

# COLORADO BUSINESS REVIEW

A publication of the Business Research Division  
Volume 81, Number 2, 2015

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## The Increasing Use of Public-Private Partnerships for Transportation

Matt Girard

### Introduction

Surface transportation continues to lead the way in the expanding market for public-private partnerships (P3s). In the United States, states like Virginia, Florida, Indiana, California, Texas, Ohio, and Maryland have either already embarked on a number of transportation or transit P3 projects, or are set to do so in the coming years.

The State of Colorado is already using the P3 model to advance its objectives on a number of key projects. In 2007, Denver's Regional Transportation District (RTD) closed the Eagle P3 Project—the nation's first transit P3 project. Then in March 2014, the Colorado Department of Transportation (CDOT) and its

High Performance Transportation Enterprise (HPTE) followed with the US 36 Express Lanes Project, which the Federal Highway Administration has recognized as one of the nation's first transportation corridors designed to simultaneously accommodate multiple transportation modes.

For public agencies, including Colorado's CDOT and RTD, an effort to identify alternative financing mechanisms for critical infrastructure was the initial driver of the shift toward alternative financing mechanisms. But many transportation agencies have increasingly come to appreciate the other benefits of the P3 delivery model, most importantly long-term life-cycle risk transfer and performance-based contracting.

### P3 101

Typically, transportation infrastructure has been procured using standardized “low-bid” processes, with design and construction services procured in a linear, segregated fashion. Once the relevant government department has identified a specific infrastructure need, the first step is to identify the financing mechanism, usually government bonds or “pay-go” and budgeting mechanism. The next step is to

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### From the Editor

Colorado's transportation industry helps move people and products safely and efficiently throughout the state, and includes the transportation of passengers and cargo, scenic and sightseeing transportation, support activities related to transportation, and warehousing and storage. The articles in this issue reflect this diversity, with contributions from the Colorado Department of Transportation and Denver International Airport to Boulder B-cycle and RTD. Public-private partnerships, such as the US 36 project, are examined beginning on page 1. The article on page 10 by the Public Utilities Commission looks at how transportation network companies, including Uber and Lyft, are impacting consumers and industry regulations. On page 12, Uber discusses the company's role in closing gaps in public transportation. The overview article provides a brief look at the industry's role in Colorado's economy.

Our next issue will review the state's economy six months into the year. Look for it in your in box this summer.

Please contact me with any comments at 303-492-1147.

Richard Wobbekind

competitively choose a design firm via qualifications based selection, which will then draft comprehensive designs for the facility. Once those designs are finalized, it will competitively procure a construction company to build the asset, based on those completed designs, typically for the lowest price. Finally, once built, the department will maintain—or not—the asset into the foreseeable future. The issue with this process is that there are significant time inefficiencies, misaligned incentives, and a multitude of responsible parties.

A full design, build, finance, operate, maintain (DBFOM) model can alleviate many of these issues. There is a single responsible party for the life of the contract—which is typically long enough to go through a few repair and rehab cycles (otherwise known as “life-cycles”). Bringing the design, construction and operations teams into the same room during design results in projects that better incorporate the realities of on-the-ground construction upfront, as well as the realities of long-term maintenance and costing for the life of the asset. And rather than taking the linear process of design, then build, the team can begin construction on parts of the asset that have been designed while completing some design elements on other portions.

However, it is the inclusion of private financing that provides the most value to the taxpayer under a DBFOM model. With the development team only getting repaid on an ongoing basis, once construction has been completed and contingent on the facility functioning as prescribed, teams are thus incentivized to build the facility quickly but also to build it well. That often means incorporating material and design elements that may be more costly on the front end but can result in lower life-cycle replacement costs and greater resiliencies. Thus the public sector benefits from the transfer of risk for not only cost overruns and construction delays, but also quality construction and maintenance. Finally, the public sector is able to use the funds for alternative projects it would otherwise have held in reserve during project construction, while having a known, set repayment for the life of the agreement.

It is important to note that not all P3 projects are for infrastructure that is revenue generating. Despite some early examples of revenue risk deals, whereby the project team takes on the risk that it will be repaid solely through the revenues accrued from the project (i.e., tolls), the market appears to be leaning toward “availability” structures much more frequently. Under an availability payment structure, the developer is repaid a set amount on a recurring schedule, with a strict set of negotiated requirements that must be met for it to be classified as “available.”

### US 36 Improvements

The US 36 Express Lanes Project is one of the most visible P3 projects the state has developed in recent years. Plenary Roads Denver (PRD), the state's long-term partner on the project, is responsible for repaving and improvement of the existing general (free) lanes, the creation of a new Express Lane in each direction, an improved Bus Rapid Transit system and stations, as well as a separated bike path along the entire route. In addition, PRD is now operating and maintaining the existing I-25 Express Lanes segment connecting US 36 to downtown Denver, and will be responsible for operations and maintenance along the US 36 corridor once construction has been completed. PRD guarantees on-time and on-budget delivery of the project and then guarantees performance of the roadways to prescribed requirements and service levels over the 50-year concession.

PRD will be repaid over the 50-year period through toll revenue from the new Express Lanes on US 36 and the existing Express Lanes on I-25. By utilizing this method of financing, CDOT and HPTE are transferring the risk of sufficient toll revenue coverage to the private sector; there is no contractual guarantee for a minimum level of revenue for PRD and beyond a certain return, toll revenues will be shared with HPTE. In addition, any changes in toll rates for the Express Lanes requires the approval of HPTE.

Finally, the project promotes multimodal transportation strategies that increase travel choices and efficiency for all modes—while reducing emissions and resource use. As part of the concession agreement, PRD is required to guarantee minimum travel speeds for buses within the Express Lane. Toll rates will be prominently displayed along the corridor to inform users of the cost and allow them to make a decision whether or not to enter the Express Lane. Initially tolls will be based on “time-of-day” pricing. In later years when congestion has increased, tolling will be “fully dynamic” with pricing based on real-time expected time savings.


Despite concerns about the level of transparency around HPTE's use of P3 procurement method, the recently released US 36 audit report has confirmed that the DBFOM approach is a “good deal” for the public. By partnering with the private sector, CDOT and HPTE are able to deliver this project and its many public benefits 20 years earlier than otherwise planned and possible.

### P3s Create Savings

Plenary has also recently begun construction on another innovative P3 in Pennsylvania that

“bundles” a series of assets into a single project. The Pennsylvania Rapid Bridge Replacement Project includes the replacement of 558 bridges across the state, making a big commitment to reducing the large backlog of structurally deficient bridges. Plenary is part of Plenary Walsh Keystone Partners (PWKP), which will manage the financing, design, and construction of the replacement bridges and will then be responsible for their maintenance for 25 years after construction. There is a robust agreement on how the bridges must perform over the 25 years, and the team will be compensated at a set amount each year so long as it adheres to this strict and measurable performance regime; if it does not, the agreement details the appropriate deductions from the annual payment based on the negotiated criteria.

PWKP was selected in part for its commitment to delivering the full complement of bridges eight months earlier than required, and construction is required to be completed within 36 months of financial close. The project is the first multi-asset P3 to be undertaken in the United States for bridges, allowing Pennsylvania to replace and maintain a significant number of bridges in a more economical way. The average replacement bridge under the project is expected to cost \$1.6 million compared to the PennDOT estimate of \$2 million per bridge under the traditional delivery option—a significant savings for the state. Such innovation is the benefit of using new P3 models.

showing that while P3s alone cannot solve the infrastructure crisis, partnering with the private sector can create more capacity to deliver completed projects sooner; bring private-sector investment, innovation, and discipline to solving the infrastructure deficit; and ensure projects are completed on-time and on-budget, with a commitment to long-term operating performance without deferred maintenance. As CDOT and HPTE contemplate additional P3s, the private sector stands ready to bring unique experience and qualifications to these projects. 

**Matt Girard is COO of Plenary Concessions, the company which holds all Plenary project specific companies. In this capacity, Matt is responsible for project development, delivery, asset management, teaming and business development for all of Plenary Group Civil projects in North America. Matt also leads Plenary’s Denver Office.**

### The Future of Transportation P3s

The US 36 project and others that have been successfully closed around the country are

## Overview

# Colorado’s Transportation Sector

Emily Zalasky and Cullen Aulwurm

The transportation sector is a direct source of economic activity in Colorado, as well as a catalyst for economic activity as people and goods are moved throughout the state. The North American Industry Classification System (NAICS) places industries that provide transportation of passengers and cargo, scenic and sightseeing transportation, support activities related to transportation, and warehousing and storage in the Transportation and Warehousing Sector.

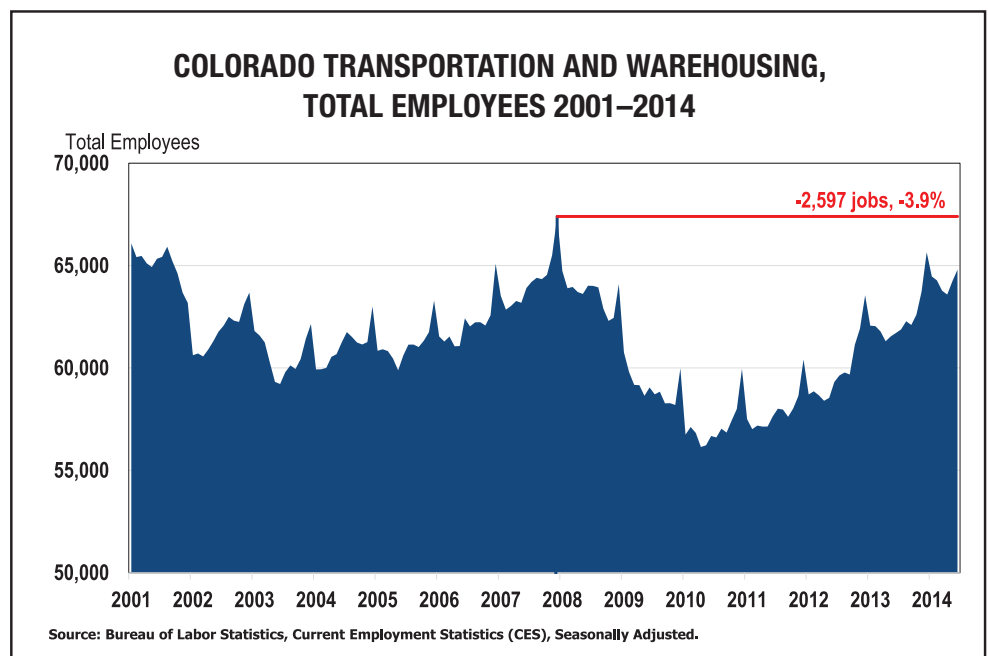
### Employment

In 2013, Transportation and Warehousing employment in Colorado grew at an annual rate of 4.2%, which compares to 2.1% for the nation. The state added a total of 2,542 Transportation and Warehousing jobs in 2013, approximately 98.7% (2,508) of which were in the transportation subsectors (rather than warehousing and storage). As of June 2014, a total of 64,803 Coloradans were employed in the Transportation and Warehousing Sector (seasonally adjusted). This compares to 65,335 in June 2001. Total employment in the sector remains 3.9% below a prerecessionary peak of 67,400 workers; however, truck transportation

employment recovered after 72 months in June 2013 (not seasonally adjusted). Air transportation employment in Colorado has been on an upward trajectory yet remains 6.6% below a March 2008 peak.

Location quotients can be used to assess the composition of jobs in an area relative to the national average. In 2013, the concentration of Transportation and Warehousing jobs in Colorado was below the national average, with

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a location quotient of 0.8. When only transportation jobs are examined, the composition moves closer to the U.S. average (0.9) (warehousing and storage employment in Colorado is half the national share). Employment in air transportation accounted for nearly twice the total share of employment in Colorado than it did nationally in 2013 (1.8), and while pipeline transportation makes up a relatively small number of sector jobs (1,001 in 2013), its share of employment in Colorado was more than the national average (1.3).

Scenic and sightseeing transportation has been the fastest-growing transportation

subsector in Colorado the past three years, with a compound annual growth rate (CAGR) of 5.7% from 2010–2013. Like pipeline transportation, it generates a comparatively small number of jobs each year in Colorado (601 in 2013) but garners a greater share of the state's total employment than what is seen nationally (1.2).

### Firms

Of all Colorado transportation firms in Q2 2014, 53% were involved in truck transportation, 17.7% in support activities for transportation, 10% were couriers and messengers, 6.3%

were involved in warehousing and storage, and 6.3% in transit and ground passenger transportation. Capturing the second-largest portion of all transportation firms in Colorado, support activities for transportation are multimodal and include the repair and maintenance of transportation equipment. Examples of occupations in this subsector include aircraft mechanics and service technicians; cargo and freight agents; dispatchers (except police, fire, and ambulance); laborers and freight, stock, and material movers; and heavy and tractor-trailer truck drivers. Included in the couriers and messengers subsector are the United Parcel Service (UPS) and other delivery services, while examples of transit and ground passenger transportation include RTD and school bus services. All others subsectors combined, including air transportation, pipeline transportation, scenic and sightseeing transportation, and the postal service, make up 6.5% of all transportation firms in Colorado as of Q2 2014.

### Occupations

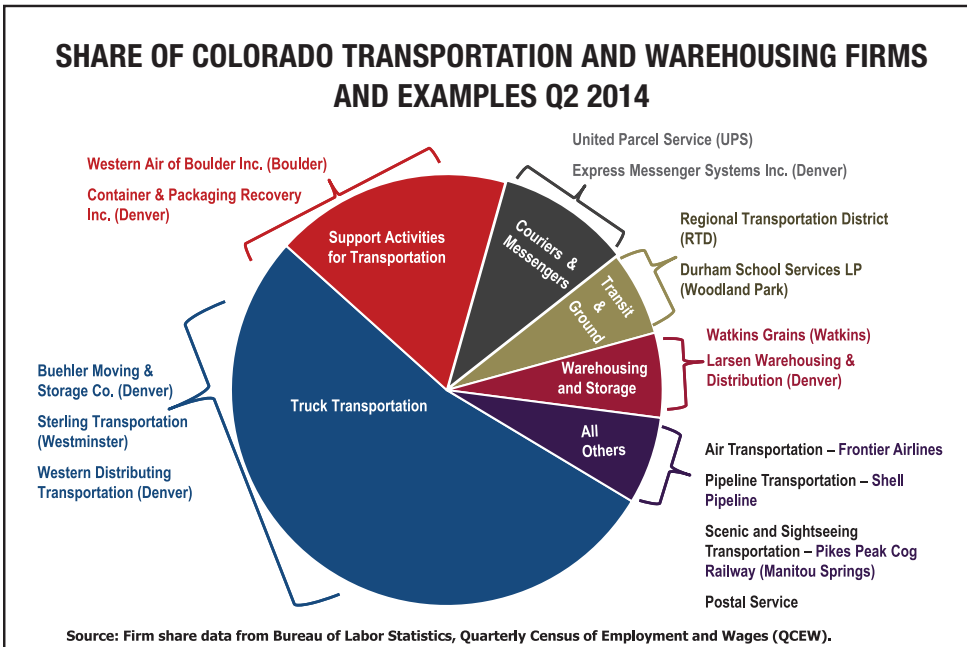
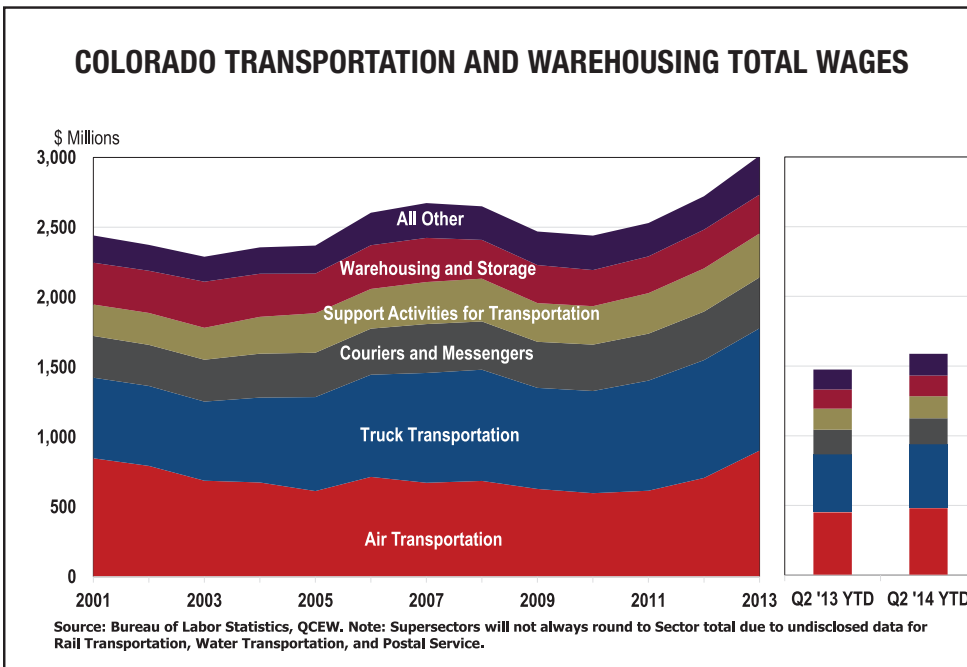
Based on research estimates from the Bureau of Labor Statistics, Office and Administrative Support occupations encompass 26.2% of Transportation and Warehousing employment in Colorado with a mean wage of \$20.66 per hour. Examples of these positions include postal service mail carriers, reservation and transportation ticket agents and travel clerks, payroll and timekeeping clerks, and dispatchers (except police, fire, and ambulance).

Transportation and material moving occupations make up 56.9% of sector employment, including heavy and tractor-trailer drivers earning a mean wage of \$20.98 per hour. Other positions in this occupational group include taxi drivers, airline pilots, copilots, and flight engineers, bus and taxi drivers, as well as cleaners of vehicles and equipment.

A third major occupational group in this sector is installation, maintenance, and repair, whose occupations account for 6.9% of total employment in the sector. Examples of these positions include aircraft mechanics and signal and track switch repairs. Management occupations make up 2.3% of all transportation and warehousing jobs in Colorado with a mean wage of \$50.27 per hour.

### Wages


Total wages in Transportation and Warehousing have reached a new peak in Colorado. While truck transportation is the largest subsector in Transportation and Warehousing, air



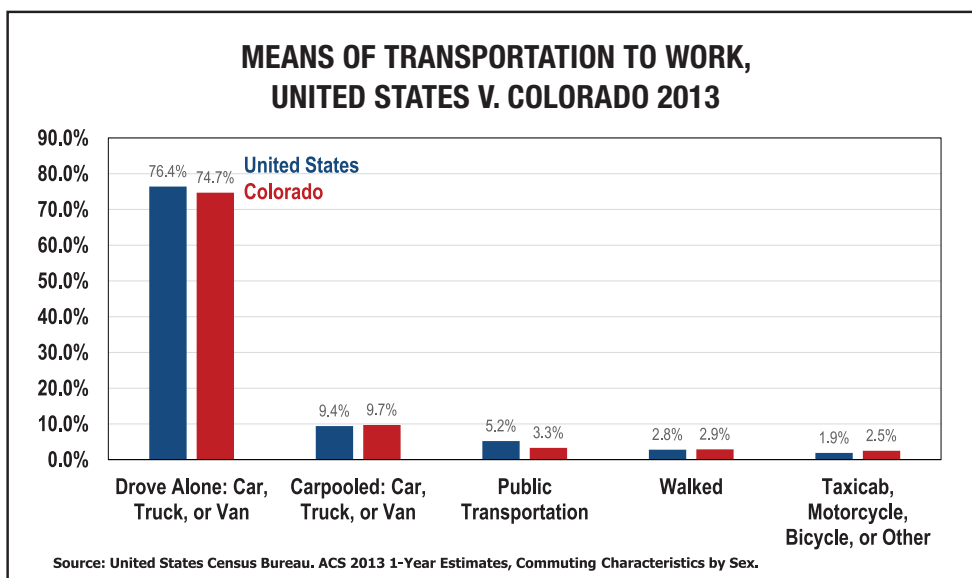
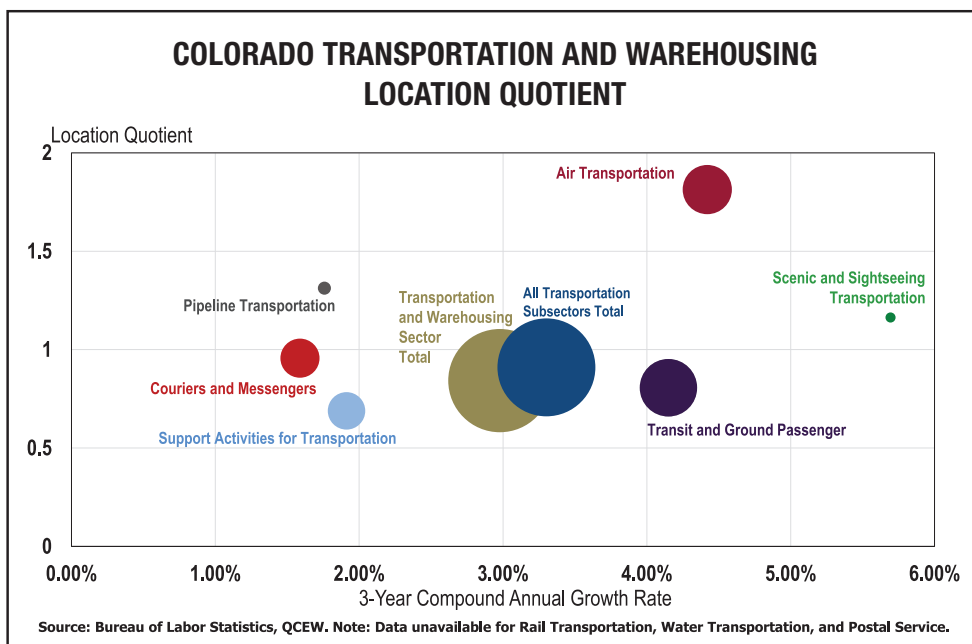
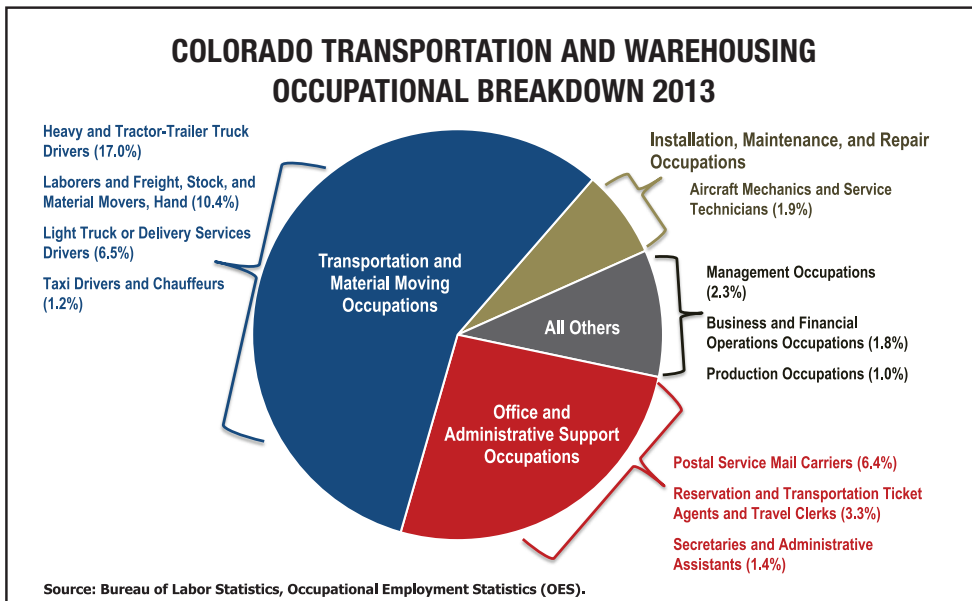
transportation contributes the largest portion of wages for the sector. In 2013, total wages for air transportation amounted to \$901.8 million. In comparison, wages for truck transportation totaled to \$875.1 million in 2013, followed by couriers and messengers (\$364.3 million), support activities for transportation (\$314.6 million), and warehousing and storage (\$277.8 million). Wages for all other Transportation and Warehousing subsectors (including scenic, ground, and pipeline transportation) totaled \$278.3 million. While Transportation and Warehousing employment nears its prerecessionary peak, wages fully recovered in Q4 2012. Year-to-date (YTD) totals in Q2 2014 indicate annual wages for the sector in 2014 will surpass those in 2013. Truck transportation wages in Q2 2014 YTD were 10.2% higher than the same period in 2013.

### Means of Transportation

National transportation data reveal that across the board Colorado closely resembles the nation in its means of transportation to work according to the American Consumer Survey. For example, Colorado has larger percentage of the population that carpools, but it is only a difference of 0.3% compared to the nation. In fact, the largest difference is 1.9% in public transportation, where 3.3% of Colorado's commuters use that service compared to 5.2% for the nation.

Within the past three years Colorado has experienced growth in every transportation means except those who walk, and this growth has outpaced that for the United States. From 2010–2013, the number of Colorado workers using public transportation grew at a three-year compound rate of 5.3% compared to 3.5% for the nation. During that same period the number of Colorado workers using a taxicab, motorcycle, bicycle, or other form of transportation increased 8.1% compared to 5.3% for the nation. The number of Coloradans carpooling to work grew to just under one-quarter of a million in 2013 (249,987). 

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# Colorado Highways

## Contribution, Condition, and Challenges

Ermias Weldemicael

### Overview

The highway infrastructure serves as the backbone for economic activities that citizens rely heavily on for their livelihood. Colorado has a vast network of road infrastructure that connects the state. The Colorado Department of Transportation (CDOT) is responsible for maintaining the 9,146-mile highway system (23,000 lane miles of highway), including 3,464 bridges, 6,668 culverts, and 21 tunnels. The highway system handled over 48.1 billion vehicle miles traveled (VMT) in 2014. The interstate system accounts for only 10% (914 miles) of the total miles the highway system, but supports 40% of all the mobility.

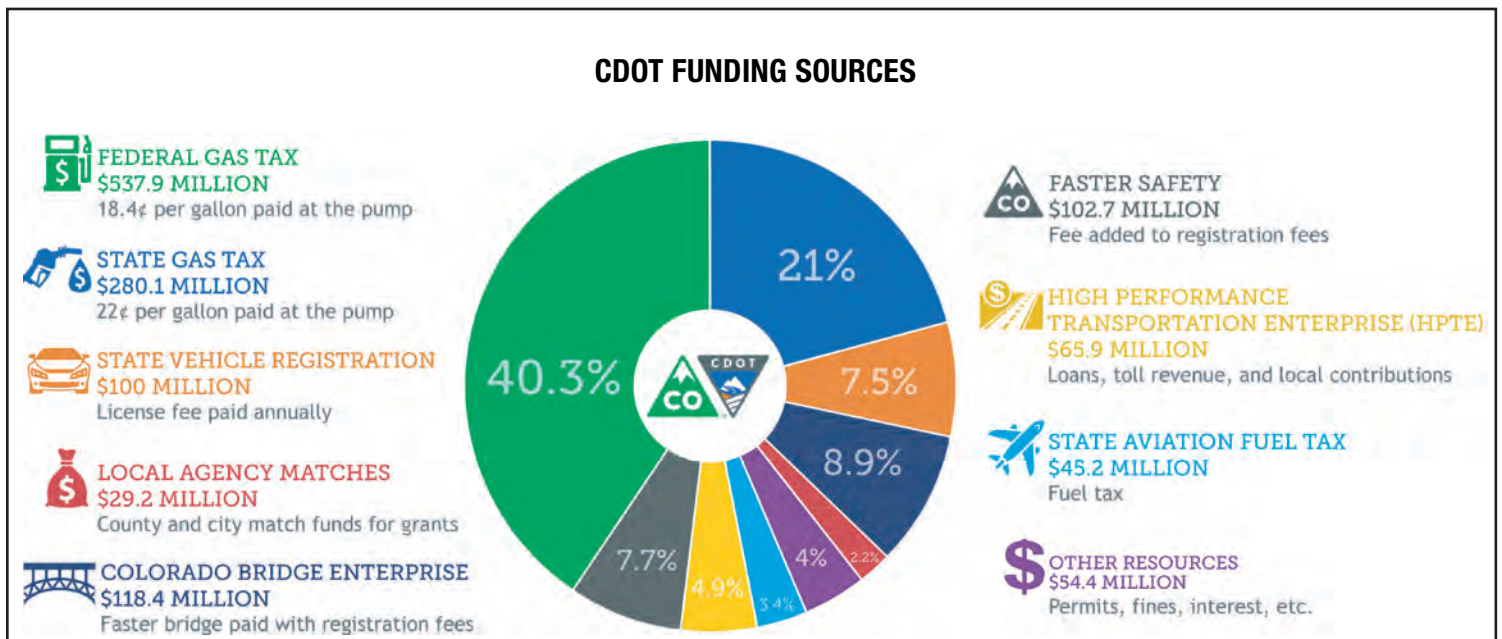
### Contribution to the State Economy

The highway system has played a historical role in supporting key economic sectors, such as mining and agriculture. Moreover, major interstate highways pass through Colorado, which makes the state an important trading route for interstate trade. A study by CDOT in 2013 shows that Colorado households and businesses spent about \$54.8 billion for transportation services. As a result, businesses created \$10.7 billion worth of gross state product (GSP) attributed to transportation, which represented 3.8% of Colorado's GSP. In terms of employment, over 128,000 Coloradans are employed by industries that rely directly on transportation services as an input of production. This amounts to \$6 billion in wage income and 4% of all jobs in Colorado.

### Funding and Spending

To accomplish its mission, CDOT receives funding from federal and state sources. The federal fuel tax, 18.4 cents per gallon of gasoline and 24.4 per every gallon of diesel purchased in Colorado, flow into the National Highway Trust Fund from all the states. The Federal Highway Administration (FHWA) distributes the money among the U.S. states and territories based on a funding formula. The state fuel tax, 22 cents per gallon of gasoline and 20.5 cents per gallon of diesel purchased, go into the Colorado Highway Users Tax Fund (HUTF). The state treasurer administers the fund, and, based on a formula, CDOT receives a portion of the fund for state highways. In addition to these funding sources, CDOT also gets funding collected from registration and other fees since 2010 per the FASTER Act. The chart below shows funding proportions for FY2013.

In terms of program expenditures, CDOT's strategy focuses on maintaining, maximizing, and expanding the system in priority order. For FY2013 the expenditure distribution shows 44% spent on maintaining the system—resurfacing, reconstruction, snow removal, etc.; 8.9% allocated to the Colorado Bridge Enterprise—repair, reconstruction, and replacement of poor bridges; 5.6% invested in maximizing the system—operational strategies to improve the functioning of the system; 4.9% assigned to the High Performance Transportation Enterprise—innovative financing for projects that improve safety, capacity, and accessibility; 12.8% used for debt service—payments on outstanding bonds and other debts; 0% for left for expanding



the system. The remainder included administration expenses, emergencies, and pass-through grants administered by CDOT. The department supports intermodal transportation services, such as transit, rail, aeronautics, bike and pedestrian, and so forth.

## Performance

CDOT measures its achievements using key performance indicators, such as safety (accidents), congestion (travel time delays), maintenance level of service, pavement condition, and bridge condition. The safety indicators show a slight decline in accidents, injuries, and fatalities both in absolute numbers and scaled to miles traveled. The average for 2006–2013 is 486 fatalities and 3,403 injuries. With respect to traffic congestion, travel time delays held steady for the same period, at an average of 17 minutes compared to free flow time. Similarly, performance in roadway maintenance, such as snow and ice removal, roadway striping, sign and signal maintenance, and rest area maintenance are assessed using letter grades. CDOT has achieved “B-” level of service, where “A” is the best and “F” is the worst, for the period 2010–2014.

Pavement condition is measured in terms of Drivability Life. (High, medium, and low drivability life corresponds, respectively, to greater than 10 years, 4 to 10 years, and less than 4 years acceptable driving conditions.) For 2014, 73% of the highway system had high–medium Drivability Life.

Finally, the bridge condition indicator has slightly improved, from 91.3% of “not structurally deficient” bridges in 2010 to 94.3% in 2014, thanks to dedicated funding to the Bridge Enterprise.

According to FHWA Statistics, Colorado ranks 19th nationally in safety, 27th in congestion, 14th in bridge condition, and 27th in pavement condition. Overall, Colorado ranks midway on the list when compared with other states.


## Challenges

Although CDOT is optimizing the level of service of the highway system, it falls short of its goals and vision due to funding constraints, cost escalations, and aging infrastructure. Gasoline taxes have remained the same since 1992, while the price of gasoline has risen considerably. The total gas tax rate (state and federal tax rates) in Colorado is the third lowest in United States and about 9.2 cents lower than the national average. Moreover, the tax dollars purchase a decreasing amount of construction work over time due to increases in construction materials and labor costs.

The State Demography Office (2013) forecasts that population and employment will increase by 23%

and 37%, respectively, by 2025. Similarly, the annual VMT will increase by 20%. All these will exacerbate the condition of the aging infrastructure and require more funding to maintain the level of service. For example, to achieve CDOT’s vision of pavement condition (90%), bridge condition (95%), and maintenance level of service (“B”) in the period 2016–2025 will require an additional \$2.5 billion. Adding these to other visions, such as capacity expansion, maximizing the system, safety, and mobility, will amount to an annual \$1.2 billion deficit for the 10-year period.

Other sources of revenue have been either insignificant or uncertain. MPACT64, a coalition of cities and counties, proposed a statewide sale tax of 0.7% for transportation funding to go on the 2014 ballot, but the effort was later discontinued as the polls indicated that voters did not support it. The polls also showed that voters are more averse to gasoline tax increases and a VMT (mileage-based) tax. The recent SB 228 provision was expected to transfer around \$1 billion in the coming five years for strategic transportation projects. However, this amount has been drastically cut to about \$200 million due to TABOR requirements. CDOT is forced to explore alternative funding sources, such as public-private partnerships (PPP) and bonds, although these funding mechanisms entail cost recovery fees, interest payments, and tolls. The US 36 Express Lane project is an example of PPP. Similarly, the I-70 East Viaduct is another project awaiting about \$2 billion in funding to expand this heavily congested section of highway with aged bridges.

Unless the public and the legislature commit to viable sources of additional funding, the performance of the highway system will eventually deteriorate and cost substantially more to the economy than what needs to be invested. 

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# Public Transit: A Vital Mobility Solution

Doug MacLeod

In 1969, the Colorado General Assembly created the Regional Transportation District (RTD) in recognition of a need for public transit to be a necessary part of the growing Denver Metropolitan Region. The assembly determined that through the public sector, and RTD specifically, Colorado could successfully “develop, maintain and operate a public transportation system for the benefit of the District.”

Since its inception, RTD’s boundaries (the District) have grown to 2,340 square miles encompassing all or portions of eight counties and 40 cities and towns in the Denver-Boulder Metropolitan area. The District’s population of more than 2.8 million people is approximately 57% of Colorado’s population.

With over 1,000 buses and 172 light rail vehicles, 324 Access-a-Ride vehicles, and 365 days of service, RTD transported 105 million riders in 2014. To accomplish this, RTD directly employs more than 2,600 individuals in addition to contracting certain operational



services to private companies that employ another 1,600 individuals.

In 2004, voters approved a 0.4% sales and use tax increase to help fund RTD’s ambitious transit expansion project known as FasTracks. When completed, FasTracks will add 122 miles of commuter rail and light rail as well as 18 miles of bus rapid transit all focused around a redeveloped central transit hub at Denver Union Station. Currently, FasTracks has more than \$5 billion in projects that are under construction, under contract, or have been completed. The first FasTracks rail line to open was the 12.1-mile West Line transporting riders between Denver Union Station and



the Jefferson County Government Golden Station that began service in 2013. In 2014, the redeveloped Denver Union Station and its underground 22-bay bus facility opened to the public as well. Under FasTracks, several additional commuter rail, light rail, and bus rapid transit lines are scheduled to open as shown on the map above.

As a result of the 2008–09 Great Recession, RTD’s sales and use taxes experienced a sharp decrease followed by a prolonged recovery. The combination of lower revenues and rising construction costs required RTD to seek innovative solutions to complete the FasTracks vision while continuing to provide existing transit operations.






Photographs provided by Regional Transportation District.

Concurrent with the recession, RTD pursued an innovative transit public-private partnership (P3) to build, operate, and maintain commuter rail on the East Line, Gold Line, the Westminster segment of the Northwest Rail Line, as well as a commuter rail maintenance facility. In 2012, RTD contracted to build the I-225 light rail line in coordination with CDOT's highway expansion. In 2013, RTD entered a contract to complete the North Metro Rail Line using an innovative financing approach through Certificate of Participation funding. RTD has also partnered with CDOT to develop bus rapid transit services along the US 36 corridor from Denver to Boulder. Furthermore, RTD is currently undertaking efforts to receive federal funding while partnering with local communities and businesses to complete the Southeast Rail Line extension.

Redevelopment of the historic Denver Union Station building, accompanied by the completion of RTD's central transit hub, has spurred more than \$1 billion in private development in the immediate surrounding area while providing a central transit link to commuters and travelers. The FasTracks expansion, as well as existing RTD transit operations, have contributed to the creation of several Transit Oriented Communities (TOCs) and expanded economic opportunities throughout other areas in the District as well.

While the economic benefits of the FasTracks expansion have injected an estimated \$5 billion into the local economy and created approximately 13,000 jobs, the underlying quest for RTD continues to be to provide mobility solutions to an ever-expanding metropolitan area. As many FasTracks projects on the horizon are completed, expanding RTD's annual ridership well beyond the current 105 million annual boardings will soon become reality. 

**Doug MacLeod, Controller at RTD, may be contacted at [douglas.macleod@rtd-denver.com](mailto:douglas.macleod@rtd-denver.com).**

# Modifying Regulation to Accommodate the Changing Taxi Industry

Fiona Sigalla

Competition in the taxi industry is changing how you can hail a cab. Traditionally dominated by firms with professional drivers in matching cars, riders now have the option to take a personal vehicle from firms like Lyft and Uber. Both types of services will get you to your destination, but passengers should expect different rules for the ride. In response to the introduction of network firms that dispatch private cars, the Colorado Public Utilities Commission (PUC), which also regulates taxis, is creating rules to clarify new laws and to be sure that consumers receive a safe, reliable ride.



Taxi cab drivers outside a hotel in downtown Denver. (RJ Sangosti, *The Denver Post*)

The State of Colorado regulates taxi companies, such as Yellow, Metro, Freedom, and Union. Entry into the taxi industry is heavily restricted; companies are required to obtain a certificate of public convenience and necessity (CPCN) from the PUC to operate. In theory, taxis are granted authority to provide service in exchange for the obligation to provide service.

In 2014, the Colorado General Assembly modified Colorado statute to introduce competition from companies that use “a digital network to connect riders to drivers for the purpose of providing transportation.” Referred to as transportation network companies, or TNCs, these firms are explicitly described as not providing taxi service.

TNCs and taxis are governed by separate statutes and separate PUC rules, even though they are in direct competition with each other. For example, taxis can be hailed on the street but TNC vehicles must be hailed electronically through their respective mobile apps.

Taxis have different driver and vehicle requirements than TNCs. The table on page 11 provides a side by side comparison of rules for taxi and TNC services.

## Challenge of Deregulation

When Colorado introduced legislation for TNCs, the State effectively took a step toward deregulation of the taxi industry without changing the laws regulating taxis. Introducing competition benefits riders with more choices for their journey; however, different rules for competing forms of transportation create an uneven playing field.

Taxi companies have their rates approved by the PUC, with riders paying the same fare at all times. TNCs change the price charged to riders based on demand and the supply of cars available, raising prices during peak periods to attract more private cars to meet demand. It is a challenge to have competitors where one type of firm can change prices and the other type of firm must retain fixed fares at all times.

Rules limit the number of taxi companies (regulated competition) so taxis can be profitable while providing the required service. Taxis are required to offer service 24 hours per day and only within their designated territory. However, TNC vehicles can choose to operate when and where it is financially lucrative.

The financial model for taxis was disrupted by the introduction of TNCs. The CPCNs that taxi firms obtained to offer service instantly lost value when TNC companies entered the market. It is yet to be seen, but ultimately without statutory changes to level the playing field, increased competition from TNCs may hinder taxis ability to comply with their obligation to serve.

Urban counties, including Denver and Boulder, may benefit from allowing taxis to change fares based on supply and demand. Taxis may need to be able to add peak demand charges similar to the flexible pricing in place for TNCs or a surcharge for off-hours transportation. Regulation could be put in place to be sure that passengers are clear about the price that they will be expected to pay for each ride.


In less-populous counties with highly seasonal activity, TNC vehicles may choose to provide service only during peak tourist seasons. If taxi companies use revenue earned during peak season to cover expenses year-round, the presence of TNCs may threaten the financial viability of taxis. Taxis may need to be able to change price, similar to TNC vehicles, to make sure that off-season riders are able to find a ride.

## REGULATORY COMPARISON OF TAXI SERVICE AND TNC SERVICE

	Taxi Service	TNC Service
<b>How to Call</b>	Can be hailed on the street, solicited electronically or by phone.	Cannot be hailed on the street. Ride must be solicited electronically.
<b>How to Pay</b>	Passenger pays driver. Drivers accept cash, checks or credit cards.	Passenger pays company. Fare is paid online through a preregistered credit card. Drivers do not accept payment, including cash.
<b>Pricing</b>	Fixed rates set by Public Utilities Commission.	Fares are determined by supply and demand.
<b>Vehicles</b>	Contracted vehicles and drivers.	Drivers with personal vehicles.
	Company and PUC confirm vehicle safety.	
	Vehicle age limited to no more than 10 years.	Customer ratings are used to assess the quality of the cars.
	Insurance provided by Company.	Insurance provided by Company or driver.
<b>Drivers</b>	Fingerprint-based background checks are required.	Private background checks are permitted.
	All drivers are required to have medical certification and follow rules to prevent driver fatigue.	
<b>How Drivers are Paid</b>	Drivers contract with taxi companies, paying a fixed weekly charge to operate. Drivers profit only when fares collected cover the weekly charge and operating expense.	Drivers don't contract with Company and pay no fixed charge to operate. Driver and Company each keep a portion of the fare.
<b>Insurance</b>	Company secures insurance. Proof of insurance coverage is kept on file with the PUC	Company or driver secures insurance. Proof of Company insurance is kept on file with the PUC
<b>Market Entry</b>	Must obtain certificate of public convenience and necessity	Free to enter and exit market. Must obtain an over the counter annual permit.
<b>Service requirements</b>	Required to offer service within territory.	No requirement to serve.
<b>Cost of Permit</b>	Firms pay a one-time application fee of \$35 (\$800 if serving Denver) and \$5 per vehicle per year.	Firms pay an annual fee of \$111,250 per company, with no per vehicle fees.

### Consumer Tips

If hailing a cab on the street, only enter a marked taxi. TNC vehicles are not allowed to be hailed on the street. Always use the app to hail a TNC vehicle. Without using the app, passengers cannot be certain that a vehicle offering a ride is truly working for a TNC company that has checked the safety of the vehicle and driver. When using a TNC service, be aware that the price changes based on the demand for vehicles. If you have concerns about a ride you've taken with either a taxi or a TNC, contact the PUC Consumer Assistance

Line at 303-894-2070 or if calling outside the Denver Metro area but within Colorado 1-800-456-0858. 

**Fiona Sigalla is a Senior Economist with Staff for the Colorado Public Utilities Commission. The views expressed are the author's and do not represent those of the Public Utilities Commission or the State of Colorado.**

# A Private-Sector Solution to Bridge the *First* and *Last* Mile

Will McCollum

The Uber app was created to ensure reliable access to safe rides for anyone, anytime, anywhere. With a few taps of a smartphone, people in need of a ride to their next destination can find one within minutes. The popularity of the app has grown exponentially over the years, including in Colorado, where thousands are turning to Uber every day to access safe, reliable rides.

Much attention has been paid to the popularity of ridesharing platforms like Uber among younger populations or those in search of safe transportation options on nights and weekends. Indeed, a recent study conducted by Uber in partnership with Mothers Against Drunk Driving, or MADD, reveals that Uber has made a meaningful contribution toward the reduction of drunk driving rates.

However, something that has arguably received less attention is Uber's potential to help solve a conundrum that has vexed public policymakers, urban planners, and transportation advocates for some time: bridging the first and last miles.

While many may view Uber as a substitute for bus or light rail, a closer look at the data paints a different picture. Far from luring riders away from these services, the ease, reliability, and affordability of ridesharing platforms like Uber are connecting

more daily commuters and weekend revelers alike to existing public transportation options.

For example, in December 2014, more than 200,000 rides with Uber in Los Angeles—a city well-known for its deeply ingrained culture of car ownership—began or ended one-quarter of a mile from a metro station. In San Diego, trips with Uber that originated within a one-quarter of a mile of a transit station accounted for 30% of total trips on an average weekday.


What these numbers show is that gaps in public transportation become hubs for Uber, contributing to the overall efficiency and reliability of existing transportation networks. Uber complements public transit, making it more likely that riders will use existing public transportation options where they may not have been able to before.

This pattern holds true in the Denver Metro area, where tremendous foresight and vision on the part of municipal and regional leaders has contributed to the growth of an extensive network of bus lines, light rail, and more.

To better understand how commuters in the Denver Metro area have incorporated Uber into their travel routines, we looked at trips in February 2015 that started or ended within one-quarter of a mile of an RTD light rail station. It was found that 23% of trips with Uber started or ended at an RTD Light Rail Station.

In every city where Uber operates that has mass transit, thousands of Uber trips begin and end at train or bus stations. Far from competing with public transit, Uber aims to provide safe, reliable, and affordable transportation options that complement, enhance, and extend its reach.

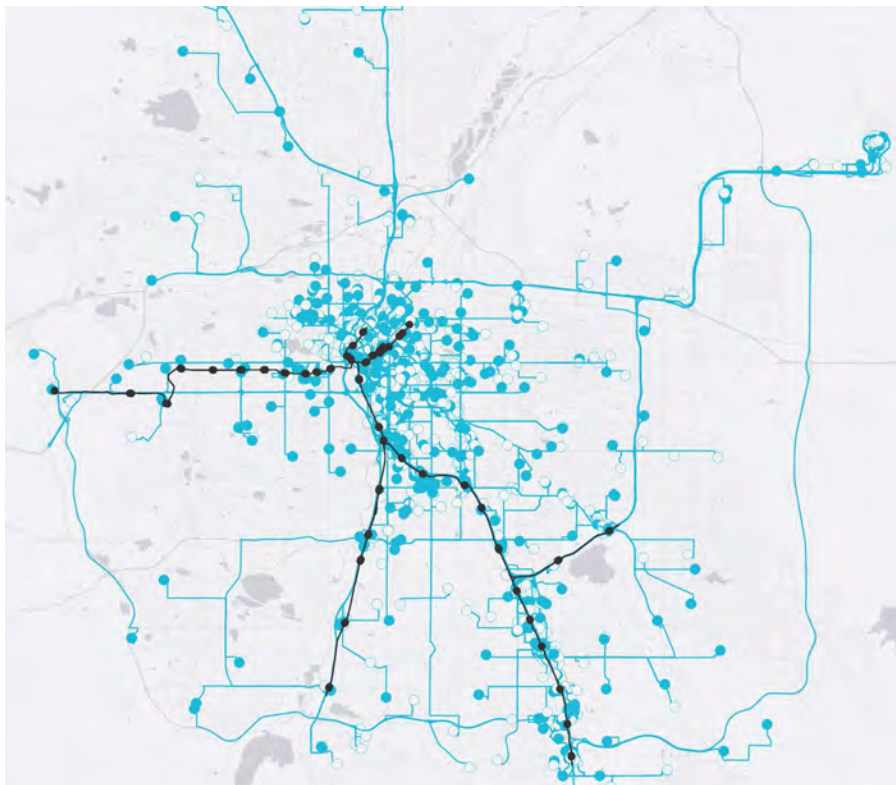
The benefits of a more efficient transportation ecosystem where private entities, like Uber, and public options, such as bus and light rail, work hand-in-hand to enhance daily commutes and bridge the first and last miles are clear: fewer cars on the road, fewer carbon emissions, and less traffic on roads and highways.

Of course, when it comes to closing existing gaps in public transportation, ridesharing is not a silver bullet. But the data show it can help, and Uber looks forward to working with policymakers, academics, and leaders in the business community to further weave Uber into Colorado's transportation infrastructure in a way that makes the Centennial state an even better place to live, work, and raise a family. 

**Will McCollum is Uber's General Manager for Colorado. Please visit <https://www.uber.com/cities/denver> for more information.**

## UBER COMPLEMENTS THE RTD

**This map shows a weekday's worth of trips starting or ending within a quarter mile of an RTD light rail station. Actual trip start and end points have been jittered to protect rider privacy.**





DIA photographs provided courtesy of Denver International Airport.

## Denver International Celebrates 20 Years as Colorado's Primary Economic Engine

Heath Montgomery

In 1986, a regional task force studied the economic impact of Denver's former Stapleton International Airport, and speculated about what a new airport could do for the city and region. While the group concluded that Stapleton was "referred to unequivocally as the region's single most important economic asset," it projected that a new airport had the potential to be so much more.

On Feb. 28, 1995, Denver International Airport (DIA) opened to the public and captured the world's attention with its striking tented roof structure and technologically advanced operations. Twenty years later, DIA has established itself as the No. 1 economic driver and job creator in the region—far exceeding original predictions.

The opening of Denver's new airport brought a departure from the ordinary. From its spacious design and distinctive architecture to its ability to grow and adapt with technology and travel habits, DIA influenced a global shift in airport design and expectations. As the airport celebrates its 20th anniversary this year, the airport is in a prime position to continue to strengthen its role as Colorado's primary economic engine.

"DIA is a jewel in the nation's aviation system, serving as the front door to our entire region for tens of millions of people every year," said Denver Mayor Michael B. Hancock. "With 32 months of consecutive months of growing international traffic, bolstered by new nonstop flights to Tokyo, Panama City and other

major destinations, DIA is a gateway to the world—with abundant potential for the future."

The first major new airport to be built in the United States in 20 years, DIA has grown from serving 31 million passengers in 1995 to an all-time record of 53.4 million passengers in 2014. Today, DIA generates \$26.3 billion in annual economic impact for the region, has more than 35,000 badged employees, and supports 188,338 jobs. At 53 square miles, it remains the largest commercial airport by acreage and is the newest commercial airport in the United States, with room to double its current capacity and remain competitive in the growing global aviation marketplace.

In addition to the opening of the new Westin Denver International Airport hotel and conference center in November 2015, commuter rail service connecting DIA to downtown Denver in just 35 minutes will begin in 2016. This year, the airport will also add new and improved customer service and amenities, such as new comfortable seating, shopping and dining options that include touchscreen ordering in the recently expanded C Concourse, additional seat electrical outlets for personal device charging, and other surprises.

"With the new Westin Denver International Airport hotel and transit center, our financial strength and stability, increasing global flights and room to grow, we are positioned well for the next 20 years," said Kim Day, CEO of Denver International Airport. "Not only will we remain a strong global competitor, but we will continue to expand economic opportunities that will generate more jobs."

The airport also continues to invest in its existing infrastructure, including a planned \$46.5 million rehabilitation of runway 17L-35R this summer. The airport is also soliciting partners from the private sector for potential redevelopment of the Great Hall inside Jeppesen Terminal, to relocate TSA, facilitate connection to the new hotel and transit center, and enhance the overall passenger experience.

At 53 square miles, DIA remains positioned for growth at incrementally low costs, which will help maintain a competitive cost structure for airlines while keeping up with growing demand. The airport has the ability to double its runways and facilities to serve 100 million passengers a year, with 1,200 acres available for commercial development in the coming years. This land represents one of the most compelling real estate opportunities in the world and would result in jobs and economic benefits for the region.

Added CEO Day, “The visionaries who planned and built this airport provided this community an extraordinary asset in Denver International Airport. And today, under the leadership of Mayor Hancock, we are outperforming all predictions, as we add new destinations, airlines and customer amenities. We are firmly establishing our global position and our long-term sustainability as the region’s largest economic driver.”

That economic influence has been 20 years in the making after Denver’s former Stapleton International Airport exceeded its original design capacity and was plagued by flight delays and an inability to expand. After locating a new site for what would become the newest and most modern airport in the world, the groundbreaking for DIA was held on Nov. 22, 1989.

Construction was a mammoth undertaking. At its peak, 300,000 cubic yards of dirt were moved daily to prepare the new site for construction, for a total of 110 million cubic yards moved—approximately one-third the amount moved during the Panama Canal project. C.W. Fentress - J. H. Bradburn Architects designed the iconic tented roof structure known around the world for evoking the nearby Rocky Mountains. Nearly 2.9 million cubic yards of concrete were used to construct DIA’s six runways (the sixth runway was completed in 2003), taxiways, and aprons.

On Feb. 27, 1995, more than 100 aircraft, 13,000 vehicles, and 6,000 rental cars were relocated to the new airport in just 12 hours. DIA’s first departure was United Airlines Flight 1062 to Kansas City, and the first arrival was United Airlines Flight 1474 from Colorado Springs. On opening day, DIA accomplished the world’s first triple-simultaneous landing using the most sophisticated aircraft control tower in the country.

**DENVER INTERNATIONAL AIRPORT VS. STAPLETON INTERNATIONAL AIRPORT**


	<b>Denver International Airport</b>	<b>Stapleton International Airport</b>
Annual economic impact	\$26.3 billion (2013)	\$3.1 billion (1984)
Jobs supported (direct and indirect)	188,338 (2013)	140,000 (1984)
Gross concessions revenue	\$294.8 million	\$45 million (1994)
Total passengers	53.4 million (2014)	33.1 million (1994)
U.S. ranking for passenger traffic	5th	8th (1994)
Size	53 square miles (largest in U.S., second largest in the world)	7.3 square miles
Airport building space	6 million square feet	4 million square feet
On-airport land available for development	9,400 acres	0 acres
Master Plan design capacity	12 runways, 100 million passengers	6 runways, 25 million (no ability to expand)
Runway capabilities	4,300-foot runway separations with ability to perform triple-simultaneous landings in inclement weather	900- and 1,600-foot runway separations with no ability for simultaneous landings in inclement weather
Airport employees	About 35,000	About 21,000 (1994)
On-airport parking spaces	More than 40,000	About 5,000

Source: Bureau of Transportation Statistics



After 20 years, DIA remains on the cutting edge of aviation technology. The airport was the nation's first to fully implement the Federal Aviation Administration's new NextGen arrival and departures procedures in 2013. It was also among the first airports to use new sensor technology to track and manage aircraft movement. With a continued commitment to sustainability, DIA maintains one of the most robust and sophisticated aircraft deicing fluid capture and recycling systems in the world. The airport is home to the longest commercial runway in North America, at

16,000 feet, and can accommodate any commercial aircraft flying today.

As DIA prepares for the next 20 years, it will focus on continuing to deliver an elevated airport experience and to become "America's favorite connecting hub, where the Rocky Mountains meet the world." 

**Heath Montgomery, Denver International Airport Communications Strategist. He may be contacted at [heath.montgomery@flydenver.com](mailto:heath.montgomery@flydenver.com).**

### DENVER INTERNATIONAL AIRPORT, THEN AND NOW

	Denver International Airport 2015	Denver International Airport 1995
Number of commercial airlines	15	19
Number of employees	35,000	23,000
Number of concessions	140	117
Number of gates	109 contact gates; 42 apron load positions	87
Average daily flights	1,500	1,300
Destinations	More than 170	119
Parking spaces	More than 40,000	13,000
Average daily passengers	146,500	85,000
Passenger traffic	53.4 million	31 million
Average cost per enplaned passenger (CPE)	\$11.49 (2015 estimate)	\$16.85
Pieces of snow removal equipment	270	45
Average domestic airfare	\$334.47 (national average \$382.15)	\$354.74 (national average \$296.90)

Source: Bureau of Transportation Statistics

# How Valuable Is a Bike Share Pass?

Kevin Bell

In my role with Boulder B-cycle, the nonprofit operator of Boulder's bike share system, I speak on a daily basis with current customers and potential riders about the program. Among the most common concerns I hear from nonriders is this: "I like the idea of bike sharing, but is a pass really worth the money? I already have my own bike."

In order to understand and respond to this concern, it's important to fully grasp the relatively new service that Boulder B-cycle offers. If you've never used a bike share system before, the concept is simple: it's biking as mass transit.

## How It Works

Bike share systems operate as a network of automated stations strategically placed around town, each holding a supply of bikes. Once riders have purchased a pass, they can ride as many times as they want for the duration of that pass, from any station to any other. Bike share operators handle maintenance and redistribution of bikes across the system as needed.

The defining characteristic of these systems is that each trip needs to be kept short—under 30 minutes in Boulder and most other cities. Once riders exceed this free trip period, additional usage fees start to accrue. Riders can avoid these fees by checking a bike into any station, then starting a new trip. This fee structure encourages riders to check bikes that aren't being ridden back into stations so that others can use this resource.

Bike sharing is a flexible, convenient, on-demand transportation option that combines more easily with public transit than a personal bicycle. Paired with the health and environmental benefits of cycling, bike sharing is a useful service not only for riders, but for cities looking to improve quality of life and reduce congestion. However, the concern over pricing seems to be keeping some potential users away from bike sharing.

## What It Costs

The Boulder B-cycle annual pass is \$70, similar to what most other cities charge, with discounts available for employers who purchase passes in bulk as employee benefits. This pass allows 24/7/365 access to the system of 250 bikes and 38 stations. Taking into account the city's population, Boulder's system is one of the largest in the nation. Annual pass holders can take as many short trips as they want, as often as they want, at any hour of the day, any day of the year, from any station to any station. This pass also works in 16 other cities, including Denver. Simply put, Boulder B-cycle offers bikes on demand for less than \$6 per month. Most riders never accrue any additional usage fees. That's \$5.88 per month for 24/7/365 access to reliable transportation.

How valuable is a bike share pass? For the sake of argument, let's set aside the myriad ways in which a bike share pass can save riders money, and look purely at the value of the service itself.

## Comparing Prices

If bike sharing were overpriced, one would expect similar services to be less expensive. While the unique nature of bike sharing prevents any direct price comparisons, two useful analogies are available: other on-demand services and transit systems.

## On-Demand Service Pricing

For the sake of analogy, rather than 24/7 access to a bike on demand, someone wants access to movies and television shows. Netflix offers that for \$9 per month—50% more than the cost of a bike share pass, with none of the health benefits.

For access to current TV shows, Hulu offers some network and cable shows the day after they air for an additional \$8 per month. Want premium content? The recently announced HBO Now offers programming for \$15 per month.

How about on-demand access to music? That costs \$8 per month through Google Play or \$10 through Spotify. How about some combination of all of these through Amazon Prime? Expect to pay \$100 per year, although the selection is smaller.







Photos courtesy of Boulder B-cycle.

Critically, each of these services supplements, not replaces ownership. The Netflix subscriber still buys DVDs, and the Spotify subscriber won't delete an iTunes library.


### Transit Pricing

When comparing bike sharing to other transit systems, the disparity becomes even more evident. An RTD EcoPass, which provides unlimited bus and light rail trips, costs between 12 and 27 times as much—between \$869 and \$1,936 per year depending on the service level. The point of this comparison is not to claim that the service B-cycle offers is equal, but does a bike share pass really only offer 5 to 10% of the value of an EcoPass? Looking outside of Boulder yields similar disparities. Citibike, New York City's bike share program, recently increased the cost of its annual membership to \$162. Comparable access to New York's subway system still costs \$1,344.

Another common refrain among price-sensitive individuals is that someone might as well purchase a bike for the cost of an annual bike sharing pass. Assuming one could find a bike for \$70, what is certain is that price would not yield a bike with the features built into a B-cycle: fenders, a lock, internally

powered lights, GPS tracking, and, most critically, the peace of mind found in never having to worry about maintenance or theft.

A bike share pass also offers the critical benefits of instantaneous access and one-way trips. Using bike sharing means that a rider can spontaneously combine modes of transportation in a single trip. Most of B-cycle's riders have figured this out. Among the 2,500 annual pass holders, 9 out of 10 have a personal bike and use bike sharing to supplement their existing riding habits.

I understand that bike sharing is a relatively new industry, and with that novelty comes uncertainty. As bike sharing systems begin to grow throughout the United States, the goal is that potential users come to understand that no matter the point of comparison, sharing is far from being overpriced. In fact, it may just be the best deal in transportation. 

**Kevin Bell is the Marketing and Communications Manager for Boulder B-cycle, Boulder's nonprofit bike share program. He may be contacted at [kbell@boulderbicycle.org](mailto:kbell@boulderbicycle.org).**

# COLORADO BUSINESS REVIEW



The *CBR* is a quarterly publication of the Business Research Division at CU-Boulder. Opinions and conclusions expressed in the *CBR* are those of the authors and are not endorsed by the BRD, the Leeds School of Business faculty, or the officials of CU.

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Richard L. Wobbekind, editor; Cindy DiPersio, assistant editor; Brian Lewandowski, technical advisor; Lynn Reed, design.

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