

## TECHNOLOGY SECTORS

Colorado is an undeniable leader in technology. A host of objective rankings bear this out:

- AeA's "Cyberstates" 2007 edition ranked Colorado #3 in the country for concentration of high-tech workers, with 86 of every 1,000 private sector workers classified as high-tech.
- The 2007 State New Economy Index published by the Information Technology & Innovation Foundation ranked Colorado #2 in economic dynamism and #7 in innovation capacity.
- Corporation for Enterprise Development's, "Development Report Card for the States, 2007" placed Colorado on its Honor Roll, one of only seven states to earn this distinction. Colorado received A's in Business Vitality, Development Capacity, Competitiveness of Existing Business, Entrepreneurial Energy, Financial Resources, and Innovation Assets.

### Selected Rankings from Various Technology Reports

| <i>Measure</i>   | <i>Rank</i> | <i>Comments</i>   |
|--|-------------|---|
| Concentration of Technology Jobs                           | 3           | Percent of total jobs in high tech industries                                     |
| National Science Foundation Funding                        | 1           | As a percent of Gross State Product   |
| Population with College Degree                             | 2           | Percent of adult population   |
| New Companies  | 3           | Number of new companies per 1,000 workers   |
| Business Starts  | 2           | Business starts per capita  |
| Small Business Innovation Research (SBIR) Grants           | 4           | SBIR grants (\$) awarded per worker   |
| High tech industries with Location Quotient greater than 1 | 3           | Measure of high tech industry clusters within the state                           |
| High Tech Exports  | 4           | 55% of Colorado's exports are high tech products                                  |
| Long Term Job Growth                                       | 5           | Ten-year trend in employment growth   |
| Initial Public Offerings                                   | 2           | Weighted measure of number and value of IPO's as a share of total worker earnings |
| Venture Capital Investment                                 | 4           | Venture capital investment  |
| Households with computers                                  | 6           | Percent of households with computers  |

Several technology sectors are the focus of special emphasis in Colorado's economic development strategy.

### Renewable Energy

Colorado is well positioned to become a national and global leader in renewable energy. Its natural resources of abundant solar energy and wind power, coupled with innovation and entrepreneurial assets, make Colorado a prime location to develop and grow a significant new energy economy.

- Colorado is home to the National Renewable Energy Laboratory (NREL), the Department of Energy's major lab for renewable energy and energy efficiency research.

- Colorado's research universities are leaders in energy research and development. This role has been solidified by the formation of the Colorado Renewable Energy Collaboratory, a partnership between NREL and the three Colorado research universities -- the Colorado School of Mines, Colorado State University and the University of Colorado.
- The Collaboratory will receive up to \$2 million per year for three years, beginning in fiscal year 2007. These monies can be used only as matching funds to enable the Collaboratory to qualify for federal and private research projects.
- Colorado has a renewable energy portfolio standard that was the result of a referendum of the people of the state. In 2007, that standard was doubled from 10 percent to 20 percent renewables by 2020.
- Colorado is among the national leaders in potential from renewable energy with solar quality in the 5000 to 7000 watt hours per square meter per day range, and wind energy potential is ranked in the top tier of states – 11<sup>th</sup> nationwide.
- Legislation in 2007 established the Clean Energy Fund. From that fund, \$3.5 million will be specifically earmarked for economic development opportunities in renewable energy technologies.
- The rapidly growing renewable energy sectors, including energy research, have an estimated 1,300 companies in Colorado, with employment of nearly 22,000.

### Biotechnology & Life Sciences

The biotechnology industry encompasses a broad spectrum of applications from diagnosis and treatment of human diseases to the development of technologies that will increase the productivity of agriculture. Colorado's university and private-sector research facilities, as well as an educated and highly skilled labor force, provide an environment conducive to continued growth in biotechnology.

- Biotech/bioscience is a growing industry in Colorado, currently providing about 16,000 direct jobs statewide, with an estimated average annual salary of \$63,000.
- In 2006, the Colorado legislature appropriated \$2 million to implement the Bioscience Discovery Evaluation Grant Program with the purpose of improving and expanding the evaluation of new bioscience discoveries at research institutions in Colorado. This is essentially a proof of concept program with the intent to accelerate development of new products and services.
- A \$6 million grant to University of Colorado Medical School from the Charles C. and June S. Gates Family Fund, longtime Colorado philanthropists, will fund the creation of a stem cell research center, headed by Dennis Roop, a noted stem cell researcher who will bring with him five National Institutes of Health grants totaling \$3.8 million.

- Fitzsimons BioBusiness Incubator is the only Colorado incubator facility dedicated to assisting the growth of bioscience companies with business planning and management, technical and scientific advisory services, intellectual property and access to capital.

Accelerating Colorado's biotechnology position is the \$4.3 billion redevelopment of the former Fitzsimons Army Medical Center into one square mile dedicated to life science research, education and patient care. It is the first of its kind west of the Mississippi. The new 217-acre campus of the University of Colorado Health Sciences Center and the 160-acre Colorado Bioscience Park Aurora anchor the project, being developed by Forest City Enterprises.

The 160-acre bioscience park has been master-planned for up to 4 million square feet and an on-site work force of 16,000. The park can accommodate research-oriented biomedical, biotechnology and pharmaceutical operations in multi-tenant buildings as well as in single-tenant build-to-suit buildings. It is currently home to 18 biotech companies. The park's affiliation with the University of Colorado allows tenant companies easy access to the resources of the largest academic medical center in the Rocky Mountain Region. For more information, visit their website at <http://www.cobioscience.com>

- Since 2000, almost 2.5 million square feet of facilities have been constructed, representing an investment of over \$685 million. Among the largest completed projects are a 483,000 University of Colorado Hospital Anschutz Inpatient Pavilion and a 126,875 University Physicians, Inc. building.
- Projects currently under development and slated to be completed by mid-2008 total 3.2 million square feet and \$637 million of investment, including the Barbara Davis Center for Childhood Diabetes and the new 1.2 million square foot Children's Hospital.

### Aerospace Industry

Colorado has a strong aerospace, satellite and space industry. Colorado is home to the nation's second largest space economy, behind only California. There are more than 300 companies in the space business in Colorado. The industry provides an estimated 150,000 direct and industry support jobs and between \$4 and \$5 billion a year in revenues. Industry leaders include Ball Aerospace, Lockheed Martin, Boeing, Raytheon, Northrup-Grumman, Inc., Space Imaging, and Echostar. These companies are engaged in satellite manufacturing, launch and ground equipment, and space communications. It is anticipated that this industry will be an economic generator as commercialization of space becomes more widespread in the future. By the year 2010 it is estimated that revenues will increase to \$7 billion and employment to 232,000.

- Lockheed Martin was awarded an \$8.2 billion contract to build the Orion crew exploration vehicle. This project will span seven years and will add 600 highly skilled engineering and related jobs to Lockheed Martin's existing Colorado workforce and bolster Colorado's position as a leader in space exploration.
- United Launch Alliance, ULA, is joint venture between Lockheed Martin and Boeing Corporation to develop a new generation of space technology based on merger of the Atlas and Delta rocket operations. The ULA program management, engineering, test and mission support functions are headquartered in Denver, with a current workforce of about 1,600.

- University of Colorado at Boulder is the #1 ranked public university in NASA funding.

### Information Technology

Colorado's information technology sector has helped transform the state's economic base, and has been a major driver of its economic growth over the past decade.

- Colorado ranks fifth in software publishing employment.
- Colorado ranks second per capita in recent degrees awarded in Science and Engineering.
- Two of the world's ten fastest supercomputers are in Colorado – at NOAA and NCAR.
- The IT sector (including telecom) is estimated to contribute \$17 billion to the Colorado economy.

### Average Number of Jobs in Selected IT Sectors in 2006

| <i><b>IT and Related Sectors *</b></i>      | <i><b>Annual Average Employment</b></i> |
|---|---|
| 333-Machinery Manufacturing                 | 9,057                                   |
| 334-Computer & Elec. Products Manufacturing | 28,370                                  |
| 511-Publishing Industries (except Internet) | 28,516                                  |
| 517-Telecommunications                      | 27,833                                  |
| 518-ISPs, Search Portals & Data Processing  | 7,086                                   |
| 5415-Computer Systems Design                | 33,591                                  |

\* Based on North American Industry Classification (NAICS) data

Source: Colorado Department of Labor & Employment, 2007

### Advance Colorado Center

The Advance Colorado Center, a partnership between OEDIT and the Colorado Economic Development Commission and the University of Colorado at Denver and Health Sciences Center (UCDHSC) provides support for fledgling non-profit associations and business support programs that will help advance targeted industries within Colorado. The ACC provides a common headquarters for a number of business development and high-tech associations. They receive basic office services and training in everything from association organization and marketing to grant writing and strategic planning, all the while sharing with each other their own considerable expertise.

The following are organizations currently housed in the Advanced Colorado Center:

- **CTEK** provides expert financial and business volunteers mentor entrepreneurs working with innovative technologies. [www.ctek.biz](http://www.ctek.biz)
- **Colorado Film Commission** stimulates and supports growth of all segments of the Colorado film and video industry. The CFC promotes the state as a competitive location for filming. [www.coloradofilm.org](http://www.coloradofilm.org)
- **Colorado Software & Internet Association** fosters innovation and growth for the technology industry in Colorado. [www.coloradosoftware.org](http://www.coloradosoftware.org)

- **Colorado BioScience Association** grows the state's bioscience workforce, provides networking opportunities, educational and technical programs, creates corporate partnerships, and finds investors. [www.cobioscience.com](http://www.cobioscience.com)
- **Connected Organizations for a Responsible Economy (CORE)** promotes Colorado as a center for environmental commerce and sustainable technologies and business practices. [www.corecolorado.org](http://www.corecolorado.org)
- **Colorado Association for Manufacturing and Technology** assists manufacturers through consulting, training, export assistance, and improved technology. [www.CAMT.com](http://www.CAMT.com)
- **Colorado Alliances for Microenterprise Initiatives** seeks to build the capacity of very small businesses, to help entrepreneurs become economically self-sufficient. [www.coloradoalliance.org](http://www.coloradoalliance.org)
- **Colorado Nanotech Initiative** is dedicated to nanotechnology development in Colorado through research, education, technology commercialization, and business development. [www.coloradonanotechnology.org](http://www.coloradonanotechnology.org)
- **Colorado Photonics Industry Association** promotes Colorado's cluster of large and small optics and photonics companies, four national research laboratories, and educational institutions. [www.coloradophotonics.org](http://www.coloradophotonics.org)

### Summary of High-Tech Economic Impact

Colorado is a leading high-tech state. When assessing Colorado's position as a high-tech hub, the summary of economic impacts of high-tech reported in *Cyberstates 2007* tells a compelling story:

- Concentration of high-tech workers, with 86 of every 1,000 private sector workers classified as high-tech, Colorado ranks third in the country.
- 158,100 high-tech workers (13<sup>th</sup> in the nation).
- High-tech average wage of \$80,200 (7<sup>th</sup> in the country), or 93 percent higher than average private sector wages.
- High-tech payroll of \$12.7 billion in 2005 (12<sup>th</sup> in the nation).
- More than 10,900 high-tech establishments (11<sup>th</sup> nationwide).
- High-tech exports represent 55 percent of Colorado total exports in 2006 (4<sup>th</sup> nationwide)
- \$4.3 Billion in high-tech exports (11<sup>th</sup> nationwide).
- Colorado ranked 8<sup>th</sup> in computer and peripheral equipment exports at \$1.6 Billion.

Colorado's prominent role as a high tech leader is greatly enhanced by the presence of a number of key federal laboratories.

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#### **Federal Laboratories in Colorado**

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|---|----------------|
| Bureau of Reclamation Research Laboratory           | Denver         |
| Climate Monitoring & Diagnostics Laboratory         | Boulder        |
| Department of Energy-Grand Junction Projects Office | Grand Junction |
| Environmental Technology Laboratory                 | Boulder        |
| Forecast Systems Laboratory                         | Boulder        |
| Institute for Telecommunication Sciences            | Boulder        |
| National Center for Atmospheric Research            | Boulder        |
| National Geomagnetic Information Center             | Denver         |

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| National Institute of Standards & Technology               | Boulder     |
| National Renewable Energy Laboratory                       | Golden      |
| National Seed Storage Laboratory                           | Ft. Collins |
| National Wildlife Research Center                          | Ft. Collins |
| Natural Hazards Research & Applications Information Center | Boulder     |
| Rocky Mountain Research Station                            | Ft. Collins |
| Space Environment Laboratory                               | Boulder     |
| Transportation Test Center                                 | Pueblo      |

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