

# Colorado Economy

## Energy Sector

Includes nonrenewable energy resources (petroleum, natural gas, and coal), and the emerging renewable energy and biofuels industries. The RE industry includes solar, wind, water, biomass and geothermal resources, and excludes hydroelectric sources. Testing laboratories, scientific and technical consulting services, environmental, natural resource, energy, and institutional research are also included in the energy industry cluster.

Colorado and the Rocky Mountain Region are at the center of this sector with its mining and oil and gas resources/industries and its growing involvement in the renewable energy and its subsectors.

Energy has played a key role in past economic development worldwide. There is virtually no country that has been able to sustain economic growth without increasing energy consumption (American Petroleum Institute, *Workforce Challenge*, May 2005).

### Stats from the Metro Denver Economic Development Corporation:

	Metro Denver*	US
Direct employment 2003	34,000	1.6 million
Nonrenewable energy	12,200	1.0 million
Renewable energy	17,100	238,800
Total direct employment growth 1998-2003	8%	5%
Nonrenewable energy	4%	4%
Renewable energy	18%	38%
Avg. annual direct employment growth 1998-2003	2%	1%
Nonrenewable energy	1%	1%
Renewable energy	3%	7%
No. direct industry cluster companies	31,600	77,600
Nonrenewable Energy	970	42,600
Renewable energy	3%	7%
Direct employment concentration	2.7%	1.3%
Nonrenewable energy	0.9%	0.8%
Renewable energy	1.3%	0.2%
Energy research	0.4%	0.3%

\* Includes Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, Jefferson, & Weld counties.

### Oil/Gas sector

The Rocky Mountain region has traditionally been known as the "energy production corridor of the United States" or the "energy capital of the West." (Metro Denver Economic Development Council)

Growing energy consumption in the US combined with concerns about national energy security will increase reliance on and demand for US energy sources. In 2000 the nation imported 55% of oil consumed in the US. Energy demand is predicted to increase 32% by 2020, far exceeding predicted increase in domestic supply and stimulating support for domestic resource development and for new clean power technologies. (US Dept. of Energy, 2003)

"The Rocky Mountain Region clearly has a bright future for gas exploration and development. With about 40 percent of the US's proven natural gas reserves, the Rockies are hot for growth." (American Conference Institute's 4th Annual Rocky Mountain Gas Symposium, Feb. 2005)

# Colorado Economy

## *Energy Sector*

Over the next couple of years, 10 Chinese rigs -- and crews to operate at least half of those rigs -- will be imported from China to this region ... to fill the shortage of rigs in the West's booming energy industry. (*Rocky Mountain News*, July 9, 2005)

Scenario planners at Royal Dutch/Shell think that gas may surpass oil as the world's most important energy source by 2025. (*The Economist*, August 26, 2004)

Large natural gas basins and other natural resources fuel this industry cluster. Energy-related governmental agencies and research institutions also provide a strong base for the energy industry cluster in the metro Denver area.

The US Dept. of Energy's National Renewable Energy Laboratory (NREL), Golden; Colorado School of Mines, Golden; The University of Colorado Boulder, and the University of Colorado at Denver and Health Sciences Center; and Colorado State University among others are **premier research institutions in the state**.

US locations with oil, natural gas, and coal reserves will continue to enjoy economic benefits from their natural resources and production capacity. Mining is an important contributor to this industry sector. It provides the needed raw materials for products and energy to meet electricity needs in the US and the world. The combined direct and indirect economic impacts from mining are estimated at \$523.6 billion. The US is the world's second largest producer of coal. (Colorado Mining Assoc., 2003)

“Projections by the United States government and gas industry research organizations indicate that US gas consumption could increase by up to 50% from the current 22 trillion cubic feet by the year 2015. The Rocky Mountain Region contains the largest remaining potential gas resource, outside of the U. S. Gulf Coast.” (John B. Curtis, Colorado School of Mines, Dept. Geology & Geological Engineering, Golden, CO)

Metro Denver area ranks 12th out of the 50 largest metro areas in energy research employment concentration in 2003. (Metro Denver EDC)

Metro Denver ranks 4th out of the 50 largest metro areas in nonrenewable energy sector employment concentration in 2003. (Metro Denver EDC)

Metro Denver has the 2nd highest concentration of renewable energy employment out of the 50 largest metro areas in 2003.

From 2003 to 2025, the largest increase in lower 48 onshore natural gas production is projected to come from the **Rocky Mountain region**, primarily from unconventional gas deposits.

Rocky Mountain natural gas production is projected to increase from 3.7 trillion cubic feet in 2003 to 5.6 trillion cubic feet in 2025). In 2003, Rocky Mountain production was 27 percent of total lower 48 onshore production. The Rocky Mountain region's share of lower 48 onshore production is projected to increase to 38 percent in 2025. (DOE Energy Information Administration, *Annual Energy Outlook*, 2005).

Colorado produced 385 bcf of coal bed methane (CBM) in 2000 representing 52% of the state's total gas production and placing Colorado first in the United States (Colorado Petroleum Association, 2003). Two refineries operate in Commerce City: Suncor Energy USA and Valero Energy.

Workforce shortages looming. Between now and 2030, sustaining a moderated rate of global economic growth is estimated to require more than a 50% increase in energy supply, with about two thirds of this growth in the form of oil and gas. The oil and gas industry faces a number of challenges in meeting these demands, the greatest one being workforce shortages in all of the key technical skills. For over two decades, the industry has been in a persistent

# Colorado Economy

## Energy Sector

state of contraction that has reduced demand for new entrants into the industry in a number of key technical fields. It has also removed the incentives required to develop the required pool of new talent, and resulted in a severe atrophy of that pool. The consequences of these trends are both severe and imminent. The combined effects of demographics and increasing technical skill requirements are likely to pose major challenges to both recruiting and managing the workforce over the next five years. If all of the anticipated needs over that period could be satisfied, about a third of the key technical positions would turn over in just five years. (American Petroleum Institute, *Workforce Challenges Survey Results*, May 2005)

### Rocky Mountain region oil/gas companies

Recognizing the resource potential in the Rocky Mountains, large energy companies have acquired nine Colorado oil/gas companies in the past year. According to *Scandinavian Oil-Gas Magazine* (6-11-04), consolidation in the oil/gas industry is part of an ongoing cycle in which executives of small private oil and gas firms take their companies public, build up value in the company, sell it and then look to start another private company. "It just shows you that mid- to larger-sized independents (oil and gas companies) are desperate for growth and there aren't many places left you can get it," said analyst Dave Tameron of Stifel Nicolaus & Co., Denver. The Rocky Mountain region is the only area left in the Continental United States that hasn't already had its natural gas resources extensively exploited, he said.

- Prima Energy Corp. acquired by Santos Ltd., an Australian company; Tom Brown Inc., by EnCana, Calgary; Antero Resources by XTO Energy, Texas; Patina Oil & Gas by Noble Energy Inc., Texas; Inland Resources by Newfield Exploration, Texas; Prima Energy Corp. by Petro-Canada, Calgary; Evergreen Resources by Pioneer Natural Resources, Texas; Westport Resources by Kerr-McGee Corp.; Medicine Bow Energy by El Paso Corp. This is the second time in four years that Mitch Solich, Medicine Bow's owner, has sold an oil and gas company he started from scratch.
- Like many big energy producers, Houston-Based El Paso has been looking for Rocky Mountain oil and gas to supplement declining production from its maturing fields in Texas, Louisiana and Oklahoma. (Denver Post 7-20-05)

Other key players:

- Bill Barrett Corp., Denver, an oil and gas exploration firm, is expanding its exploration work and on June 15, 2005 received permission from the South Dakota Board of Minerals and Environment to start drilling in the state. It is believed there are substantial untapped oil reserves in western South Dakota. (Rapid City Journal 6-15-05). 500 employees approx.
- CH2M HILL, a global project delivery firm headquartered in Greenwood Village, CO., serves public and private clients in all areas of infrastructure, water and wastewater, transportation, energy, solid and hazardous waste, and telecommunications.
  - Clients range from the local – such as the water, gas and electricity company Colorado Springs Utilities – to the international, as with water utilities in Sydney, Australia, and Auckland, New Zealand. The company has also been involved in the restructuring of Iraq. (*Denver Business Journal*, July 19, 2004)
  - Fortune magazine in its March 7 issue named CH2M HILL one of its "Most Admired Companies" for 2005, ranking it #3 out of 582 companies so listed.
  - CH2M Hill has 14,500 employees around the world.
  - The company's projects have taken them to 110 countries on 6 continents.

# Colorado Economy

## Energy Sector

- Forest Oil, Denver, is a \$2 billion company engaged in the exploration, acquisition, development, production and marketing of natural gas and crude oil in North America and selected international locations. 500 employees approx.
- Western Gas Resources, Denver, with 729 employees in 2004, has been involved in two of the most prolific onshore US natural gas developments in the last 10 years, both of which are in Wyoming.
  - Galaxy Energy Corp., Denver, is an oil and gas exploration and production company focused on acquiring and developing coalbed methane and other natural gas properties in Montana, Texas, and Wyoming. In 2005 Galaxy Energy acquired 60% of a parcel of 4,000 undeveloped acres in the Piceance Basin in Colorado. The company is also looking into natural gas opportunities in Europe, primarily in Germany and Romania. 20 employees.
  - Galaxy Energy's subsidiary, Pannonian International Ltd., has farmout agreements to evaluate properties in Germany and Romania.
- ARCADIS, a UK company with US headquarters in Highlands Ranch, CO, is a leading, global, knowledge-driven service provider, active in the fields of infrastructure, buildings, environment and communications. Clients, in the private and public sectors, include suppliers of natural gas. There are 9,000 consultants that generate \$1 billion in annual revenues.
- Suncor Energy (U.S.A.) Inc. is a wholly-owned subsidiary of Suncor Energy Inc., an integrated energy company based in Calgary, Canada. Suncor U.S. business includes refining operations in Commerce City, Colorado and retail sales in the Denver area under the Phillips 66 brand, a products terminal in Grand Junction Colorado, and pipeline operations in Colorado and Wyoming.

## Renewable energy sector

Colorado has the resources to become one of the top ten clean energy-producing strategies in the nation.

Two technologies developed by NREL in metro Denver, were among *Research and Development Magazine's* 100 most significant innovations for 2004. The awards recognized a lower-cost method of transforming plant materials into sugars that can be used to make fuels and chemicals, and a thin-film solar cell producing electricity directly from sunlight.

North Dakota Biodiesel, Inc. plans to construct a \$50 million biodiesel manufacturing plant in Minot, North Dakota. The facility will be the largest biodiesel refinery in North America, able to produce 100,000 tons of premium biodiesel annually from more than 355,000 acres of canola. The new facility, with the first sale of biodiesel products likely in December 2006, will pump millions of dollars into the local economy and produce hundreds of jobs. (US Dept. of Energy, April 6, 2005)

There are currently 35 biodiesel production plants throughout the country. Biodiesel production and sales on average have doubled every year. Nationally, more than 450 retail filling stations make various biodiesel blends available to the public, and more than 1,400 petroleum distributors carry biodiesel and biodiesel blends. (National BioDiesel Board, July 1, 2005)

Three new ethanol plants under construction on Colorado's Eastern Plains -- in Windsor, Sterling and Evans -- will push Colorado from virtually zero production to become one of the nation's top 10 ethanol producers by the end of 2006, according to the Renewable Fuels Association. (*Denver Post*, 7-19-05)

Studies show that renewable energy production can create more jobs for the money invested since it is generally more labor-intensive than that of traditional fossil fuel-based energy.

# Colorado Economy

## *Energy Sector*

Colorado has over 300 days of sunshine per year providing the opportunity for growth in sale and installation of solar photovoltaic (PV) and solar thermal power plants.

In addition to NREL, Denver is home to one of 6 regional offices of EREN, the U.S. Department of Energy's Energy efficiency and Renewable Energy Network.

Colorado State University houses SEAL, the Solar Energy Applications Laboratory.

The University of Colorado is home to JCEM, the Joint Center for Energy Management.

The Colorado School of Mines is home to CSEM, the Center for Solar and Electronic Materials.

Thousands of companies and organizations involved in manufacturing, sales, installation, education, and advocacy of renewable energy solutions throughout the world are located in the Rocky Mountain region.

NOAA, the U.S. National Oceanic and Atmospheric Administration is headquartered Colorado.

## **Rocky Mountain region renewable energy companies**

XCEL Energy, Colorado's power company, offers wind-generated power to customers from 2 wind farms totaling 77 turbines.

Frontline BioEnergy, Inc., Colorado develops and installs integrated systems and components for conversion of plant waste material into valuable fuel and chemical products

Barlow Projects, Inc., Fort Collins develops renewable energy facilities using its proprietary combustion technology. The company has two subsidiaries: The Barlow Group, Inc., which provides consulting/engineering services to energy generation and waste-to-energy facilities worldwide; Barlow Engineering Services, which provides engineering services for the company's projects.

Community Power Corporation, Littleton, develops market-driven, cost-effective small biopower products that can be deployed around the world. For the past five years, CPC has focused its efforts in Asia, specifically in the Philippines, and in the US.

Power Energy Fuels, Inc. is a Nevada corporation with corporate offices in the metro Denver area. The company is in the forefront of the expanding alternative fuel industry.