



2035 Statewide Transportation Plan

Economic Connection

TECHNICAL REPORT

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INTRODUCTION

The Link Between Transportation and the Economy

The quality of life and economic successes that Colorado residents and businesses enjoy are made possible by an affordable, safe and efficient transportation system. Manufacturers and farmers alike rely on the network to access markets and to receive supplies. Businesses rely on it to conduct face-to-face meetings with customers and business associates. Residents rely on it to reach jobs, shopping destinations, schools, health care facilities, and leisure travelers to reach recreational and tourist sites. Colorado's economic health and its ability to remain competitive with other states depend on the efficient transport of people and goods.

The link between transportation and economic development revolves primarily around the ability of new investments to 1) lower the transportation costs borne by businesses and individuals, and 2) create jobs and spending capacity. For instance, an investment in a highway or other transportation facility improves productivity because it enables more product to be produced per dollar spent. In turn, this results in economic development, simply defined as an increase in income and product generated in an area.

Economic Growth Sectors

As the 2035 Statewide Transportation Plan has been developed, discussions around the state with elected officials and the general public have consistently revealed concern about the growth being experienced and the ability of the transportation system to adequately serve that growth. In addition to the population growth that is underway, a number of industry sectors are frequently mentioned which will impact or be impacted by the transportation system.

Energy – The production of coal bed methane, natural gas, coal, oil shale and oil has boomed in recent years and is expected to grow much, much more in the future, predominately in western Colorado. Wind power and agriculture-based fuels are gaining ground in eastern Colorado. Commuting of employees and transporting both product and materials place unprecedented demands on underdeveloped transportation facilities.

Tourism – Tourism is one of the largest elements of Colorado's economy, and it is also critical to the economy of many communities. With visitor spending in Colorado amounting to \$8.9 billion in 2006, it is important to most regions of the state. Safe and convenient transportation is essential to a quality visitor experience.

Military – With military expansion and consolidation, the Colorado Springs area is expected to grow substantially. The arrival of over 22,000 military personnel, civilian personnel and their families with the expansion of Fort Carson in the next four years will have a discernible impact on the community and its transportation system. While it has been estimated that the expansion will bring a \$700 million annual boost to the economy, the movement of people, equipment and supplies will place additional demands on the transportation network.

Agriculture – With over 31.3 million acres of land in farms and ranches in Colorado, it is little wonder that agriculture comprises a large portion of the state's economy, accounting for nearly \$5 billion in annual marketing receipts. Agriculture depends on the ability to move farm products to market and on the delivery of supplies necessary to conduct business.

Diverse Perspectives

In order to understand the economic benefits of transportation improvements, it is important to recognize that there are many perspectives from which economic benefits can be considered:

Individual:	Time savings and increased productivity Savings in vehicle operating expenses Savings in vehicle maintenance costs Safety enhancement Increased employment opportunities Improved access to recreation areas Improved quality of life
Consumer:	Lower prices due to reduced transportation costs Greater choices with more competition
Business:	Lower vehicle operating costs Lower vehicle maintenance costs Greater reliability for “just-in-time” business Ease of conducting business

Each of these factors represents an economic benefit, some of which can be quantified and others which cannot.

ECONOMIC BENEFITS OF INVESTING IN COLORADO'S TRANSPORTATION SYSTEM

Although the link between transportation and the economy seems intuitive, in 2006 the Colorado Department of Transportation (CDOT) researched numerous studies from across the country and conducted focus group sessions throughout Colorado to begin to better understand the economic benefits of transportation investment. Based on the findings of this research, CDOT has proceeded to evaluate statewide economic benefits under alternative transportation investment scenarios in order to better establish the link between transportation investment and economic growth in Colorado.

This research focused on the benefits of additional transportation spending above a baseline investment scenario. The scenarios chosen for evaluation represent the different levels of investment identified in CDOT's 2030 Statewide Transportation Plan (2030 Plan). The baseline "Forecast Revenue" scenario represents investments that can be made with current revenue projections. The alternative "Sustain Current Performance" scenario assumes that Colorado can raise additional funds to keep transportation system performance at current levels. **Table 1** summarizes the characteristics of these two investment scenarios.

Table 1. Baseline and Alternative Investment Scenarios

Forecast Revenue	Sustain Current Performance
\$75 billion	\$123 billion
CDOT's current revenue projections through 2030	Sustains existing system performance
System deterioration	Addresses backlog of maintenance issues
Does not meet CDOT's 2030 Vision	Does not meet CDOT's 2030 Vision

Source: CDOT 2030 Transportation Plan, 2005.

The study team evaluated the economic benefits associated with the additional transportation investment of \$48 billion under the Sustain Current Performance scenario in comparison to the Forecast Revenue scenario. The team used available CDOT data, findings from other states and other secondary sources to estimate these effects. Many of the benefits could not be quantified in this preliminary study. Such benefits were instead qualitatively addressed.

Quantifiable Benefits of Transportation Investment

If CDOT's current resource projections are the only funds available, conditions on the transportation system will continue to degrade in the future. Under this scenario, by 2030 the pavement condition of only 32 percent of the state's highways will be rated good or fair, and 25 percent of the lane miles on state highways will be congested. Peak period drivers will spend an average of 53 hours in congestion related delays in 2030 at an annual cost of about \$500 per driver, and popular recreation destinations will become more difficult to reach. Further, as transportation costs and delays increase, Colorado will become a less attractive place to do business. It is estimated that in 2030 the cost of this delay will amount to more than \$0.74 billion in wasted time and fuel for Colorado businesses.

Colorado residents and business owners are interested in the types of benefits that affect them on a daily basis. These benefits include safer roads, less time wasted in traffic, more money in their pockets and more jobs. By the year 2030, additional transportation investment would have an average annual benefit to each Colorado household of \$1,578, or \$624 per Colorado resident. **Table 2** presents these types of benefits for the year 2030 under the Sustain Current Performance scenario. Benefits presented here represent annual benefits in 2030 compared to the Forecast Revenue scenario.

Table 2. 2030 Benefits of Increased Transportation Spending Under the Sustain Current Performance Investment Scenario

Benefit	Annual Benefit to Colorado in 2030
Reduced congestion	<ul style="list-style-type: none"> • 26 hours of time saved (per resident) • 30 gallons of fuel saved (per resident) • \$1.7 billion in travel time savings for households • \$240 in travel time savings (per resident) • \$0.6 billion in savings for Colorado businesses
Better pavement quality	<ul style="list-style-type: none"> • \$0.9 billion in reduced vehicle operating costs for households • \$205 in savings (per vehicle) (\$120 per resident) • \$0.2 billion in savings for Colorado businesses
Safety improvements	<ul style="list-style-type: none"> • 12,100 fewer accidents • 4,300 fewer accidents involving injuries • 140 lives saved • \$0.5 billion in reduced economic losses
General system improvements	<ul style="list-style-type: none"> • 10,900 new long-term jobs • \$0.7 billion in increased personal incomes • 28,000 additional construction-related jobs • Increased economic competitiveness • Improved access to health and human services • Increased visitation to tourist destinations

Source: “*Statewide Economic Benefits of Transportation Investment*”, BBC Research and Consulting and Felsburg Holt & Ullevig, 2007.

Shorter travel times. Under the Sustain Current Performance scenario, Colorado residents would save 26 hours per year from reduced congestion-related delays and improved pavement quality. Less time spent in stop-and-go traffic would reduce annual fuel consumption by 30 gallons per resident. The value of these savings total more than \$1.7 billion for Colorado households (\$240 per resident) and \$0.6 billion for Colorado businesses in 2030.

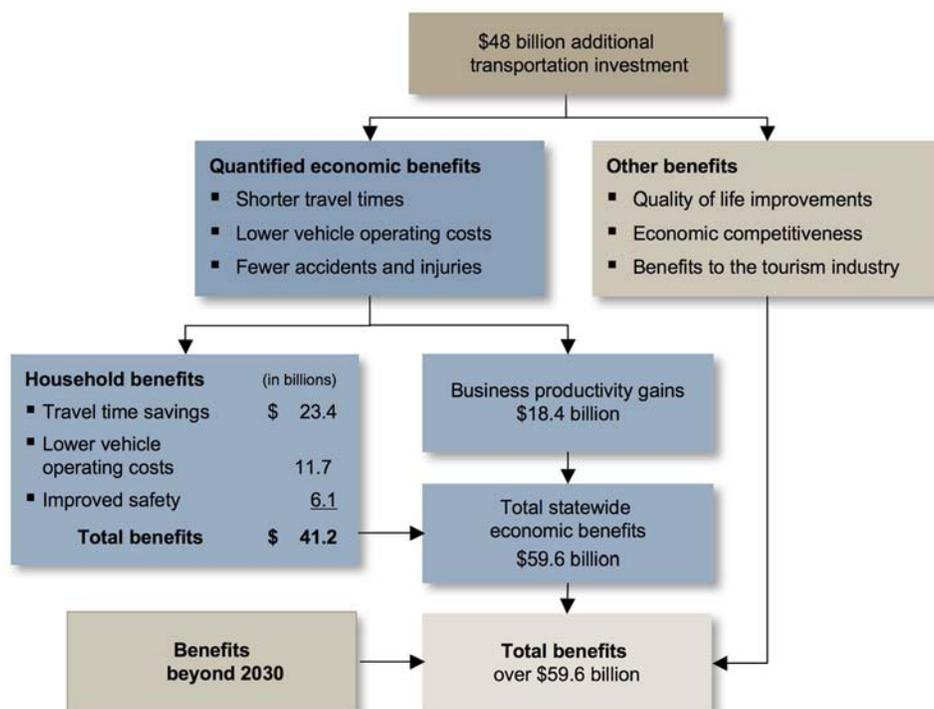
Reduced vehicle operating costs. Compared to current revenue projections, sustaining the current transportation system would significantly improve roadway conditions. This would reduce general wear and tear on vehicles and would result in lower vehicle repair, maintenance, insurance and depreciation costs. In 2030, improved pavement conditions under the Sustain Current Performance investment scenario would save Colorado residents \$0.9 billion in vehicle operating costs (\$205 per vehicle). Colorado businesses would save \$0.2 billion from reduced vehicle operating costs.

Fewer accidents and injuries. Additional investments that improve the safety of Colorado's roads could result in 12,100 fewer accidents in 2030. This includes 4,300 fewer accidents involving injuries. There could be 140 fewer fatalities in that year. In turn, Colorado residents and businesses would save \$0.5 billion in medical care and insurance expenses, lost workplace productivity and personal property damage in 2030. Improved safety conditions under the Sustain Current Performance scenario could also lead to lower automobile insurance rates for Colorado residents.

Business expansion and attraction. The benefits described above reduce the cost of doing business in Colorado and improve business productivity. Local businesses would expand and new businesses would locate to the state, creating more jobs, higher incomes and greater overall economic productivity. On an average annual basis, these benefits would create 10,900 new long-term jobs for Colorado residents, increasing personal incomes by \$0.7 billion compared to the Forecast Revenue scenario. This does not include construction-related jobs from additional transportation spending.

Summary. The 2030 Statewide Transportation Plan indicates that between now and 2030 Colorado will need an additional investment of \$48 billion beyond current revenue projections to sustain current levels of transportation system performance. Over the 26-year investment timeframe, the economic benefits of this additional investment amount to \$59.6 billion in travel cost savings and additional income for Colorado residents arising from business expansion and attraction benefits.

Thus, of the economic benefits the study team was able to quantify, the benefits would exceed the required investment by \$11.6 billion (2005 constant values). To account for the difference in the timing of costs and benefits, the study team also compared the total value of future investments and benefits through 2030 in "present value" form. This analysis shows that even with the most conservative of estimates, total benefits would still exceed the additional investment costs. **Figure 1** summarizes total economic benefits over the 26-year investment timeframe.

Figure 1. Statewide Benefits of Increased Transportation Investment through 2030

Source: "Statewide Economic Benefits of Transportation Investment", BBC Research and Consulting and Felsburg Holt & Ullevig, 2007.

Non-quantifiable Benefits of Transportation Investment

Additional benefits of transportation investment under the Sustain Current Performance scenario include improved quality of life for Colorado residents and a healthier state economy. Although it is difficult to place a dollar value on many of these types of benefits, recent studies can demonstrate the importance of these benefits for Colorado.

Economic competitiveness. The quantified benefits of business expansion and attraction include the direct and indirect effects of the reduced cost of doing business in Colorado. The study team did not capture benefits for businesses associated with increased access to inputs or expanded market areas. These factors are difficult to determine because states throughout the U.S. are facing similar transportation funding challenges. If other states choose to improve their transportation systems, this will reduce the gains in economic competitiveness of Colorado.

Benefits to the tourism industry. Transportation improvements can encourage Colorado residents and out-of-state visitors to make more frequent and longer trips to Colorado's tourist attractions and recreation areas. This is particularly important in Colorado, where tourism is more than an \$8 billion industry that constitutes over 12 percent of the state economy.

Findings from the I-70 Programmatic Environmental Impact Statement (I-70 PEIS) demonstrate the importance of transportation investment for Colorado's tourism industry. The I-70 PEIS indicates that accommodating tourism growth in the I-70 corridor would increase visitation to surrounding recreation areas by up to 8 percent in the summer and 5 percent in the winter in 2030. This could increase out-of-state visitor spending by more than \$0.4 billion in the I-70

corridor in the year 2030. Transportation investment in other parts of the state would generate additional recreation and tourism benefits.

Quality of life. Under the Sustain Current Performance scenario, system reliability and mobility improvements would provide Colorado residents with greater freedom of travel, including choice of route, time of day, destination and mode. Public transportation improvements in metropolitan areas would increase access to jobs and other services, provide more travel options and result in cost savings for Colorado residents. Improved public transit systems would also serve a broader population of seniors, disabled citizens and economically disadvantaged residents.

Short-term construction benefits. Additional transportation investment creates immediate demand for construction services, raw materials and other goods and services. This demand ripples through the economy, creating secondary effects. Conservative estimates from studies in other states indicate that transportation expenditures under the Sustain Current Performance investment scenario could support more than 28,000 new jobs per year through 2030, increasing personal incomes in Colorado by more than \$1.0 billion. (Consistent with economic impact and benefits literature, these impacts are not included in the measure of total economic benefits.)

Efficient transportation investment. Under current revenue projections, CDOT and local authorities will not be able keep pace with the maintenance requirements of the state's transportation system. This would result in the costly rebuilding of roads and other infrastructure that deteriorate beyond the point of repair. With additional transportation investment under the Sustain Current Performance scenario, preventative maintenance would replace costly reconstruction, saving Coloradans money. The cost savings from keeping up with required maintenance would accrue beyond 2030, but are not quantified here.

Benefits of the 2030 Vision

The 2030 Statewide Transportation Vision balances local, regional and statewide transportation needs through an integrated system of statewide corridor investments. These investments extend beyond what is included in the Sustain Current Performance scenario, and would require an additional \$55 billion.

The 2030 Vision improves the state's economic competitiveness and enhances the quality of life of Colorado residents beyond what would be achieved under the Sustain Current Performance scenario.

Improved safety. Additional transportation investment under the Vision scenario would further reduce the number of accidents, injuries and fatalities on public roadways throughout the state. Compared to the Sustain Current Performance scenario, safety improvements under the Vision would save an additional 55 lives in 2030. Fewer accidents on public roadways would further support the efficient movement of goods and improve recreational travel in many corridors.

Economic development. Improved pavement quality and increased capacity on heavily traveled freight corridors would promote economic development and improve farm-to-market commercial activity in rural areas of the state. Examples of potentially affected corridors include US 385 and portions of US 50 and I-70. Further, investments in the Ports-to-Plains Corridor and the Heartland Expressway would increase Colorado's importance in north-south movement of goods and generate additional economic activity. More frequent air service and other aviation improvements would increase economic competitiveness in many regions.

Public transportation demand. Under the 2030 Vision, improved public transit systems would meet a far greater portion of residents' demand for this service. Public transportation improvements benefit Colorado residents throughout the state by providing access to higher paying jobs, health and human services and competitively-priced consumer goods. In urban and rural areas of the state, public transportation systems provide a vital community link for seniors, the disabled and children.

Public transportation investments can also serve to increase the economic competitiveness of metropolitan areas. For example, investments in public transportation along the I-25 corridor would allow employers in Metro Denver and Colorado Springs to attract skilled employees from a larger total workforce. A well-developed public transportation system also improves air quality.

Access to recreation destinations. Additional capacity and improved public transit services on I-70 west, SH 82 and US 160 would provide access to many of Colorado's key recreation sites. This would not only improve quality of life for Colorado residents but would encourage out-of-state visitors to make longer and more frequent trips to Colorado's tourist destinations. For example, in the I-70 corridor, highway and transit improvements under the Vision scenario would increase trips to recreation areas by an estimated 10 to 14 percent above the Sustain Current Performance scenario. This could increase out-of-state visitor spending by more than \$0.6 billion in 2030.

Next Steps

This research provides a foundation for analyzing the economic benefits of transportation investment by region within the state. A series of transportation benefit studies by region would further explore the economic benefits and communicate the importance of transportation investment to each region. These regional studies could be tied to specific funding initiatives. Local businesses, transportation authorities, Transportation Planning Regions and Metropolitan Planning Organizations could lead this effort. CDOT and other state agencies could help coordinate traffic and economic modeling analyses. Specific projects, associated performance levels and local road data would need to be a part of any regional study.

THE TRANSPORTATION – ECONOMIC LINK OF SELECT COLORADO PROJECTS

The above research focused at the statewide level on investment in the entire transportation system. In addition to this research, a number of analyses have been conducted in recent years that evaluate the economic link associated with specific transportation improvement projects in a variety of modes. The following brief descriptions provide several examples.

Highway Corridors

Over the years, there have been many Major Investment Studies, Environmental Assessments and Environmental Impact Statements which have evaluated improvement programs in highway corridors throughout the state. The following examples represent very recent efforts.

The I-70 Corridor west of Denver is critical for much of Colorado's economy. Traffic volumes on this segment of highway have now reached levels of significant congestion which pose a danger to motorists, an inconvenience to residents, and an economic drain for local communities. In April 2007 the Denver Metro Chamber of Commerce and the Metro Denver Economic Development Corporation released a report entitled *The Impact of I-70 Congestion on Colorado – Denver to Grand Junction*. The study addressed tourism impacts, resident impacts, business impacts and government impacts, and found that the impact of I-70 congestion on Colorado totals \$839 million per year in 2005 dollars. **Table 3** illustrates the key impacts and the associated annual costs for each of the sectors impacted.

Table 3. Summary of the Impact of I-70 Congestion

Sector Impacted	Key Assumptions	Annual Estimated Cost (\$million, 2005)
Tourism	1% decrease in tourism spending in the Mountain Resort Region	\$25
Residents	Value of time lost due to congestion based on impacted travelers in Metro Denver, Mountain Resort Region, and the Western Slope	\$85
Business	0.5% loss in productivity and business efficiency in Metro Denver, Mountain Resort Region, and the Western Slope	\$728
Government	Loss of state, county, and city retail sales tax revenue associated with 1% decrease in tourism spending in the Mountain Resort Region	\$1
Total Impacts		\$839

In recent months the US 36 Mayors and Commissioners Coalition prepared the Colorado Urban Partnership Agreement – a proposal which would transform the US 36 Corridor into a national model that proves the principles of pricing and modal choice by combining tolling, transit, technology and teleworking options. Specifically, the project would construct a managed, congestion-priced lane along US 36 from the end of existing North I-25 Express lanes in Adams County to the Foothills Parkway in Boulder. The lane would include bus rapid transit (BRT) service as well as technology and teleworking options. This project would set the stage for ultimate implementation of the Preferred Alternative identified in the EIS underway in the corridor. The total cost of the project is \$235 million. The Coalition is focused on improving mobility in the corridor, which in turn provides economic and environmental benefits in the corridor. In making their case for this proposal, a number of economic factors have been stressed:

- Over 1 million hours of annual travel time savings from Boulder to Denver
- Transit travel time savings and reliability for more than 8,300 daily transit passengers in the corridor
- \$1 million of estimated annual toll revenue to offset maintenance and operations costs
- Reduced incidental delay due to accident clearance time reductions
- Teleworking options with an annual estimated savings of nearly 18.5 million vehicle miles traveled

Public Transportation

The Regional Transportation District (RTD) is moving ahead with its FasTracks program, a \$4.7 billion, 12-year comprehensive plan for high quality transit service and facilities in the Denver region. In 2004 the Metro Denver Economic Development Corporation and the Denver Metro Chamber of Commerce commissioned a study entitled *The Impact of FasTracks on the Metro Denver Economy* to examine the economic and fiscal impacts of the program. The following are key findings of that study:

- The 12-year design and construction period of FasTracks will create an average of 2,413 construction jobs and an additional 3,799 indirect and induced jobs each year for a total of 6,213 jobs annually. During the four peak years of construction activity (2001-2014), there will be an average of 4,001 construction jobs and 6,298 indirect and induced jobs for a total of 10,299 jobs annually due to FasTracks construction.
- FasTracks funding will pay construction workers almost \$1.2 billion dollars throughout the design and construction period. The direct and induced jobs generated across the community will create another \$1.7 billion in wages and salaries. In total, the jobs created by FasTracks design and construction will pump \$2.9 billion dollars into the metro Denver economy.
- This will generate at least \$2.4 billion in consumer spending, the bulk of it in metro Denver. As a result of this construction employment, \$90 million in state income taxes and \$46.1 million in state and local sales taxes will be generated.
- Operations and maintenance of the FasTracks system is estimated to be \$1.258 billion for the period from 2017 through 2025. A total of 2,573 jobs each year are due to the direct, indirect and induced impacts of FasTracks expenditures on operations and maintenance after build out. This will add over \$150 billion annually in wages and salaries to the metro Denver economy, most of which will be spent locally.

The impact of FasTracks on businesses in metro Denver and the State of Colorado is far bigger than the jobs and spending created by the construction, maintenance and operation of the system. Transportation issues play an important role in site location decisions. Improved mobility enhances economic development and makes metro Denver more competitive in the global market for jobs and capital.

Aviation

In many communities throughout Colorado, aviation plays a vital role in the accessibility, prosperity and overall quality of life for the citizens of those communities. In 2003 the Colorado Division of Aeronautics released *The Economic Impact of Airports in Colorado*, which documents the positive economic impacts of the public-use airports to the state and their local communities. In summary, it was found that the 75 commercial service and general aviation airports in the state generate a total of \$23.5 billion in economic activity, and are responsible for over 280,000 jobs and nearly \$10 billion in wages.

Investment in technological improvements at airports can also have large economic benefits. The Federal Aviation Administration recently approved a new radar system, called the Colorado Air Traffic Control Beacon Interrogator, to improve safety and efficiency at mountain airports in Colorado. Among the 11 mountain airports in the state, only Aspen and Eagle currently have radar. Diverted flights are common during bad weather at the other airports. The new system will cost \$13 million, and will be paid for by the local mountain communities and the Aeronautics Division. It has been estimated that the new radar system will result in an economic benefit of \$132 million because of jet fuel savings when planes no longer get diverted, because skiers won't be delayed from reaching their destinations, and from increased hourly capacity at mountain airports.

Investment in airports also often drives economic development in the vicinity of the airport, which can have substantial positive economic benefits. The Denver International Airport District, encompassing the northeast quadrant of the Denver metro area in the vicinity of DIA, is a classic example. In April 2003 the DIA Partnership unveiled a report entitled *The Economic Impact of the Denver International Airport District*. A few facts from that report highlight the economic impacts of growth in the area:

- The district is home to \$17 billion in new public and private investment in projects.
- The annual economic impact of the district to the metro Denver area is \$15.3 billion; by 2025 the area will contribute nearly \$85 billion to the metro area economy.
- Workers in the district were responsible for \$2.4 billion of taxable retail sales in 2001, generating over \$70 million in state retail tax revenue. By 2025, they will spend nearly \$16 billion.
- The district's employers are responsible for a total annual payroll of nearly \$7 billion. In 2025, annual payroll will reach over \$44 billion.

Rail

For many years railroads have played a key role in Colorado's economic engine. Yet, as the Front Range has grown, there has been much discussion of the need to relocate through-freight train traffic away from the Front Range. In 2002 the Union Pacific Railroad Company (UP) and the Burlington Northern Santa Fe Railway Company (BNSF) proposed a Front Range Railroad Infrastructure Rationalization Project which would improve and relocate freight rail infrastructure, moving through-freight traffic and facilities east of the Front Range while still maintaining local freight service.

In 2005 CDOT conducted a **Public Benefits and Costs Study** of this proposed \$1.17 billion project to determine whether the public benefits associated with the project warranted consideration of public financial participation in the project. Primary Benefit Classifications that were studied included transportation benefits, economic and land use benefits, safety and security benefits, environmental benefits, quality of life benefits, and passenger rail facilitation benefits. Secondary Benefits included statewide job creation and expansion benefits. The total direct public benefits were estimated to be about \$2.3 billion (in 2004 dollars) over the period from 2004 to 2030. Indirect public benefits for the same time period include nearly 6,000 jobs created and benefits of almost \$2.9 billion.

This range of studies illustrates that, as noted in the Introduction, there are indeed a number of perspectives from which one can consider economic impacts and many ways in which one can measure those economic benefits. But these studies clearly illustrate that there truly is a direct link between transportation investment and the economy.