

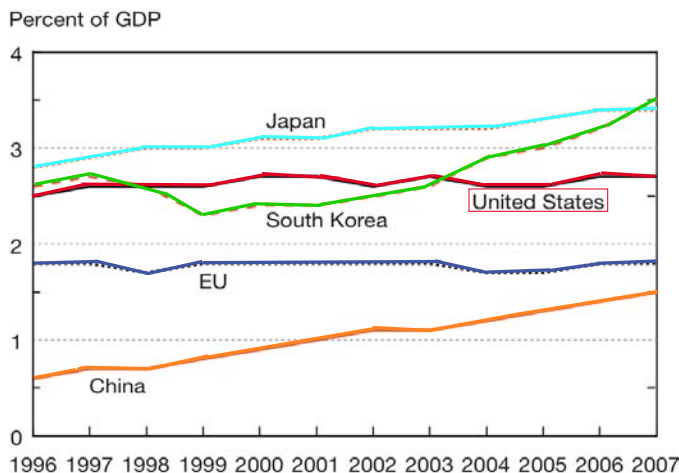
Science & Engineering R&D Fuels U.S. Economic Growth & New Jobs

More than fifty years of experience shows that a strong federal commitment to scientific research is key to building a better America. **Discovery and innovation are proven fuels for economic growth and job creation.** And they are vital elements for achieving energy security and sustaining America's global leadership in science. We must begin to reduce the deficit and begin to live within our means. But we must be smart about how we go about it. **Federal support for science will spur economic growth and help restore a firm fiscal foundation for our nation..**

A National Science Foundation (NSF) study found that 73% of the science papers cited in industry patents were funded by taxpayers through the federal government, especially university research operations.¹

Pennsylvania received \$1.147 billion in federal prime award R&D contracts in FY 2010, with approximately 3,481 transactions taking place.² Information and charts on this page demonstrate the importance of federal investment in R&D to Pennsylvania's economy, and its future in the global marketplace.

Federal R&D Expenditures as Percentage of GDP Compared to Strategic Competitors 1996 - 2007³



Fueling Pennsylvania's 21st Century Workforce: Federal R&D Expenditures at Pennsylvania Universities & Colleges FY 2008³

Pennsylvania's colleges and universities received \$2.604 billion in federal R&D spending in FY 2008, making it 5th in the nation.

Key Reports and On-line Resource

- The Science-Engineering-Technology Working Group (SETWG) sponsors the annual Congressional Visits Day Program. See www.aboutastra.org/cvdl
- **Science & Engineering Indicators 2010**, published by the National Science Board, provides a broad base of quantitative information on the U.S. and international science and engineering enterprise. It is created biennially by the National Science Foundation's Division of Science Resources Statistics (SRS). See www.nsf.gov/statistics/seind10/

Top 5 Recipients of Federal R&D Contracts (not Grants)² Performed in Pennsylvania FY 2010*

| | | |
|-----------------------------|---------------|-------|
| 1. NAVMAR APPLIED SCIENCES | \$181,788,131 | (16%) |
| 2. PENNSYLVANIA STATE UNIV. | \$156,791,507 | (14%) |
| 3. CARNEGIE MELLON UNIV. | \$114,102,738 | (10%) |
| 4. CONCURRENT TECHNOLOGIES | \$84,208,834 | (7%) |
| 5. LOCKHEED MARTIN | \$62,129,966 | (5%) |

* Note: R&D contract & grant amounts do not include management and administrative fees for the operation of Government-Owned, Contractor-Operated (GOCO) facilities under OMB definitions.

Top 5 Federally-Funded R&D Contract Product or Service Types Spent in Pennsylvania FY 2010²

| | | |
|-------------------------------------|---------------|-------|
| 1. Defense Elect. & Comm. R&D | \$222,757,581 | (19%) |
| 2. Engineering — Adv. R&D | \$71,984,227 | (6%) |
| 3. Other R&D Expl. Dev. | \$70,760,972 | (6%) |
| 4. Defense Elect. & Comm. Basic R&D | \$69,960,784 | (6%) |
| 5. Services — Mgmt. & Support R&D | \$46,156,960 | (4%) |

Top 5 Contracting Agencies for Pennsylvania R&D Investments During FY 2010²

| | | |
|---|---------------|-------|
| 1. NAVY | \$505,527,128 | (44%) |
| 2. AIR FORCE | \$240,431,027 | (21%) |
| 3. ARMY (except Corps of Engineers Civil Program Financing) | \$205,127,587 | (18%) |
| 4. Bureau of Prisoners/ Federal Prison System | \$42,700,508 | (4%) |
| 5. National Institutes of Health | \$35,511,938 | (3%) |

National Science Foundation (NSF) Pennsylvania Investments During FY 2010



The 2010 CVD State R&D Sheet State Series are made possible by the American Chemical Society www.acs.org; IEEE-USA www.ieee-usa.org; and SPIE-The International Society for Optical Engineering www.spie.org



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How Pennsylvania Ranks 2011

| Rank | Science & Technology in Pennsylvania's Economy ^{3, 4, 5} | Pennsylvania | Total U.S. ^{**} |
|------|---|--------------|--------------------------|
| 6 | Pennsylvania's Population as of July 1, 2010 (U.S. Census Bureau estimates) | 12,632,780 | 309,050,816 |
| 23 | High-Technology Share of all Business Establishments 2006 (%) | 7.74% | 8.35% |
| 36 | Net High-Tech Business Formations as Share of All Business Estab. 2006 (%) | .9% | .18% |
| 26 | Employment in High-Tech Establishments as % of Total Employment 2006 (%) | 10.58% | 11.45% |
| 15 | Average Annual SBIR Funding <i>per</i> \$1 Million of Gross Domestic Product 2006-2008 (\$) | \$146 | \$127 |
| 11 | Venture Capital Disbursed <i>per</i> \$1,000 of Gross Domestic Product 2008 (\$) | \$1.25 | \$2 |
| 29 | Venture Capital Disbursed <i>per</i> Venture Capital Deal 2008 (\$ millions) | \$4.05 | \$7.43 |
| 15 | R&D as Share of Gross Domestic Product 2007 (%) | 2.53% | 2.62% |
| 22 | 2010 State <i>New Economy Index</i> Overall Rank (composite of 26 innovation indicators) ⁵ | NA | NA |
| Rank | Elementary & Secondary Education ³ | | |
| 10 | Fourth Grade Mathematics Performance 2007 (Score out of 500) | 244 | 239 |
| NA | Fourth Grade Science Performance 2005 (Score out of 300) | NA | 149 |
| 12 | Eighth Grade Mathematics Performance 2007 (Score out of 500) | 286 | 280 |
| NA | Eighth Grade Science Performance 2005 (Score out of 300) | NA | 147 |
| 10 | Public School Teacher Salaries 2007 (\$) | \$54,970 | \$50,816 |
| 33 | Share of Public H.S. School Students Taking Advance Placement Exams 2008 (%) | 17.9% | 25% |
| Rank | Higher Education ³ | | |
| 6 | Bachelor's Degrees in Nat. Sciences & Engineering. <i>per</i> 1,000 Indiv. 18-24 Yrs. Old 2007 | 11.7 | 8.1 |
| 13 | S&E Graduate Students per 1,000 Individuals 25-34 Years Old 2007 | 14.2 | 12.3 |
| Rank | Workforce Indicators ³ | | |
| 19 | Individuals in S&E Occupations as Share of Workforce 2008 (%) | 3.55% | 3.75% |
| 26 | Engineers as Share of Workforce 2008 (%) | .99% | 1.06% |
| 18 | Life and Physical Scientists as Share of Workforce 2008 (%) | .45% | .40% |
| 20 | Computer Specialists as Share of Workforce 2008 (%) | 1.80% | 2.08% |
| Rank | Financial R&D Indicators ³ | | |
| 10 | State Agency R&D Expenditures per \$1 Million of Gross Domestic Product 2007 (\$) | \$195 | \$89 |
| 13 | Business-Performed R&D as Share of Private-Industry Output 2007 (%) | 2.16% | 2.20% |
| 9 | Academic R&D per \$1,000 of Gross Domestic Product 2008 (\$) | \$4.71 | \$3.66 |
| Rank | Academic R&D and Patent Output Indicators ³ | | |
| 16 | Academic S&E Article Output per 1,000 Doctorate Holders in Academia 2006-2008 | 581 | 577 |
| 13 | Academic S&E Article Output per \$1 Million of Academic R&D 2008 (# articles) | 3.62 | 3.24 |
| 21 | Academic Patents Awarded per 1,000 S&E Doctorate Holders in Academia 2006 | 9.1 | 11.6 |
| 25 | Patents Awarded per 1,000 Individuals in S&E Occupations 2008 | 12.1 | 13.4 |

Sources: 3. *Science & Engineering Indicators 2010*, National Science Board and National Science Foundation / Science Resources Study Division; 4. National Venture Capital Association www.nvca.org; 5. Information Technology & Innovation Foundation www.itif.org

** rankings include the District of Columbia

