

# COLORADO BUSINESS REVIEW

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**Inside:** Forum Keynote Address on this page. Colorado Economic Sector by Sector Update starts on page 2. Summaries of Industry Discussion Sessions from the 2007 Colorado Business Economic Outlook Forum appear throughout.



Leeds School of Business Dean Dennis Ahlburg welcomes attendees to the forty-second annual Colorado Business Economic Outlook Forum, held on December 4, 2006.

## Forum Keynote Address

### “Throw Your Hat Across the Creek”

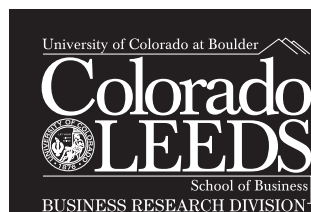
Brian Lewandowski

The Denver-based Gates Corporation is truly a global corporate model, decentralized to hedge regional risks, integrated to achieve greater efficiency, and innovative to capture emerging opportunities. Richard Bell, president of the firm, spoke of the changing dynamics in the global business community and about the results of the Gates Corporation’s “throw your hat across the creek” philosophy that signifies a “pioneering, innovative, and entrepreneurial spirit.” Strategic decisions made at Gates are similar to those that most Colorado manufacturing companies face today, including improving logistics and locations of manufacturing facilities, and entering new markets.

Gates Corporation is a long-time Colorado company (formerly the Gates Rubber Company) that dates back to 1911. The power of innovation has kept the company headquartered in Denver for nearly 100 years. Originally in the steel-tread tire business, the company evolved into the largest non-tire rubber company in the world before being acquired by Tomkins PLC in 1996. Today, the company is heavily involved in automotive original equipment (AOE), industrial original equipment (IOE), industrial general markets, and automotive secondary markets, and supplies a variety of products including hoses, belts, and connectors. Following a similar trend in Colorado, the number of Gates’ manufacturing jobs has declined over time; however, the upper echelon jobs continue to be based at the Denver headquarters.

The need to decentralize manufacturing first became apparent in the 1960s when an employee strike at Gates in Denver dragged on for months, crippling the company and exposing the risks of depending on one facility in one geographic location. Diversification of facilities was a prelude to a changing global environment where B2B

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Think Broadly.  
Act Boldly.



by Richard Wobbekind

## 2007 Colorado Business Economic Outlook: Sector Highlights



### Gross Domestic Product

**(GDP)**—The GDP is expected to register 3.4% growth in 2006. The downward movement that began in the second half of 2006 will carry through the first half of 2007. Projections call for real GDP to increase at a rate of 2.6% in 2007, the same annualized rate of

growth for the 2000–2005 period. The GDP deflator will decline to 2.5% in 2007.

**Consumption**—Moderate growth (2.8%) in consumption will be driven by a 3.3% increase in real disposable income this year. Similarly, this slower rate of growth (down from 3.2% in 2006) will be matched by slower retail sales growth (6.3%). Light truck and auto sales, a major component of retail sales, will decrease by about 2%, to 16.3 million units, as a result of overspent demand from previous creative financing programs.

**Investment**—Real business investment growth is expected to drop to 6.8% this year, from 8% in 2006. This slower rate of investment, at least in part, will bring about decreased industrial production rates (3.2%). In turn, capacity utilization in many industries will fall to levels that will decrease inflation concerns.

**Government Spending**—The solid performance of the economy over the past three years has generated higher tax revenues. As a result, the federal deficit is expected to decline to \$252 billion in 2006. A slower economy in 2007 will push the deficit higher (\$275 billion).

**Net Exports**—U.S. exports benefited from strong economic conditions in key global markets during 2006. Unfortunately, rising oil costs caused a higher than expected increase in imports, resulting in a growing trade deficit (\$629 billion). Oil prices began to taper off during the second half of 2006, which should carry over into 2007. This will lower the trade deficit, to \$615 billion.

**Prices**—Stabilized interest rates and decreased energy costs are expected to drive a decrease in the CPI, from 3.5% in 2006 to 2.5% this year. After lagging the nation significantly between 2003 and 2005, inflation rates for Colorado are again expected to match national rates. The Colorado CPI will register at 3.5% in 2006 and decline to 2.7% in 2007. Producer prices, as measured by the PPI, are expected to increase 2.2%, compared to 3.5% last year, as energy prices overall stabilize at lower rates. Employment costs, or average wage and salary levels, are anticipated to grow 3.4%.

**Population**—Nationally, the population will grow at a rate of 1%, while the state's population will increase by 1.5% in 2006 and 2% this year. Net migration will total 54,000 in 2007 in direct response to solid job increases over the past three years.

**Labor Force and Unemployment**—In 2007, the Colorado population will increase at a stronger rate than the labor force. This means that it will take unemployed workers a longer time to find a job as the unemployment rate rises to 4.8% in 2007. The national unemployment rate will increase slightly, to 5%.

**Personal and Per Capita Income**—After increasing at a higher rate for most of the 1990s, Colorado's real personal income growth rate has been similar to the nation's this decade. In 2007, real personal income for Colorado is projected to increase by 6%, compared to 5.9% for the United States. Colorado and U.S. per capita income are expected to increase at similar rates in 2007, 4.2% vs. 3.9%, respectively. Annual per capita averages will be \$40,749 for Colorado and \$37,345 for the nation.

**Employment**—About 5,200 goods-producing jobs will be added in 2007, with the addition of 3,000 jobs in construction, 2,300 workers in natural resources, and a slight decline in manufacturing. The service-producing sectors are expected to increase by a total of 37,100 jobs. In 2007, overall employment in Colorado will increase by 1.9%, or 42,300 total jobs. Compared to 2006, this lower employment growth rate reflects the slowdown in the national economy.

**Agriculture**—Livestock sales account for more than 70% of total Colorado farm gate sales. Although 2006 livestock prices were below 2005 levels, the lifting of beef bans in Asia drove record livestock sales in 2006, to almost \$4.2 billion. Drought and abnormally high temperatures caused crops, pastures, and range conditions to deteriorate rapidly during the summer of 2006. Crop prices were up compared to recent years, but drought reduced total production, especially for wheat. Total crop sales for 2006 were \$1.6 billion, and the total value of production reached record level of \$5.8 billion. Total net farm income of just under \$1 billion is projected for 2006, with reduced profits resulting from high fuel and fertilizer costs. Profits are expected to fall even lower, to \$700 million, this year based on lower prices, reduced government payments, and higher operating costs.

**Natural Resources and Mining**—While consumers have not benefited from rising energy costs, Colorado's energy sector experienced a boom from rising prices. Increased demand for energy products has resulted in growth in employment, output, and total sales. This demand is expected to continue in most energy sectors areas through 2007. The NRM sector will add 2,300 workers, for a total of 23,000 jobs this

### From the Editor

How will the Colorado economy fare this year? Read the summaries of the forty-second annual Colorado Business Economic Outlook Forum in this issue of the *Colorado Business Review*. This annual economic forecast was presented on December 4 in Denver. The half-day event included a sector by sector forecast, a Q&A panel session, a keynote address by Richard Bell, president of the Gates Corporation, and four industry discussion sessions. Highlights appear on the following pages; for additional details, visit our web site at [leeds.colorado.edu/brd](http://leeds.colorado.edu/brd) or call me at 303-492-1147.

—Richard L. Wobbekind

year. Growth will be driven primarily by increased production of natural gas. After a down year in 2006, coal production will increase to 38 million tons, with output growth constrained by limitations in Colorado's rail infrastructure. Nonfuel mineral production will increase in 2007 due to the continued rise in metal prices and the commensurate increases in gold and molybdenum prices. Sharp price increases in vanadium will result in the reopening of uranium mines in the Uravan mineral belt.

**Construction**—Between 1996 and 2005, the construction sector was one of the state's top employment drivers, adding 47,900 workers, or about 15% of the total for that period. Nationally, housing starts are projected to drop from 1.8 million to 1.6 million in 2007.

**Information**—This supersector is important to the Colorado economy because of the high-paying jobs in the telecommunications and software publishing subsectors. Between 1996 and 2005, about 9,400 information jobs were added; however, it is estimated that the supersector shed 1,600 jobs in 2006. This represents the sixth consecutive year of job losses, although this trend will reverse this year with a gain of 300 jobs. Despite the overall increase in employment, the telecommunications area is expected to lose another 500 jobs in 2007 as a result of continued consolidation.

**Financial Activities**—Between 1996 and 2005, about 30,200 jobs were added in the Financial Activities Supersector, accounting for 9.3% of the total job growth during that period.

provided by private education organizations. Private educational services employment will expand by 300 jobs this year, while the larger Healthcare Sector is expected to add 3,900 jobs. Employment growth in the healthcare sector will continue to be limited by the supply of quality labor. Overall, the supersector will increase by 2% this year.

**Leisure and Hospitality**—During the past year, the tourism industry received a \$19 million investment that will help make the state more competitive in tourism promotion. Other highlights include a record year for total DIA passengers, lift ticket sales, and casino revenues. Growth is projected in each of these areas as 4,600 jobs will be added in 2007. In the months ahead, the industry will be challenged by the volatility of

**IN 2007, OVERALL EMPLOYMENT IN COLORADO WILL INCREASE BY 1.9%, OR 42,300 TOTAL JOBS. COMPARED TO 2006, THIS LOWER EMPLOYMENT GROWTH RATE REFLECTS THE SLOWDOWN IN THE NATIONAL ECONOMY.**

Similarly, Colorado construction is projected to remain positive, but grow at a slower rate, with an addition of 3,000 jobs. The total number of residential permits will increase by 4% due to a robust multifamily segment. A large inventory of resale homes will drag down the number of permits issued for single-family homes. Total valuation of construction is expected to increase 8.3%.

**Manufacturing**—Manufacturing in Colorado is a \$14.5 billion industry, representing about 7.3% of the value of all goods and services produced in the state. Between 1995 and 2005, the sector shed 30,500 jobs. Employment losses are expected to continue in 2007 for the seventh consecutive year, with a contraction of 100 positions. The lone bright spot is in transportation equipment manufacturing, which is projected to expand employment due to increases associated with defense and aerospace spending.

**Trade, Transportation, and Utilities**—TTU is Colorado's largest provider of jobs, with 428,200 workers projected for 2007. Between 1995 and 2006, the supersector grew by a total of 41,400 jobs, with 30,800 workers added in the retail trade area alone. This year, retail trade is expected to add 3,900 jobs as the state continues to provide Coloradans with greater retail options. This employment growth is based on anticipated retail sales growth of 4.5% in 2007. The sector's high point is projected to be record traffic at DIA. More than 48 million passengers will pass through the airport in 2007. Overall, the TTU supersector will increase by 1.4%, or 5,900 positions.

The credit intermediation subsector (banks, mortgage companies, savings institutions, credit unions, and credit card issuers) has shown consistent job growth over the past 10 years. Employment gains in this area will slow in 2007 as a result of industry consolidations. Last year, the insurance subsector added 800 jobs. A favorable litigation environment, resulting from changes in the state's no-fault statute, fueled new entrants. Approximately 900 total jobs will be added in the Finance and Insurance Sector this year, with a gain of 1,400 jobs in the smaller Real Estate and Rental and Leasing Sector.

**Professional and Business Services**—As Colorado's second-largest supersector, PBS added about 61,900 jobs between 1996 and 2005, accounting for about 19% of the jobs added during that period. It was the PBS sector that led the state out of the recession in the first quarter of 2004. It is estimated that the supersector added 15,000 jobs in 2006 and is projected to gain another 13,900 jobs this year. Over the past five years, the addition of the high-paying jobs in the Professional and Technical Services (average annual wage \$67,529) and Management of Companies (average annual wage \$99,729) Sectors has helped offset the loss of high-paying positions in the Manufacturing and Information Supersectors.

**Educational and Health Services**—The EHS supersector added a total of 53,300 jobs between 1996 and 2005. Over this period, population growth, a recession that increased demand for retraining, and declines in public education budgets boosted demand for services

energy prices, high levels of consumer debt, competition from in-home entertainment alternatives, and national trends that suggest travel has become a slow-growth industry.

**Other Services**—This supersector is comprised of private businesses that provide personal services, such as auto repair shops, laundromats, and beauty salons. Because they fulfill many basic needs, growth is often contingent on population growth as much as it relies on the state of the economy. As a result, this supersector experienced positive growth during the recent economic downturn. Improved economic conditions will result in the addition of 1,200 jobs in 2007.

**Government**—As the state's population has grown, so has the need for government services. As a result, all sectors of government are expected to grow in 2007, with the exception of federal government, which will shed jobs in the U.S. Postal Service and the Department of Defense. The state government will increase by about 800 jobs, 500 of which will be added in the education subsector. As has been the case in the past, the largest growth will occur at the local level, where about 3,800 jobs will be added, split evenly between public K-12 education and local government organizations. Overall, 4,500 government workers will be added in 2007, as the government sector will grow at a rate well below the state average.

**International Trade**—An improved global economy in 2006 led to increased U.S. and



## Forum Breakout Session

# Colorado Real Estate Markets

Ginger Wolf

CU Professor and Global Real Estate Markets Chair Tom Thibodeau moderated the Colorado real estate markets session at this year's business economic outlook forum. He was joined by representatives from Cushman & Wakefield, Slifer Smith & Frampton Real Estate, and Apartment Realty Advisors.

Thibodeau got the ball rolling with a discussion of the so-called "bubble" in Colorado's housing market, determined to show the audience that the real story is "house prices are returning to their historical norm."

Appreciation rates across the state are, for the most part, very high right now: Grand Junction's rate is 8.1%—the closest to the national rate of 8.6%. Greeley is the only area of the state where the appreciation rate is not rising, and the rest are mostly in the 4–5% range.

Thibodeau next illustrated how easy it is for different calculation methods to have particular biases that affect the representation of the market. The National Association of Realtors (NAR) looks at the market through median prices. He described how this is misleading, and used Aspen as an example. "Fewer of those \$5 million homes are selling," he said. In general, prices are going up, but it is taking a little longer to sell the higher-priced homes, so the median price has decreased in short-term calculations. As a result of similar situations, the NAR's Q2 2005–Q2 2006 figures across the U.S. market show prices declining almost everywhere.

The Office of Federal House Enterprise Oversight's (OFHEO) monthly figures were released a week after the NAR reported the downward market trend, and showed price increases in the same locations because they use a weighted-repeat sales methodology.

Thibodeau estimates a decline of 23% in housing permits for 2006 from the approximately 57,200 issued in 2005. He says that all of the loss (about 10,000 permits) will be single-family, and as a result, multifamily permits will come to claim more of the market. Through October, in fact, multifamily permits were up 40%. He anticipates that overall residential numbers will increase again in 2007.

The bottom line is that while certain rates are high right now, there is no bubble—the market is returning to where it should be.

Jeff Hawks of Apartment Realty Advisors further explained a particular multifamily component: apartments in the Denver market. In

2000, the Denver market rating was an "A." The following year it fell drastically, to a "C-."

Hawks noted that the Denver market is in a good position right now as there is a large population of adults in their thirties and forties. Less than 15% of the current population is over age 55. "This is very unusual for a metropolitan area like this," and means that a generation of people moved here in the 80s to start their families.

Foreclosures totaled 24,000 in 2005 and 2006. This will make the rental market stronger as former homeowners return to renting. Hawks also described what he called the "boomerang generation," the children of baby boomers who leave their parents' homes and then come back. Some parents decide to help pay for apartments for their "boomerang-ers," and Hawks suggested that baby boomers want to see their kids in good neighborhoods and/or newly constructed buildings, which is contributing to low vacancy rates in Denver's newer units.

Construction of new apartments around the new light rail routes will be extensive; however, in keeping with past market trends, the vacancy rate will have to fall below 5% before new building will really pick up again, which is expected to happen in 2007.

Tim Richey of Cushman & Wakefield discussed large commercial real estate. Denver is becoming a first-tier city, along with Washington, D.C., Chicago, New York, and Los Angeles. To date, the city has spent \$4.7 billion on the RTD light rail expansion. Other developments include Union Station, which will total approximately \$560 million, and significant commercial projects, such as Stapleton, Lowry, and Fitzsimons.

Richey pointed out 15 projects around Denver that are currently either in planning or in progress, noting that while many people think the vast majority of growth is happening in LoDo, a great deal is going on in the east part of the city.


For some specific examples of the market trends over the last several years, Richey showed the selling prices of some office towers around Denver. A building in Interlocken sold for \$155 per square foot, and 1999 Broadway sold for \$122 per square foot at the start of 2006, but would cost \$350 a square foot to build today because of the increased value of the location. The recent sale of Qwest's Denver Service Center, at 1007 17th Street, for \$108 million to Miller Global Properties may be worth more than \$195 million in the future with proper repositioning and redeveloping.

Rod Slifer of Slifer Smith & Frampton Real Estate provided a look at the big picture of trends in residential real estate in mountain communities. Slifer said "we did have downturns in the market [in 1972 and 1982], but they were triggered by huge inventories [of mostly unsold, under construction condos] and, in both cases, an energy crisis."

Only 30% of the population in Vail is permanent, with the other 70% composed of second-home owners. As a result, prices have increased, which in turn makes it difficult to offer affordable housing for the temporary and seasonal workforce. In Aspen, the issue has already been addressed, with the appreciation capped on about 2,500 apartments, townhouses, and single-family units.

In Vail, very little land is left for development, making affordable housing, such as that which available in Aspen, very difficult. As a result of the land shortage, a large number of current facilities will be redeveloped—dubbed "the new dawn"—totaling \$1 billion in the next six to seven years. This redevelopment will build on new technological advancements. For example, when the roads in Vail were re-paved, they "put in snow melt," said Slifer, "so all our streets in the core of Vail are now snow-melted . . . [and have] cobblestones and pavers and a lot of streetscape and landscaping."

There was a feeling of optimism from all of the speakers. They indicated that the market is doing well, and pointed out efforts that are being made in Colorado to avoid falling into harsh and fast boom-and-bust cycles. According to Richey, Denver's market, particularly in commercial real estate, is "very elastic. Values in the commercial real estate sector tend to go up and down. Fortunately, the cycles tend to be getting longer, and the growth in value...has been very significant over the last 16 years."

Jeff Hawks suggested, in jest, that we keep our eyes on the Broker-Golf Index (BGI), in which the rental market is directly proportional to the golf game of brokers. "Watch what the brokers are doing, how their golf game is going. . . . The market has recovered and is going the right direction." 

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Colorado exports as the state total for 2006 grew by 18%, surpassing \$8 billion for the first time. Despite a slowing global economy in 2007, Colorado exports are expected to increase 11%, approaching \$9 billion. Approximately 40% of Colorado exports are shipped to our NAFTA trading partners, and 11% are exported to Japan and China. Colorado's top manufactured products include semiconductors, computers and peripherals, computer components, telecommunications equipment, medical instruments, and scientific/measuring equipment. About 40% of Colorado's agriculture exports are beef and meat products.

**Summary**—During most of the decade, the Western states have led the nation in economic growth. In 2007, Colorado is expected to rank fourth out of 12 western states in population growth, with a rate of 2%, behind only Nevada, Arizona, and Utah. From an employment growth standpoint, Colorado will place in a three-way tie for 8th, at 1.9%, ahead of only Oregon and California.

**Key International and National issues**

The following international and national events will shape Colorado's economy in the months ahead:

- Solid but slower GDP growth. Bright spots will be China, Australia, Taiwan, South Korea, Russia, and parts of Eastern Europe.
- The change of control in Congress from the Republicans to the Democrats.
- Curtail inflation.
- Slower U.S. real GDP growth.
- High energy costs, but their volatility will have less effect on the economy.
- Stable mortgage rates.

**Key Colorado Issues**

The following state events will shape Colorado's economy in the months ahead:

- The political pendulum has shifted in favor of the Democrats.
- With TABOR restrictions on hold, the legislature is expected to have funding to provide better services.

- Top issues facing the legislature are immigration legislation, water availability and drought, education funding, maintenance of transportation infrastructure, and sustained and controlled economic growth.
- Slower retail sales growth is anticipated.

**Around the State**

As part of the annual report, economists from around the state provided snapshots of economic activity in their areas.

**La Plata County**—Although LaPlata County enjoys significant benefits from winter tourism, the strength of the economy is provided by summer tourism and the stability of Fort Lewis College. For the past couple of years, local tourism has benefited from an absence of forest fires. In addition to tourism, energy (particularly natural gas) remains a major contributor to the local economy despite a recent drop in prices. Throughout the downturn and into 2006, LaPlata County had a lower unemployment

# Renewing Colorado's Energy Economy

Colin Hickey

The roots of wind energy trace back 6,000 years; however, modern adaptations of the technology to serve energy needs have only prevailed in the market for about 25 years. With a rich history in transportation and harnessing power for some of the most powerful machinery, the outlook for adapting the power of the wind to ease energy pressures is promising.

thousands of jobs in manufacturing, construction, and maintenance.

Electricity production makes two-thirds of CO<sub>2</sub> emissions and 90% of all nuclear waste. The capacity in the Dakotas alone could supply the nation's electricity demand and eliminate the pollutants from coal and nuclear power plants. Currently, though, a disconnect exists between wind capacity and wind development. This is primarily due to poor transmission infrastructure,

**SIMPLE WASTE-MANAGEMENT EFFICIENCY SHIFTS TO T-12 LAMPS, OCCUPANCY SENSORS, MAGNETIC BALLASTS, AND REFLECTORS COULD RESULT IN ESTIMATED SAVINGS OF \$1.9 BILLION BY 2026.**

Tom Feiler of Clipper Windpower touched on the possibilities and developmental challenges of wind energy. Currently, Europe has three times more megawatt capacity for using wind as a source of energy than the United States. Europe has seen steady progression of its wind energy production, but U.S. growth has been volatile, corresponding to the influx and disappearance of incentives, such as the Public Utilities Regulatory Policy Act. In the coming years, projections estimate that 50% of energy will need to come from renewable sources, although presently, only 9% of our energy is from renewable sources and less than .5% is from wind energy. As a point of comparison, Germany gets 10% of its energy needs from wind and Denmark uses 30% wind energy. These astonishing figures are a result of strong government incentives and aggressive policy with goals of reducing pollutants and dependency on fossil fuels.

The wind energy industry is the fastest-growing renewable industry, with annualized growth from 1990–2002 above 22%. The United States has approximately 80,000 turbines that produce 60,000 megawatts—equal to 60 nuclear power plants. Although President Bush stated that 20% of our energy could come from wind, incentives for development/efficiency and tax relief have come and gone. With current renewable portfolio standards, which require a percentage of energy to come from renewable sources, and the Production Tax Credit, which grants 1.9 cents/kilowatt hour generated, plans are in the works to build the world's largest wind farm in central South Dakota. It would be one of the nation's largest power plants and generate \$6.5 million in revenues for land leasers, \$17 million in tax revenues, and

where input energy is lost along the power lines. Additionally, it costs between \$300,000 and \$500,000 per mile to build this infrastructure. Technological advancements, such as superconducting power lines, are essential to the further development of wind capabilities.

Technological advances have made wind energy a feasible investment. Turbine diameters have increased more than five times since the mid-eighties. With these innovations, there is a “cubed” relationship between the amount of energy captured and amount of energy produced. Furthermore, as production cost increases arithmetically, productivity increases exponentially.

In a more focused look at Colorado's energy climate, Holli Baumunk of the Metro Denver Economic Development Corporation addressed Colorado's renewable goals. Seeking to be “the balanced energy capitol of the West,” an energy efficiency report documented the cost-effectiveness of transitioning to efficiency. Companies desire to improve efficiency but lack the means. The report titled, “Energy: Metro Denver Industry Cluster Profile,” links brokers and developers to foster improved efficiency and savings.

An overwhelming majority of Colorado's energy consumption comes from electricity use, most of which, in turn, is simply from lighting energy (nearly 5,000 gigawatt-hours per year). Simple waste-management efficiency shifts to T-12 lamps, occupancy sensors, magnetic ballasts, and reflectors could result in estimated savings of \$1.9 billion by 2026. A gradual transition, furnishing new buildings with these efficiency measures and retro-fitting existing buildings to include these features, could result in enormous energy savings.





From left to right, Mike Englund of Action Economics, Tim Sheesley of Xcel Energy, and Brian Vogt of the Office of Economic Development and International Trade respond to audience questions at the Outlook Forum.


Improved technology has accelerated the return on investment, making efficiency goals more feasible.

If this energy switch is voluntary, strong initial value propositions need to be put in place for businesses, including rebates, technical assistance, and incentives. Strong internal management is necessary to optimize the timing of these investments and create a climate that encourages companies to consider efficiency when building.

The final panelist, John Tobin of the Energy Literacy Project, was quick to point out that no economic activity occurs without energy. Although various forms of energy compete for their market share, the global economy needs them all. As Tobin put it, “A BTU by any other color is still a BTU.” All energy comes from the sun regardless of the form, whether photovoltaics, wind, hydro, or bio-mass energy. For growth, the economy needs more total BTUs, not competition between forms, and if more BTUs become available, they will be put to use. An energy-informed public is the first step toward a national energy policy, which, theoretically, would regulate cost by minimizing risk premiums.

Ultimately, a balance exists between energy, the economy, and the environment. At the present, many of the available BTUs are wasted by leaving the computer on, or driving with underinflated tires, or inefficient transmission and conversion

from one form of energy to another. One way to curb energy consumption is to focus on these and other efficiency measures. Consumers want BTUs, but they approach productions with the philosophy “not in my backyard.” With the oil shale, coal, and natural gas resources in Colorado, there is tension between energy availability and the “price of pristineness” of the environment. In order to supply reliable sources of energy to fuel economic activity and improve quality of life, the following elements are needed: well-informed consumers; a stable political climate; sustainable regulations; and viable, long-term technological development and science.

With the Colorado School of Mines, National Renewable Energy Laboratory, and the acumen of state’s population as resources, the state is at the forefront of renewable research. Alternative energy forms could play a large role in Colorado. The state contains the headwaters of five major rivers with the potential to produce 4.4 million megawatt hours of electricity from hydropower. Moreover, the state’s southwest location provides between 5,000 and 7,000 watt hours per square meter per day. 

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## **Forum Breakout Session**

# **Nanotech, Weather, Climate, and Energy: The R&D Impact on Colorado's Economy**

Brian Lewandowski

Research and development is an integral component of Colorado's economy. Federal laboratories alone add \$681 million in payroll and budgets, which have an estimated \$1.8 billion multiplier effect. Indirectly, the impact is far greater as the research puts Colorado at the forefront of technology, generates spin-out businesses via tech transfer, and creates technology clusters. The "Nanotech, Weather, Climate, and Energy: The R&D Impact on Colorado's Economy" breakout session provided insight into the impact of R&D on Colorado's economy, the laboratories spawning research and development, and the emergence of nanotechnology as a developing, and significant, technological hub. It also offered an example of public-private collaboration between NOAA and Vaisala.

Colorado's research diamond comprises clusters of research institutions and federal laboratories.

### **Golden**

- National Renewable Energy Laboratory (NREL)
- Colorado School of Mines (CSM) Denver
- Fitzsimons Campus of the University of Colorado
- Denver Health Sciences Center and the University of Colorado Hospital

### **Fort Collins**

- Colorado State University

### **Boulder**

- National Center for Atmospheric Research (NCAR)
- National Oceanic and Atmospheric Administration (NOAA)
- National Institute for Standards and Technology (NIST)
- National Technology and Information Administration (NTIA)
- University of Colorado at Boulder


Tom Clark with the Metro Denver Economic Development Corporation noted that "between 1999 and 2002, 6.5% of GDP [was] attributable to R&D—\$178 billion. By contrast, all of commercial and other buildings con-

structed in the United States at that same time contributed 2% to GDP." As the value of these laboratories is realized, the attractiveness to other states increases. Clark argued, "The economy of laboratories at the federal level has nothing to do with supply and demand; it has to do with how many electoral votes you have in Congress, and Colorado does not have a great deal." Colorado benefits as one of the top five states with the greatest concentration of scientists and engineers, and despite this concentration, very little of the state's General Fund is spent on research.

Colorado is at the forefront of renewable and sustainable energy, and is led by a collaborative effort between Colorado's research institutions and NREL. According to Susan Avery, University of Colorado at Boulder, NREL is "working on improving the composition of the characteristics of plant materials used in making ethanol." By improving the plant structure, efficiency gains can be achieved in bio fuels. The NIST laboratory in Boulder has on display the first atomic clock, accurate to 1 second in 80,000 years. Atomic clocks have important applications in global positioning systems, cellular phones, and the national power grid, all which require precise synchronization. Scientists are working on low-power, chip-scale atomic clocks the size of a grain of rice. Recently, significant improvements to the atomic clock have been made at the EUV Center in Fort Collins.

Avery pointed out the risk of changing climate conditions, asserting the "preponderance of enhanced drought and less water in the Colorado river basin." NOAA's climate research includes a study of the spawning ground for hurricanes in order to make more accurate severe weather predictions. NOAA embraces technology transfer relationships in order to employ and commercialize technological breakthroughs, such as the cooperative research and development agreement (CRADA) between NOAA and Vaisala. The company is in the business of developing, manufacturing, and marketing products and services for environmental and industrial measurement. It licensed wind profiler technology, and created a commercial product. It now pays royalties back to NOAA. Vaisala's core business develops and markets sensors that are used to measure the weather: wind speed, wind direction, temperature, humidity, and pressure. Ron Shellhorn, strategic business unit manager for

Vaisala, admitted that his unit "is totally dependent on a licensed technology developed at NOAA."

According to Debbie Woodward, executive director of the newly formed Colorado Nanotechnology Alliance (CNA), the organization will lead the consortium of federal facilities, research institutions, and private companies working in nanotechnology. Nanotechnology is the science of manipulating extremely small particles of matter (1–100 nanometers)—about 75,000 times smaller than the width of a human hair, or one billionth of a meter. Colorado companies are leveraging the state's science and technology assets for nanotechnology. About two-thirds of the 75 companies are located in Boulder and Jefferson counties near the federal laboratories, CU, and CSM. The symbiosis between CU and the business community was evident in October with the opening of the Nanomaterials Characterization Facility in Boulder and the DARPA Focus Center on Nanoscale Science and Technology for Integrated Micro/Nano-Electromechanical Transducers (MINT) in Boulder. More than 250 individuals attended, including 100 from the business community. These centers symbolize the collaboration between faculty, students, and businesses across the state. Colorado's promising nanotechnology sectors include homeland security, bioscience/biomedical, aerospace, electronics, defense, and energy. 

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## **Forum Breakout Session**

# **The Aging Workforce and Its Interaction with Industry**

Luke Willoughby

As an eager audience listened intently, the panel members of “The Aging Workforce and Its Interaction with Industry” breakout session discussed “a growing concern” at this year’s Colorado Business Economic Outlook Forum. Moderator Booker Graves, with the Office of Workforce Development, was backed by a three-person panel that included Elizabeth Garner from the Colorado Department of Local Affairs, Joseph Winter of the Colorado Department of Labor and Employment, and Deena Kemper, program coordinator of the Arapahoe/Douglas Workforce Center.

Elizabeth Garner began by discussing Colorado demographic trends and population forecasts. She focused on baby boomers—people who will be between 41 and 62 in 2007—and their influence in the future. Colorado currently ranks sixth in the nation, with baby boomers composing 31% of the population. As these workers age and begin to retire, stress will be placed on companies to fill jobs with qualified workers.

After this background, Garner then underlined Colorado’s future opportunities. This next generation of retirees will be far wealthier than any before; thus, job growth and profits in housing, transportation, and healthcare areas are expected. An estimated 210,000 jobs will be created from retiree spending alone by 2030.

The second panelist to speak was Joseph Winter, who focused on the aging of Colorado’s workforce. He introduced the Colorado Department of Labor and Employment’s Labor Market Information ([coloradoworkforce.com/lmi/](http://coloradoworkforce.com/lmi/)), which is a package of programs and data sources that contain employment numbers, statistics, and estimates from around the nation.

The main program of LMI is the QCEW, which is collected from tax records and organizes employment and wage information by location

and industry. However, the most commonly used program is the CES, which is revised monthly and is ideal for finding the most up-to-date industry labor estimates. Another data set, LAUS, features employment data from QCEW and CES. It shows detailed information about labor market areas, including every city in the state with a population over 25,000. The final program, OES, can be used to find specific occupational wages for any industry.

Considering that most baby boomers will retire for good in the future, anyone who wants to continue to work should have adequate opportunities. Sharpened job-hunting skills will help their prospects.


The Arapahoe/Douglas Workforce Center, which is located in Aurora, helps thousands of clients improve their skills and confidence and provides interview opportunities with companies. It conducts numerous small work groups

### **COLORADO CURRENTLY RANKS SIXTH IN THE NATION, WITH BABY BOOMERS COMPOSING 31% OF THE POPULATION.**

With these tools at hand, Winter proceeded to break down each of the Colorado industries that drive the state’s economy, which range from Natural Resources and Mining to Financial Activities. He presented a plethora statistics, including age distribution, average weekly wages (AWW), and the percentage of workers who are baby boomers. Natural Resources and Mining has the highest AWW, \$1,600, and Leisure and Hospitality has the lowest, with \$328. The Government Supersector employs the largest percentage of baby boomers, almost 50%, while Leisure and Hospitality has the fewest, with just 20%. Changes brought about by the aging workforce will bring uncertainty to these driver industries.

In the final presentation, Deena Kemper, program coordinator of the Arapahoe/Douglas Workforce Center, spoke about a possible solution to ease an impending workforce shortage. The center focusing on helping those over age 50 who have experienced a layoff, a career switch, or any other unexpected employment change. Clients are invited to attend job fairs, recruitment activities, support groups, workshops, and may request help with their resumé.

and help sessions year-round. Its main event is the semi-annual job fair that attracts more than a thousand job seekers and hundreds of employers. The next fair will be in March. For more information, visit the workforce center’s web site at [www.adworks.org](http://www.adworks.org).

As Colorado residents and workers grow older, the focus and clarity of the future might blur, similar to the vision of a baby boomer. Regardless, the state will adapt to any changes just as it has in the past. As the panel members suggested, an aging workforce should not prevent the state from continuing on its same progressive economic path into the future. 

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LMI	Labor Market Information	<a href="http://www.coworkforce.com/lmi/">http://www.coworkforce.com/lmi/</a>
QCEW	Quarterly Census of Employment and Wages	<a href="http://www.coworkforce.com/lmi/es202/index.asp">http://www.coworkforce.com/lmi/es202/index.asp</a>
CES	Current Employment Statistics	<a href="http://www.coworkforce.com/lmi/ces/ceshome.asp">http://www.coworkforce.com/lmi/ces/ceshome.asp</a>
LAUS	Local Area Unemployment Statistics	<a href="http://www.coworkforce.com/lmi/ali/lfp.asp">http://www.coworkforce.com/lmi/ali/lfp.asp</a>
OES	Occupational Employment Statistics	<a href="http://www.coworkforce.com/lmi/oes/oesmain.asp">http://www.coworkforce.com/lmi/oes/oesmain.asp</a>

rate than Colorado and the nation. Per capita personal income in the county has improved in recent years and is higher than surrounding counties. The most current data reflect 2004 per capita income of \$31,887 for the county, compared to \$36,113 for Colorado. Population for the area continues to grow at a rate of about 3%, well above the state average. This growth has occurred despite the county having a median home price of \$325,000.

**Mesa County**—Mesa County weathered the 2001 recession better than other regions in Colorado due to increased economic diversity, and it is now experiencing growth

at a stronger rate than most other parts of the state. The energy and construction sectors are driving much of the region's growth. As a point of reference, construction activity in both 2005 and 2006 doubled the total activity in 2000. In addition, construction employment is expected to increase nearly 50% through 2014. The bulk of Mesa County's economy—other services, retail, healthcare, and government—is expected to grow in conjunction with expansion of the energy and construction segments. Mesa County is a regional medical, service, and retail hub that serves a half million people in western Colorado and eastern Utah. The largest unknown for the county and region is the future of oil shale as a source of domestic oil.

**Northern Colorado**—The northern Colorado economy (Larimer and Weld counties) continues to outpace the state in employment growth. In September 2006, the unemployment rate in northern Colorado reached 3.7% as underemployment became a concern. Growth in the following areas continues to drive the regional economy: accommodations and food services, finance and insurance, healthcare and social assistance, retail, and construction. These categories have accounted for about 85% of the new jobs since 2001. On the downside, the manufacturing sector continues its slide. Looking ahead, it will be interesting to see if regional consumer retail demand will match the supply. While national forecasts predict that the manufacturing sector will expand in areas important to northern Colorado, the region remains at risk due to the relative significance of a few large employers. Although increased energy prices have played havoc with the national economy in 2006, Weld County has enjoyed significant growth in energy extraction due to the increase in demand for oil and natural gas.

**Pueblo County**—Pueblo is poised for stable job growth and will likely weather the impending slowdown fairly well. The area's economic expansion has been fueled by a combination of growth in residential construction, expanding employment, and several large construction projects, all of which appear likely to continue through 2007. Residential projects include the Westridge subdivision and McCulloch Ranch, and smaller commercial projects include the Cingular Call Center and headquarters for the Professional Bull Riders and Community Banks. Larger projects include the \$225 million GCC American cement plant and the \$1.3 billion Xcel power plant. Although job growth remains below the state level, Pueblo remains an attractive place to work because of very inexpensive housing prices.

**Southern Colorado (El Paso County)**—The southern Colorado economy showed significant slowing during 2006, led by weak residential construction, new car sales, enplanements, consumer sentiment, and increased foreclosures. On the positive side, wages and retail sales were higher, gains were made in employment, and unemployment fell. However, continued sluggish growth is expected through 2007. The effects of the current slowdown are not expected to be as serious as in 2001-2003. The ability to weather the storm is attributed to a more diverse local economy, increased importance of small businesses, and the expected large infusion of military personnel and their families in 2008. ☐

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**Patty Silverstein, president of Development Research Partners and chair of the Manufacturing Committee, comoderated the 2007 forecast along with Richard Wobbekind.**

customers demand just-in-time inventory stocks and products within close proximity for greater efficiency of their supply chains. Gates was at the front of this curve, building small manufacturing facilities on the East Coast of the United States and Canada in more remote communities close to their customers. This effectively solved the problems of underdiversification, and the inefficient shipping of raw materials to Denver and final products back east. This model was further refined when Gates became a fully owned subsidiary of Tomkins. Some inefficiencies existed in operating many small facilities due to fixed overhead costs, making the company more susceptible and less resilient to economic shocks. Gates adapted by condensing operations to fewer, large regional facilities.

Now, Gates faces a global consumer environment—“global meaning that the customers want the same product delivered anywhere in the world,” according to Bell. This refers not only to the same specifications, but to the same quality and processes. The company’s proactive diversification started in the 1960s in Canada, Mexico, and Europe. The firm is now located in 21 countries around the world, and is always at the forefront of emerging economies: Japan, followed by Korea, and then China and Thailand. Gates is currently augmenting its presence in Eastern Europe and Russia, and exploring opportunities in South Africa and the United Arab Emirates. “Our common areas of geographic focus in investment are in the United Arab Emirates. People might gasp at that and think it is a bit risky, but entrepreneurial spirit and opportunity tend to be where other people do not want to go at the time,” said Bell.

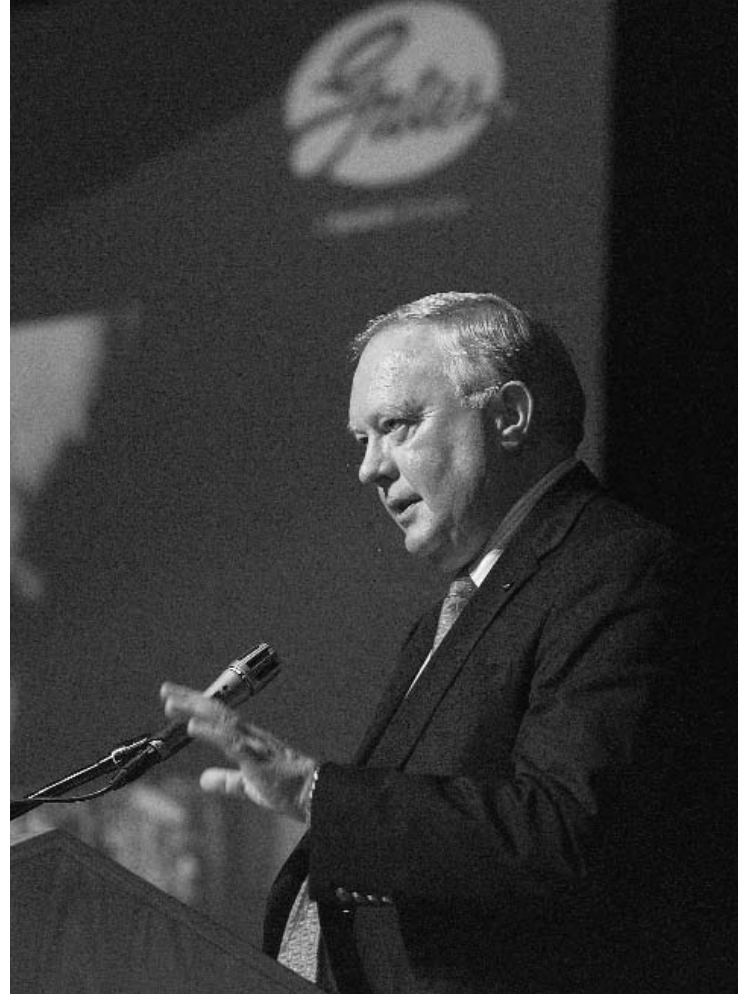
Diversification, however, does not end at the country level. Even though Gates’ main attraction to new markets and communities

revolves around engine manufacturers, the company strives to not depend on single customers by building plants that also manufacture for aggregate global demand and regional industrial demand. As Bell puts it, “no plant is too dependent on any one country, any one market, or any one product.”

Only an aggressive growth strategy can warrant such ambitious measures that include following engine manufacturers into emerging markets. For Gates, that translates to a 10-10-10 strategy: 10% growth in each line of business, 10% return on invested capital, and 10% operating profit. Realizing that 10% growth is an aggressive goal, the company seeks expansion both organically through market share, innovation, and new products, but also makes strategic acquisitions that are in similar product fields and provide Gates with a new growth platform.

Bell refers to the distribution in the North American market as revolving around “velocity, which basically means how fast can you deliver product to [the customer].” Companies up and down the supply chain are seeking to gain incremental benefits in working capital, inventory, and distribution. Coordinating logistics is a key component that Gates has adopted through Corelinks, meaning that Gates basically shares logistics services, including warehouses and ecommerce, with other significant manufacturers. This has allowed it to improve distribution by a factor of three (i.e., instead of shipping weekly to the West Coast, Gates can now do it every other day). Bell asserts, “The trend is generally to smaller shipments more frequently.”


Global scale distribution, however, is different. Until five years ago, transportation regulation in Europe led transporters to carry loads across borders and return empty. Bell estimated that only 8% of distribution in Europe is in the hands of pan-European distribution



**Richard Bell, president of the Gates Corporation, asserted “... entrepreneurial spirit and opportunity tend to be where other people do not want to go at the time.”**

chains, compared to 40% in the United States. In Asia, the distribution situation is even worse, presenting additional logistical challenges for a global manufacturing company. Still, Gates pointed to increasing developments in global transportation, stating that these markets have the opportunity to “skip some points of development along the way. Get much more out of e-commerce and the use of the web, where Western Europe and the United States went through a 20- or 30-year cycle of changing things.”

Bell said there is no need for centralized manufacturing when standards vary globally, and explained that vehicle tires have

different standards around the world. Rather, Bell notes, “Global is a state of mind. It doesn’t mean standardized.” 

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## CHANGES IN COLORADO NONAGRICULTURAL WAGE AND SALARY EMPLOYMENT (In Thousands)

Sector	2005	2006 <sup>a</sup>	2007 <sup>b</sup>	2006 New Jobs <sup>a</sup>	Percentage Change	2007 New Jobs <sup>b</sup>	Percentage Change
Natural Resources and Mining	17.1	20.7	23.0	3.6	21.1%	2.3	11.1%
Construction	160.1	167.3	170.3	7.2	4.5	3.0	1.8
Manufacturing	150.6	150.3	150.2	-0.3	-0.2	-0.1	-0.1
Trade, Transportation, and Utilities	413.5	422.4	428.2	8.9	2.2	5.8	1.4
Information	77.3	75.7	76.0	-1.6	-2.1	0.3	0.4
Financial Activities	158.1	161.5	163.8	3.4	2.2	2.3	1.4
Professional and Business Services	316.2	331.2	345.1	15.0	4.7	13.9	4.2
Educational and Health Services	224.5	229.0	233.5	4.5	2.0	4.5	2.0
Leisure and Hospitality	257.3	263.1	267.7	5.8	2.3	4.6	1.7
Other Services	88.6	89.5	90.7	0.9	1.0	1.2	1.3
Government	363.0	368.0	372.5	5.0	1.4	4.5	1.2
Total	2,226.3	2,278.7	2,321.0	52.4	2.3%	42.3	1.9

<sup>a</sup>Estimated.

<sup>b</sup>Forecast.

Note: Due to rounding, the sum of the individual sectors may not equal the total.

Source: Colorado Department of Labor and Employment and Colorado Business Economic Outlook Committee.