector are included, despite the fact that some programs may not have reported dollar amounts. Changes in government reporting methods during fiscal year 2007 typically make the estimates for that year highly unreliable, yet the Science, Space, and Technology sector remains considerably more constant over time than other sectors analyzed. For more information about the quality of these data sources, visit Clearspending.org.

The direct expenditure totals presented on this Web page are compiled using government data from USASpending.gov and the Catalog of Federal Domestic Assistance (CFDA).[4] As previously noted, these data may not include some types of subsidies and may contain gaps that prevent allocating some published subsidy data to the Science, Space, and Technology sector. All of these limitations can result in omissions of federal support that may, nonetheless, influence markets. However, they are the best data available and they provide a baseline for comparing subsidies across economic sectors. By publishing these estimates, Subsidyscope makes these data more accessible and their shortcomings can be more easily identified and, ultimately, improved.

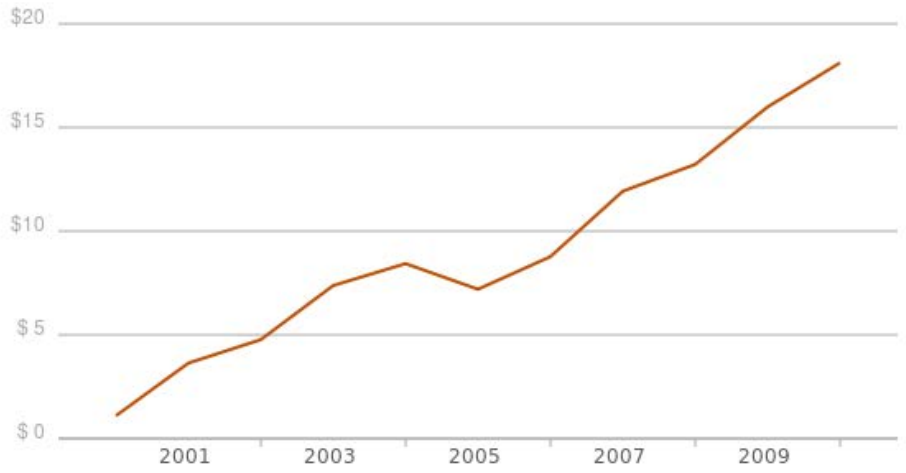
Contracts in the Science, Space, and Technology Sector

In addition to awarding grants, the government directly contracts with organizations to provide goods and services. During fiscal year 2010, all reported science, space, and technology-related contracts totaled $59.2 billion, 11 percent of all government contracts ($537.8 billion).[5] Of the $59.2 billion in total science, space, and technology-related contracts, $17.9 billion, or 30 percent were not competed.[6] While not all contracts contain a subsidy, non-competed contracts are more likely to contain a subsidy than competed contracts.

Subsidyscope's focus on non-competed contracts reflects that the federal government generally prefers agencies to compete contracts because competition is expected to result in lower costs and/or better quality goods and services. In contrast, non-competed contracts generally are assumed to be more likely to cost the government more than the fair market value.[7]

Subsidyscope presents spending on programs deemed likely to contain a subsidy, rather than the subsidy amount itself. Under a contract, a subsidy occurs when the government pays more than fair market value for a good or service. It is difficult to determine when and how much of a subsidy is included, as the fair market value may be open to interpretation. Subsidyscope does not differentiate between specific contracts that may or may not include a subsidy or measure the amount of the subsidy. However, competed contracts—contracts that are subject to an open bidding process—generally are less likely to have a subsidy component, even though the bidding process may include certain preferences. Therefore, Subsidyscope does not analyze competed contracts. This does not mean non-competed contracts contain a significant subsidy, only that they are more likely to do so. There may be various reasons why the government uses non-competed contracts, for example, there may be only one provider of the service, there may be unique experience required, or it may be more expedient or convenient. For more information on contracts, see Subsidyscope's Contracts page.

Figure 2: Expenditures on Non-competed Contracts in the Science, Space, and Technology Sector, Fiscal Years 2000-2010 ($ billions)



Source: Subsidyscope analysis of data from USASpending.gov. Estimates are in nominal dollars and reflect the data as they appear in USASpending.gov at the time of this analysis.

Note: Government spending on non-competed contracts is likely more consistent during this time period than the figure represents. Any increases or decreases may reflect poor data resulting from reporting variation, in addition to actual spending increases or decreases in science, space, and technology-related contracts.

To search Subsidyscope's direct expenditures data from the federal government's USASpending.gov Web site, click here for grants and here for non-competed contracts. The table below provides an aggregate summary of the grants made by each program in the Science, Space, and Technology sector in fiscal years 2009 and 2010, retrieved from Subsidyscope's searchable database of grants.

Table 1: Science, Space, and Technology Sector Direct Expenditure Programs, Fiscal Years 2009 and 2010 ($ thousands)

CFDA #	CFDA Program Title	FY 2009	FY 2010
11.557	Broadband Technology Opportunities Program (BTOP)	not reported	$3,996,692
10.787	Broadband Initiatives Program	not reported	$2,337,246
47.049	Mathematical and Physical Sciences	$1,434,618	$1,503,320
47.076	Education and Human Resources	$899,599	$928,352
47.050	Geosciences	$798,465	$925,079
47.041	Engineering Grants	$675,992	$775,640
47.074	Biological Sciences	$684,008	$729,240
47.070	Computer and Information Science and Engineering	$581,766	$612,164
47.082	Trans-NSF Recovery Act Research Support	$2,350,554	$598,449
11.558	State Broadband Data and Development Grant Program	not reported	$294,733
47.080	Office of Cyberinfrastructure	$213,025	$257,130
47.075	Social, Behavioral, and Economic Sciences	$214,539	$222,055
11.618	National Institute of Standards and Technology Construction Grant Program	$79,783	$173,517
47.081	Office of Experimental Program to Stimulate Competitive Research	$116,294	$132,748
47.078	Polar Programs	$147,171	$128,275

11.609	Measurement and Engineering Research and Standards	$44,544	$112,515
43.001	Science	$94,609	$106,373
47.079	International Science and Engineering (OISE)	$46,220	$59,413
11.616	Technology Innovation Program (TIP)	$10,571	$51,216
10.861	Public Television Station Digital Transition Grant Program	$5,086	$4,627
12.113	State Memorandum of Agreement Program for the Reimbursement of Technical Services	$14,446	$2,850
59.058	Federal and State Technology Partnership Program	not reported	$1,900
11.555	Public Safety Interoperable Communications Grant Program	$3,881	$825
43.006	Science, Recovery Act	not reported	$293
43.009	Cross Agency Support	not reported	$75
43.002	Aeronautics	$0*	-$60
10.863	Community Connect Grant Program	$13,208	not reported
11.554	Low-Power Television and Translator Digital-to-Analog Conversion	not reported	not reported
11.556	TV Converter Box Coupon Program	not reported	not reported
43.003	Exploration	not reported	not reported
43.004	Aeronautics, Recovery Act	not reported	not reported
43.005	Exploration, Recovery Act	not reported	not reported
43.007	Space Operations	not reported	not reported
43.008	Education	not reported	not reported
43.010	Construction & Environmental Compliance & Remediation	not reported	not reported
43.011	Office of Inspector General	not reported	not reported
81.214	Environmental Monitoring/Cleanup, Cultural and Resource Mgmt., Emergency Response Research, Outreach, Technical Analysis	not reported	not reported
Grand Total		***$8,428,379***	***$13,954,667***

** This program reported a dollar amount of $0 for FY2009 in USASpending.gov.*

Source: Subsidyscope analysis of data from USASpending.gov. Program names are copied directly from USASpending.gov. For more information about the quality of these data sources, visit Clearspending.org.

Notes: Individual estimates may not sum to the reported total due to rounding. Some programs report negative totals for FY2009 and FY2010. This reflects a downward adjustment to obligations made in previous years. Table excludes loans and loan guarantees.

1. *Subsidyscope analysis of USASpending.gov. This estimate is likely an undercount based on the fact that several programs in this sector, including those run by the National Aeronautics and Space Administration (NASA), do not report most of their funding. In FY2010, NASA's total budget was $18.7 billion. Space Operations (CFDA # 43.007), for example, had total funding of $6.2 billion spread out across the Space Shuttle, International Space Station, and Space and Flight Support (SFS) programs, yet there is no spending reported in USASpending.gov.*

2. *The seven agencies are the Department of Agriculture (CFDA # 10.***), the Department of Commerce (11.***), the Department of Defense (12.***), the National Aeronautics and Space Administration (NASA, 43.***), the National Science Foundation (47.***), the Small Business Administration (59.***), and the Department of Energy (81.***). For the purpose of counting the number of agencies that administer funding in a sector, Subsidyscope relies on the CFDA's designation of what constitutes a federal agency.*
3. *Subsidyscope analysis of USASpending.gov. This total is the aggregate of grant spending in Subsidyscope's Agriculture, Education, Energy, Health, Housing, National Defense, Natural Resources and Environment, Science, Space, and Technology, and Transportation sectors. The Nonprofit sector is not included in this total, as it is not mutually exclusive in scope and cuts across all other sectors.*
4. *The Catalog of Federal Domestic Assistance (CFDA) captures domestic grant programs and thus does not include grants administered in a foreign capacity.*
5. *Subsidyscope analysis of USASpending.gov. This total is the aggregate of total contract spending (competed and non-competed) in Subsidyscope's Agriculture, Education, Energy, Health, Housing, National Defense, Natural Resources and Environment, Science, Space, and Technology, and Transportation sectors. The Nonprofit sector is not included in this total, as it is not mutually exclusive in scope and cuts across all other sectors.*
6. *Subsidyscope analysis of USASpending.gov. Subsidyscope has previously determined that there can be problems with the quality of the contracts data that are reported by agencies to USASpending.gov. In order to sort government contracts by economic sector, Subsidyscope uses North American Industry Classification System (NAICS) codes to match contracts to the appropriate economic sector, or Product Service Codes if NAICS codes are not available. (See Section C of Subsidyscope's methodology for more on how contracts are organized by sector.) Specifically, Subsidyscope found that there is significant variation in agencies' use of NAICS codes when reporting contracts to USASpending.gov over the 10-year period from fiscal year 2000 to 2010. For instance, despite there being a requirement that contracting officers identify NAICS codes for each contract, for fiscal year 2000, approximately 88 percent of all contract records are missing NAICS codes while in fiscal year 2010, only 3 percent of records are missing NAICS codes. This inconsistent application of NAICS codes as well as other reporting variations may be responsible for some of the increase in science, space, and technology-related contracts spending in fiscal years 2000 to 2010, as presented in Figure 2 above.*
7. *U.S. Department of Energy (DOE). "Competition in Contracting Guide." p. 1.*

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Tax Expenditures in the Science, Space, and Technology Sector

Tax expenditures are government revenue losses resulting from provisions in the tax code that allow an individual or business to reduce their tax liabilities by taking certain deductions, exemptions, exclusions, preferential rates, deferrals, or credits. Tax expenditures reduce the amount of revenue that would otherwise have been collected by the government, and thus have a similar effect on the federal budget as a spending program. They also can benefit recipients in much the same way as direct spending. Subsidyscope illuminates the budgetary costs of these programs; however, any use of these data for policy evaluation must weigh those costs against the benefits they provide. The costs of tax expenditures are estimated by two government entities: the US Department of the Treasury (Treasury), in the executive branch, and the nonpartisan staff of the Joint Committee on Taxation (JCT), a congressional committee. Each uses different methods and formats for calculating and presenting its estimates (see this Methodology page for more detail). Subsidyscope presents Treasury estimates below that are published by the Office of Management and Budget (OMB).

Table 1: Science, Space, and Technology Related Tax Expenditures for Individuals and Corporations, Fiscal Years 2009 and 2010 ($ millions)

Tax Expenditure	FY 2009	FY 2010
Credit for increasing research activities	$8,010	$5,890
Expensing of research and experimentation expenditures (normal tax method)	$3,820	$3,560
Total [1]	***$11,830***	***$9,450***

Source: Subsidyscope analysis of data from OMB. Budget of the U.S. Government. Fiscal year 2009 figures are from Analytical Perspectives, FY2011, p. 209; fiscal year 2010 figures are from Analytical Perspectives, FY2012, p. 241.

The two tax expenditures in the Science, Space, and Technology budget function are both aimed at encouraging innovation by providing "special treatment of business investments in research and development."[2] They were both were introduced in the Recovery Tax Act of 1981 and have been amended and extended on numerous occasions. In fiscal year 2010, $5.77 billion of the $5.89 billion dollar credit for increasing research activities was estimated to have been used by corporations and $120 million was estimated to have been used by individuals.[3]

1. *Summing tax expenditures often provides a reasonably good estimate for the total cost of groups of tax expenditures, though it does not capture potential interactions among tax expenditures or behavioral responses if any single one is changed or repealed. For more on summing tax expenditures and their interaction effects, see Burman, Leonard, Eric Toder and Christopher Geissler. "How Big Are Total Individual Income Tax Expenditures, and Who Benefits from Them?" The Urban Institute. Washington, DC. December 2008. For more on why tax expenditure estimates are not exact estimates of the amount of federal revenue that would be raised if they were eliminated, see the Methodology page of Pew's Tax Expenditure Database.*

2. *Cordes, Joseph J. "Research and experimentation tax credit." Encyclopedia of Taxation and Tax Policy. Eds. Joseph J. Cordes, Robert D. Ebel, Jane Gravelle. Urban Institute. pp. 330-332.*
3. *Subsidyscope analysis of data from OMB. Budget of the U.S. Government. Analytical Perspectives, FY2012, p. 246.*

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Science, Space, and Technology

Grants & Contracts
Tax Subsidies
Loans & Loan Guarantees
More Research

Loans and Loan Guarantees in the Science, Space, and Technology Sector

Science, Space, and Technology Sector Direct Loan Programs

In the case of direct loans, the government lends money directly to the borrower and services the loan by collecting repayments. When the government offers direct loans at below market interest rates, or terms more generous than what private markets would provide, there is a subsidy. The government estimates the subsidy conveyed through such credit programs as the net cost to the government of a loan or loan guarantee, calculated by summing all the expected future cash flows to and from the government; this is the cost the government is required to present under the 1990 Federal Credit Reform Act (FCRA).[1]

Many argue that there is also an implicit subsidy, not measured by the government under FCRA, that results from excluding the costs of program administration and market risk (which arises from volatility in the economy).[2] This implicit subsidy is generally the difference between the terms the recipient would get in a competitive market and those offered by the government. The estimates below do not include the implicit subsidy because the government does not measure it.

Tables 1 and 2 provide information about loan and loan guarantee programs. The "obligations" and "commitments" columns, respectively, illustrate the breadth of the government's role in the sector (the amount of loans disbursed or authorized and loan guarantees backed), but does not measure the subsidy costs that will ultimately be incurred. The "subsidy rate" column presents the government's reported subsidy rate for these programs, as required by FCRA, which can be defined broadly as the ratio of the subsidy to the disbursement.[3]

Table 1: Direct Loans in the Science, Space, and Technology Sector, Fiscal Years 2009 and 2010

Program	Agency	2009 Subsidy Rate (%)	2009 Obligations ($ millions)	2010 Subsidy Rate (%)	2010 Obligations ($ millions)
Broadband Treasury Loans	USDA - Rural Utilities Service	3.90	1,406	7.24	7,107
Telecommunication Hardship Loans	USDA - Rural Utilities Service	-1.76	145	-18.59	145
FFB Telecommunications Loans	USDA - Rural Utilities Service	-0.94	295	-0.65	295
Treasury Telecommunication Loans	USDA - Rural Utilities Service	0.21	250	-0.43	250
Total Obligations			***2,096***		***7,797***

Source: Subsidyscope analysis of data from the Federal Credit Supplement (FCS). 2009 figures are from the FCS FY2010, Table 1; 2010 figures are from the FCS FY2011, Table 1.

Almost all reported loans in the Science, Space, and Technology sector are administered through the U.S. Department of Agriculture's (USDA) Rural Utilities Service (RUS). The RUS provides risk transfers for a host of programs that provide electricity, telecommunications, and water disposal services to rural America.

The largest loan program in the Science, Space, and Technology sector falls under Broadband Treasury Loans, which in fiscal years 2009 and 2010 consisted of programs established by the American Recovery and Reinvestment Act (ARRA) of 2009. These loans seek to "expand broadband access and adoption in communities across the U.S."[4] They are distributed through both the Broadband Initiatives Program (BIP), run by the RUS, and the Broadband Technology Opportunities Program (BTOP), housed within the Department of Commerce's National Telecommunications and Information Administration (NTIA).[5]

Between fiscal year 2009 and fiscal year 2010, loans in the Science, Space, and Technology sector increased from $2.1 billion to $7.8 billion. The largest contributor to this increase was broadband infrastructure and development.

Science, Space, and Technology Sector Loan Guarantees

In the case of a government loan guarantee, a private lender disburses the loan to the borrower, and the government acts as the guarantor of the loan by agreeing to make payments should the borrower fail to do so. Such a guarantee often allows a borrower to secure a loan at a lower interest rate than the borrower could otherwise obtain. Even if the interest rate is a market rate and the loan is repaid in full, there could be a subsidy if the borrower did not pay an upfront fee for the guarantee as may be the case with a private lender. In addition, a government guarantee encourages lenders to offer loans to borrowers to whom they might otherwise not extend credit because they are more of a credit risk. As with loans, the government does not include administrative costs or market risks in the subsidy calculation.

Using Subsidyscope's methodology for identifying loan guarantees, we find that there are no loan guarantees that fit into the Science, Space, and Technology sector in the Federal Credit Supplement (FCS) portion of the President's Budget for fiscal year 2010 or fiscal year 2011.

1. *Congressional Budget Office (CBO). "Estimating the Value of Subsidies for Federal Loans and Loan Guarantees." August 2004. p. 1.*
2. *Ibid.*
3. *Federal Credit Supplement (FCS). FY2010. p.iii. The Federal Credit Supplement includes four components that sum together to create the subsidy rate: defaults as a net of recoveries, interest accrued, fees, and an "all other" category. A positive subsidy rate indicates there is a net cost to the government, and that a subsidy is being provided to the borrower. A negative subsidy rate by contrast means that the government predicts it will receive more money than it pays out in a particular program. However, as noted at the top of this page, the government does not take into account the implicit subsidy in these calculations, potentially making government estimates an undercount of the subsidy. See this page for more on how the government calculates subsidy rates for loans and loan guarantees.*
4. *BroadbandUSA.gov. February 2, 2011.*
5. *Kruger, Lennard G. Congressional Research Service (CRS). "Broadband Loan and Grant Programs in the USDA's Rural Utilities Service." June 17, 2011. pp. 8-15.*

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