

The Impacts of Colorado Telecommunications Association Members on the Colorado Economy

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Executive Summary

In today's global economy, the ability to quickly access and share information is critical. Accordingly, a prerequisite for economic growth is an advanced, reliable and affordable telecommunications infrastructure. This is especially true for rural areas, where distance and low population densities often put small communities at competitive disadvantages.

This report first documents the economic contribution of small, local, rural wired telecommunication providers to the Colorado Economy. It then examines the potential impacts of reduced federal payments to small, rural providers.

Colorado's rural wired telecommunications providers support \$96.7 million in output and nearly 430 jobs

Colorado's local rural wired telecommunication providers serve 30,800 lines, covering the state's most rural areas. Rural wired telecommunications companies directly provide jobs for a substantial number Coloradoans. Yet their economic contributions reach far beyond what happens at their place of business.

The state's rural providers support 165 jobs, with an average compensation of \$61,300 (35 percent higher than the rural average).

Considering both their own impacts and the subsequent spin-off impacts, rural wired telecommunications providers support \$96.7 million in economic output, which translates into 428 total jobs with annual payroll of \$21.0 million.

Potential reductions in federal support to rural wired telecommunications providers could cost more than 140 jobs

To help rural areas overcome a variety of barriers to low cost service provision, the federal government established the Universal Service Fund (USF) High Cost Program. This fund—which is supported by a surcharge on interstate and end-user revenues—offers financial support to rural wired telecommunication providers in order to help them deliver affordable services to residents and businesses.

In 2010, Colorado's small, rural providers had \$69.2 million in total revenue, with \$23.7 million (34.3 percent) generated from the USF.

The relative importance of USF varies by company, with USF providing at least 25 percent of all revenue for 18 companies.

Recently, the Federal Communications Commission has proposed fundamental changes to the national telecommunications policy that would drastically reduce, or even potentially eliminate, USF funding to rural wired telecommunication providers.

If enacted, these changes would profoundly impact these providers and the communities they serve where they would be forced to both downsize and raise prices. In some cases rural residents might see tremendous increases in the rates they pay, dramatically impacting household budgets. In other cases, providers might go out of business, laying off workers and potentially leaving communities without a wired service provider.

To better understand how the state might be impacted by changes to USF support this study uses an economic impact model created specifically for Colorado. Overall, the authors consider five scenarios. The results shared here look at two of them.

The first simulation estimates statewide impacts if USF funding were eliminated in the state of Colorado. We estimate that a complete loss in this funding would reduce total state output by \$33.4 million. Universal Service Funding supports 57 direct employees and with spin-off effects, 148 total employees would be lost with the elimination of this funding. We estimate that the loss in these employees would reduce state payrolls by \$7.3 million.

The second simulation considers the case where USF funding is reduced by 30 percent. This would lower Colorado output by a total of \$10.0 million leading to a loss of 17 jobs in CTA member companies. Including spin-off effects, we estimate a total of 44 rural jobs lost, reducing rural payrolls by a total of \$2.2 million. Further, state and local tax revenues are estimated to decline by \$608,000 - \$873,000 per year.

1. Introduction

In today's global economy, the ability to quickly access and share information is critical. Accordingly, a prerequisite for economic growth is an advanced, reliable and affordable telecommunications infrastructure. This is especially true for places where distance, uneven terrain and low population densities put communities at competitive disadvantages.

To help such areas overcome these challenges, the Federal Communications Commission (FCC) established the Universal Service Fund (USF) High Cost Program. This fund—which is supported by a surcharge on communication providers interstate end-user revenues—offers financial support to wired telecommunication providers in high cost areas in order to help them deliver affordable service to residents and businesses in their service areas. By its nature, the program is especially important for many rural communities.

Recently, the FCC has proposed fundamental changes to the national telecommunications policy that would drastically reduce, or even potentially eliminate, USF funding to rural wired telecommunication providers. If enacted, these changes would profoundly impact these providers and the communities they serve. In some cases rural residents might see tremendous

increases in the rates they pay, dramatically impacting household budgets. In other cases, providers might go out of business, laying off workers and potentially leaving communities without a wired service provider.

This study analyzes and reports on the economic impacts of wireline providers in rural communities in Colorado and identifies the implications if USF funds are reduced or eliminated. Since the providers in the study are all wireline providers, the study only details their impacts. Wireless providers also supply service to many of the same communities. Rural wireless service provides customers with mobility and in some areas access to broadband service. It is important to note, however, that many of the wireless carriers depend on state-of-the-art broadband networks from wireline providers in order to deliver their services. In this regard, it is important to note that without robust rural multi-use wired networks, many wireless providers may not be able to deliver quality services including broadband (for more information please refer to *The Truth About Wireless Broadband* by the Foundation for Rural Service).¹

In the next section we give a basic overview of some key aspects of current national telecommunications policy and potential changes that could greatly affect rural Colorado. In section 3 we provide an overview of rural Colorado's economic performance over the past decade, emphasizing trends in the rural wired telecommunication sector. Overall, we show the industry directly provided 165 jobs and \$10.1 million in payroll in 2010.

In part because wired telecommunications providers have extensive supply chains, the jobs they provide do not fully describe their economic impact. In section 4 we use an economic model to quantify the spin-off economic activity supported by these businesses. Considering both their own impacts and the subsequent spin-off impacts, we estimate that rural wired telecommunications providers support \$96.7 million in economic output, which translates into 428 total jobs with annual payroll of \$21.0 million.

In section 5 we look at the economic impacts that might arise from the total or partial elimination of USF support. Here we use a new model of the Colorado economy developed at CSU to help better understand how households and the state economy are impacted by changes in the prices of essential goods and services, in this case wired telecommunications. Impacts on output, wages, employment and state and local taxes are among those we discuss.

2. Policy Background

A robust wired telecommunications infrastructure is critical for economic development. This is especially true in rural areas, where reliable and affordable voice and data service can help overcome many of the information sharing challenges facing smaller, more remote places.

Because they have a smaller and more dispersed customer base, it is relatively expensive to provide quality telecommunications service to rural areas. At the same time, rural residents

¹ This study is available here: www.ntca.org/ceoblog/broadband/the-truth-about-wireless-broadband. This study suggests some of the potential impacts of reduced funding for rural wired providers but the reader should also be aware of the implications for rural wireless service.

tend to have lower incomes than their urban counterparts. As a result, wired rural telecommunications tends not to be a lucrative industry.

One consequence of lower profit margins is that rural areas are often less attractive to large, national telecommunications providers. Reflecting this, many of Colorado's rural communities receive wired telecommunications services from small, local and regional companies. Currently, the Colorado Telecommunication Association (CTA) represents most of these companies, serving 30,800 lines.

Federal and state governments have long recognized the business challenges facing rural wired telecommunication providers. In part to help ensure rural residents and businesses have access to affordable, high level and high quality services, Congress enacted the Telecommunications Act of 1996. This Act was the first major overhaul of US telecommunications law since 1934, and introduced a newly codified approach to supporting the deployment and maintenance of vital communications networks in rural high-cost areas. Additionally, the Act ordered providers to contribute toward advanced telecommunication services for schools, health care providers and libraries.

In 1997 the Federal Communications Commission created the Universal Service Fund (USF) to meet to the goals of the Telecommunications Act. Essentially, the USF adds a surcharge to a telecommunication company's interstate and end-user revenues, with the proceeds allocated to four program areas:²

- *High Cost Program* – These funds ensure that telecommunication customers across the country have access to services and pay rates comparable to urban customers.
- *Low Income Program* - Provides discounted, basic, local telephone service discounts for low-income customers.
- *Rural Health Care* – Subsidizes telemedicine in rural areas to enable affordable access to specialists.
- *Schools & Libraries* - Subsidizes internet access, telecommunications services, internal infrastructure and basic maintenance of internal telecommunications for schools and libraries.

The USF is an important revenue source for Colorado's rural telecommunication companies, providing over \$23.7 million in assistance to CTA member providers in 2010. Overall, this represents about 34 percent of total operating revenue for these companies.

Beyond operational support the USF plays a complementary role to other rural telecommunications initiatives. Especially prominent is the Rural Utilities Service (RUS) program of the United States Department of Agriculture (USDA). RUS activities support rural economic development by lending money for telecommunications infrastructure improvement, with \$5.3 billion of lending approved for 487 borrowers since 2001. Traditionally, USF funding has been considered as part of a provider's revenue stream in the lending application process. Accordingly, reduced USF support will not only hamper the ability of providers to obtain new loans, but also compromises their ability to pay back current loans, possibly leading to default.

² The surcharge rate, which changes quarterly, was set as 15.5 percent in the first quarter of 2011.

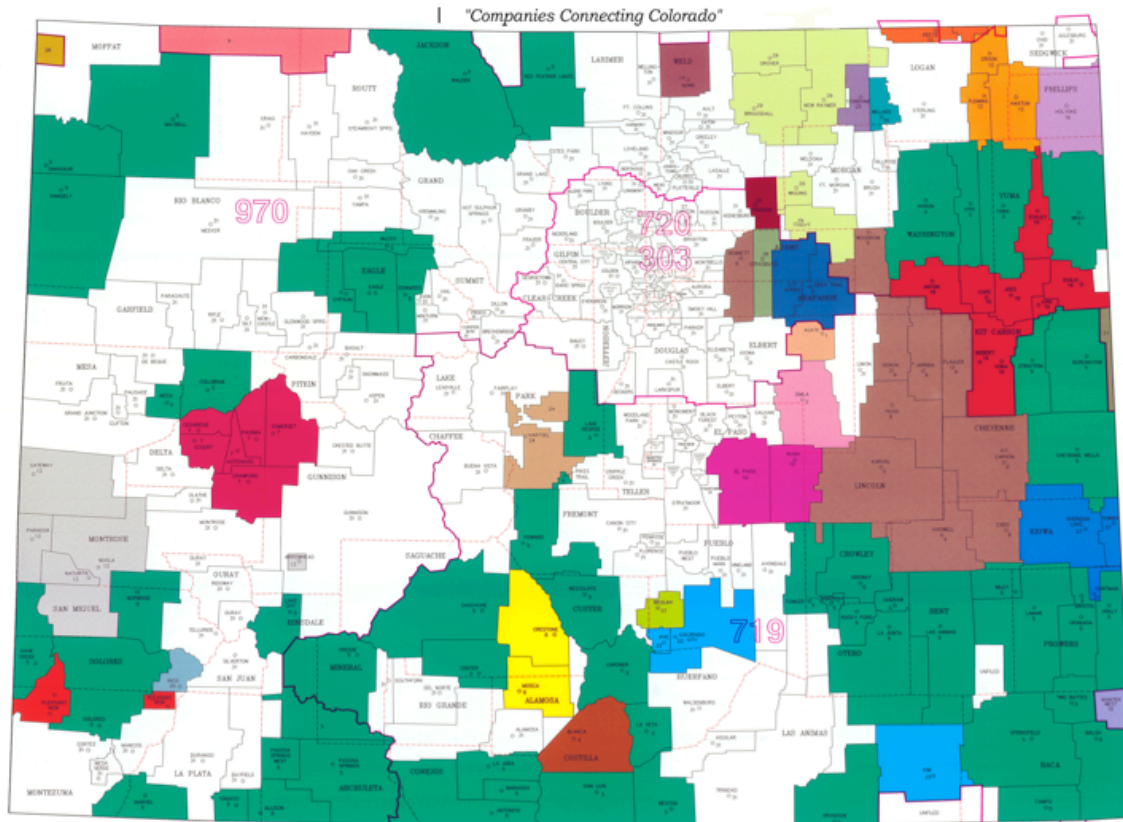
While USF funding is critical to many of the state's rural providers, there is great uncertainty about its continuance. In March 2010 the FCC released its National Broadband (NBP), which is designed to improve high-speed internet access across the United States. Supporting the implementation of the NBP, the FCC issued a Notice of Proposed Rulemaking (NPRM), which describes, among other things, the parameters of the NBP, including funding in high cost areas.

One critical aspect of the NPRM is that it potentially will shift up to \$15.5 billion nationally from the USF fund to support broadband deployment in underserved areas. Although increasing broadband access is certainly laudable, reduced USF funding will adversely impact rural wired telecommunication providers and potentially the communities and customers they serve.

3. Rural Wired Telecommunications Providers and the Colorado Economy

Colorado's rural economy is diverse. Some regions depend on natural resources, others on tourism, and still others on production agriculture. Yet the Great Recession hit all of them hard, with job losses and high unemployment a pervasive problem. In this section we describe recent economic trends in Colorado's 29 counties primarily served by rural wired telecommunication providers.³ We then provide a closer look at industry trends, including the CTA member companies.

³ The service areas of Colorado's rural wired telecommunications providers do not coincide with county boundaries, for the most part. The descriptive analysis we provide in this section considers only those counties where smaller providers cover the majority of the county's population. One consequence is that we omit counties with rural providers present but dominated by a metropolitan region (e.g., Adams, Larimer and Weld Counties). Because of this, our results indicate general trends more than precision. The counties we look at here are: Alamosa, Baca, Cheyenne, Costilla, Dolores, Hinsdale, Kiowa, Kit Carson, Lincoln, Morgan, Park, Phillips, San Miguel, Washington and Yuma.



Source: CTA

NB: The green and white areas are serviced by Century Link, which is not included in this study.

Despite pockets of growth, some rural providers serving fewer households

Although Colorado added nearly 728,000 people (17 percent) between 2000 and 2010, many of the state's most remote counties experienced population decline. For the areas primarily served by the rural wired telecommunication providers, total population grew by only 2.1 percent over the decade, with 7 counties actually losing population.

Job losses pervasive in most CTA service areas

Like the nation, Colorado's economy has struggled over the past decade. The combined effects of the 2001 'dot-com' recession—which hit Colorado particularly hard—and the more recent deep and wide-ranging Great Recession meant the state's economy has added only 7,000 jobs since July 2001. A closer look at employment trends of over the past 5 years shows that the rural areas served by CTA members have added less than 50 total jobs over this time frame, with 8 counties having lost jobs.

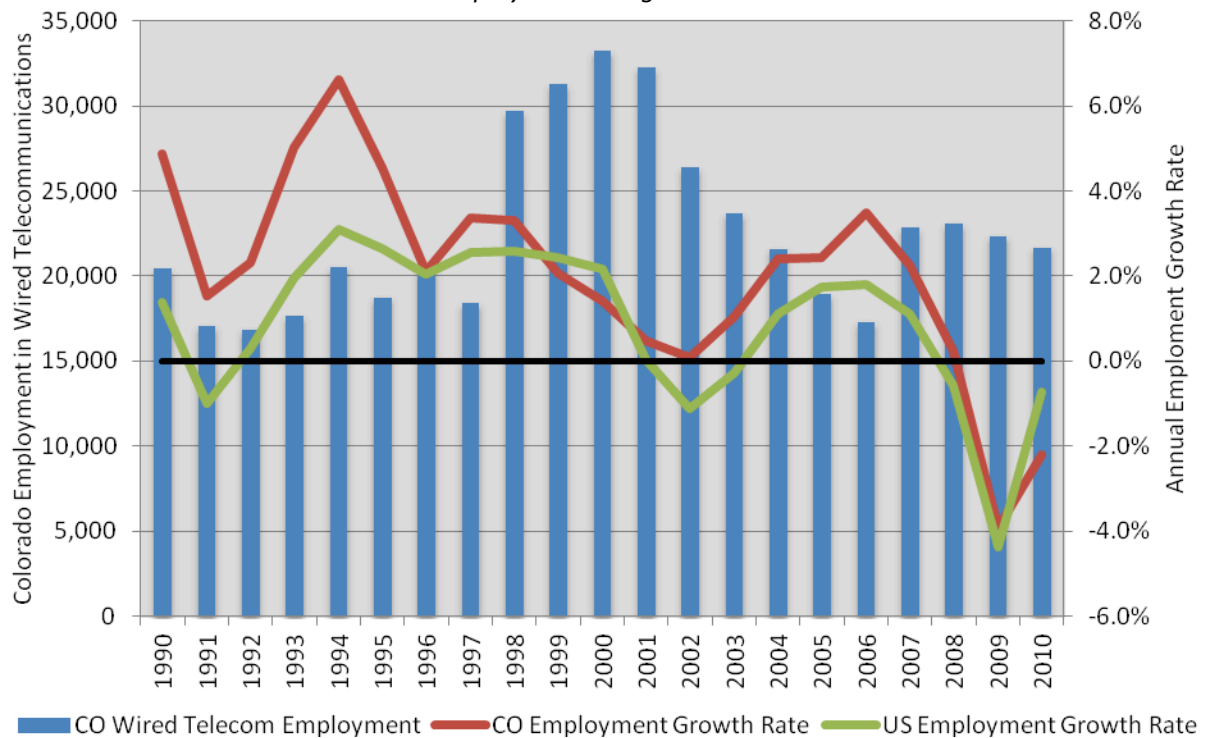
Incomes well below state average in CTA service areas

Reflecting relatively poor job markets, incomes remain substantially lower in the rural service areas. For example, in 2009 the average county per capita income in the rural areas considered here was only 86 percent of the state average. Because rural households tend to have lower incomes, increases in telecommunications costs will have a greater impact on them than would a similar increase for typical urban households.

A closer look at the telecommunications sector

Although industry growth has slowed since the 1990s, Wired telecommunication carriers (NAICS 517110⁴) provide important contributions to Colorado’s economy and its rural areas. In 2010, the sector provided nearly 21,700 jobs in the state. Over the period 2005-2010, Colorado’s wired telecommunication carriers added more than 2,700 jobs (14.3 percent); remarkable in a period when the state has lost jobs overall. Industry wages averaged \$81,100 in 2010, 69 percent higher than the state average.

Colorado wired telecommunications employment has grown since 1990



Source: Colorado Department of Labor and Employment (CDLE)-Quarterly Census of Employment and Wages (QCEW) and the Bureau of Labor Statistics (BLS)

While most wired telecommunications jobs are concentrated in Colorado’s more populated places, the sectors’ jobs are an important part of the state’s rural economy. In 2010 Colorado’s local rural wired telecommunications providers used in this analysis provided 165 jobs, with an

⁴ For a further discussion of NAICS codes, see Appendix C

average compensation of \$61,300. With a total payroll of \$10.1 million, the industry pay for the rural providers are 35 percent higher than the rural average.

4. The Economic Impact of Colorado's Rural Wired Telecommunications Providers

Colorado's local rural wired telecommunication providers serve 30,800 lines, covering the state's most rural areas. As shown above, wired telecommunications companies directly provide jobs for a substantial number Coloradoans. Additionally, they pay state and local taxes, which help support the communities and schools in which they operate.

Yet their economic contributions reach far beyond what happens at their place of business. For example, wired telecommunication providers are just one part of a highly integrated supply chain, which includes equipment and material providers, accountants, attorneys, labs, and many more—all providing jobs. Additionally, expenditures by employees—both of the providers themselves as well as their supply chain—create statewide economic activity. Economic activity created through these spin-off activities are known as ripple—or multiplier—effects.

This section quantifies these multiplier effects to provide a broader examination of the impact of rural wired telecommunications providers⁵ on the rural and state economies. As we describe below, our results indicate that the rural wired telecommunication providers support \$91.2 million in value-added activity through direct and multiplier impacts. This supports 428 total jobs, paying an average compensation of \$49,200.

Methods

To estimate the multiplier impacts we use the Colorado version of the IMPLAN model (www.implan.com).⁶ IMPLAN is a well-established, county level input-output model that estimates how changes in final demand (i.e., output) ultimately translate into changes in employment (i.e., inputs), as well as associated compensation.

Our data is drawn from several sources. Most important are the annual Incumbent Local Exchange Carried reports that providers file with the Colorado Public Utilities Commission. Among other things, these reports provide key information on a variety of company details, including revenues by source, number of employees, number of lines, taxes paid, etc. We also draw on data from the Universal Service Administrative Company, which provides USF funding data for participating companies. Wage data is drawn from the Quarterly Census of Employment and Wages. Output and value-added data is provided by IMPLAN.

Our analysis considers two impacts. First we measure the direct impacts, which are the economic activities attributable directly to the wired telecommunications providers themselves. We then calculate spin-off impacts using IMPLAN multipliers. These impacts are caused by wired telecommunications making purchases from their supply chains and the spending of

⁵ This report excludes CenturyLink (Qwest) and subsidiaries.

⁶ Multipliers quantify the relationship between direct impacts and total impacts. For example, if 100 direct jobs support 50 spinoff jobs, then the multiplier is 1.5 (100 jobs * 1.5 = 150 jobs (direct + spinoff)).

employees—both providers and supply chain—as they conduct day-to-day activities (e.g., buying groceries, accounting services, travel, etc.). Total impacts are obtained by adding direct and spin-off impacts.

Our analysis considers 4 economic impact measures: output, value added, employee compensation and employment. *Output*--which is the same as total revenue--is the broadest measure. Because providers use much of their revenue to pay their suppliers, output overstates the sector’s unique contributions, which can lead to double counting when spin-off effects are considered. To avoid double counting, economists prefer measuring impact with *value-added*,⁷ which considers the economic activity directly attributable to providers. We also provide estimates of *employee compensation* (wages plus benefits) and total *employment* (combined full and part-time).

Statewide impacts

Overall, the state’s rural wired telecommunication providers generated \$96.7 million in output in 2010, \$69.1 million directly and an additional \$27.6 million in spin-off impacts. This translates into \$91.2 million in total value added activity. In employment terms, the 165 jobs generate an additional 263 jobs through multiplier impacts. Together, these 428 jobs add more than \$21.0 million to state payrolls.

Summary economic impacts of Colorado’s rural wired telecommunication providers

	Direct	Spin-off	Total	Multiplier
Output	\$69,108,000	\$27,607,000	\$96,715,000	1.4
Value Added	\$61,023,000	\$30,216,000	\$91,240,000	1.4
Employee Compensation	\$10,116,000	\$10,912,000	\$21,028,000	2.1
Employment	165	263	428	1.6
Average Employee Compensation	\$61,300	\$41,500	\$49,200	

Source: Authors’ calculations using data from CDLE-QCEW and Public Utilities Commission public annual reports, and IMPLAN

5. The Potential Economic Impacts of Reducing USF Funding to Colorado’s Rural Wired Telecommunications Providers

As described in Section 2, the FCC is considering a dramatic overhaul of the high cost initiative of the USF program. Under the NBP, the FCC will potentially reallocate billions of dollars that have long been used to support wired rural telecommunications. Such a policy shift would have important implications for Colorado, where USF support provides about 34 percent of total annual revenue for the state’s rural wired telecommunications providers.

With such dramatic losses providers would likely follow one of two courses, each with important ramifications for Colorado’s rural communities. First, it is quite conceivable that many providers would simply go out of business. In affected communities, rural residents and consumers would see reduced choice--if they have access to any remaining providers at all. Further, many rural

⁷ At the national level value added is the same as Gross Domestic Product (GDP).

areas would see higher unemployment rates, as shuttered companies layoff their workforce. (The industry’s economic impact described in the preceding section can be considered an estimate of the impact of the proposed policy should it force all of Colorado’s current rural providers out of business.)

For companies surviving the new regime, the proposed changes still would have far-reaching consequences. First, it is unlikely that companies could continue to provide the same level of service as they did with High Cost Program assistance. In an era where a robust and reliable telecommunications is essential for economic competitiveness, rural communities would be further disadvantaged. Additionally, with lower revenues, companies would need to get smaller, probably by laying off workers as part of their restructuring.

The following table describes the total and USF revenues for Colorado’s rural wired telecommunications providers in 2010. Overall, the providers listed here had \$45.5 million in revenue, with \$23.7 million (34.3 percent) generated from the USF. The relative importance of USF varies by company, with USF providing at least 25 percent of all revenue for 18 companies. Companies with higher dependence on USF are more likely to be adversely impacted by changes to the USF, and perhaps may even go out of business if they cannot overcome the reduction.

Universal Service Fund Support

Colorado Telecommunication Member	Revenue	Total Universal Service Fund Support	Total Revenue	USF Share of Total Revenue
Rye Telephone Company	\$5,734,000	\$4,270,000	\$10,004,000	42.7%
Blanca Telephone Company	\$5,080,000	\$2,854,000	\$7,934,000	36.0%
Eastern Slope Rural Telephone Association	\$4,844,000	\$2,145,000	\$6,989,000	30.7%
Plains Cooperative Telephone Association	\$2,857,000	\$1,933,000	\$4,790,000	40.4%
Wiggins Telephone Association	\$2,591,000	\$1,654,000	\$4,245,000	39.0%
Nunn Telephone Company	\$1,971,000	\$1,394,000	\$3,365,000	41.4%
Phillips County Telephone Company	\$2,307,000	\$1,200,000	\$3,507,000	34.2%
South Park Telephone Company	\$1,398,000	\$1,114,000	\$2,512,000	44.3%
Delta County Tele-Comm (TDS Telecom)	\$5,861,000	\$1,106,000	\$6,967,000	15.9%
Pine Drive Telephone Company	\$1,456,000	\$912,000	\$2,368,000	38.5%
Nucla-Naturita Telephone Company	\$2,086,000	\$788,000	\$2,874,000	27.4%
Haxtun Telephone Company	\$1,515,000	\$736,000	\$2,251,000	32.7%
Farmers Telephone Company	\$1,277,000	\$696,000	\$1,973,000	35.3%
Columbine Telephone Company (FairPoint)	\$1,557,000	\$657,000	\$2,214,000	29.7%
Roggen Telephone Company	\$757,000	\$636,000	\$1,393,000	45.7%
Strasburg Telephone Company (TDS Telecom)	\$1,441,000	\$475,000	\$1,916,000	24.8%
Agate Mutual Telephone Cooperative Association	\$628,000	\$450,000	\$1,078,000	41.7%

Peetz Cooperative Telephone Company	\$583,000	\$272,000	\$855,000	31.8%
Big Sandy Telecom (FairPoint)	\$700,000	\$190,000	\$890,000	21.3%
Stoneham Cooperative Telephone Company	\$121,000	\$88,000	\$209,000	42.1%
Rico Telephone Company	\$366,000	\$77,000	\$443,000	17.4%
Sunflower Telephone Company (FairPoint)	\$226,000	\$76,000	\$302,000	25.2%
Willard Telephone Company	\$140,000	\$12,000	\$152,000	7.9%
CTA Member Total	\$45,496,000	\$23,735,000	\$69,231,000	34.3%

Source: Public Utilities Commission public annual reports and the Universal Service Administrative Company

In the remainder of this section we use the IMPLAN model to examine the potential economic impacts of 1) the complete elimination of USF funding, and 2) a 30 percent reduction of USF funding. We then use a CGE model for Colorado to examine two cases where rural wired telecommunication providers face a 30 percent reduction in USF support, but are able to generate additional revenue through higher rates. In these final two scenarios we consider effects on the economy due not only to providers having less revenue, but also those resulting from households spending more for the same level of telecommunications services, and subsequently less on other goods and services.

Scenario 1: Potential economic impacts of elimination of USF funding support for rural wired telecommunication providers

Scenario 1 examines the estimated statewide impacts if USF funding were eliminated in the state of Colorado; this funding constitutes about 34 percent, or \$23.7 million, of total revenue for CTA member providers. We estimate that a complete loss in this funding would reduce total state output by \$33.4 million. Universal Service Funding supports 57 direct employees and with spin-off effects, 148 total employees would be lost with the elimination of this funding. We estimate that the loss in these employees would reduce state payrolls by \$7.3 million.

Estimated impacts of a total loss in USF funding for all local rural wired telecommunication providers

	Direct	Spin-off	Total
Output	\$23,733,000	\$9,537,000	\$33,411,000
Value Added	\$21,081,000	\$10,438,000	\$31,519,000
Employee Compensation	\$3,495,000	\$3,770,000	\$7,264,000
Employment	57	91	148

Source: Authors' calculations using data from CDLE-QCEW, CTA member public annual reports, Universal Service Administration Company, and IMPLAN

Scenario 2: Potential economic impacts of 30 percent reduction of USF funding support for rural wired telecommunication providers, without additional customer revenues

In this scenario we examine the impacts of a 30 percent cut in Universal Service Funding, which translates to a \$7.1 million reduction to CTA member providers. We chose 30 a percent reduction as it reflects a conservative estimate of the implications of the NBP on USF. Using IMPLAN, we estimate that at 30 percent USF cut would reduce Colorado output by a total of \$10.0 million. Our calculations estimate that the proposed reduction would cause a loss of 17 jobs in CTA member companies. Including spin-off effects, we estimate a total of 44 rural jobs lost, reducing rural payrolls by a total of \$2.2 million.

Estimated Impacts of a 30 percent reduction in Universal Service Funding (all rural local wired providers)

	Direct	Spin-off	Total
Output	\$7,120,000	\$2,844,000	\$9,965,000
Value Added	\$6,287,000	\$3,113,000	\$9,400,000
Employee Compensation	\$1,042,000	\$1,124,000	\$2,167,000
Employment	17	27	44

Source: Authors' calculations using data from CDLE-QCEW, CTA member public annual reports, Universal Service Administration Company, and IMPLAN

Scenario 3: Potential economic impacts of 30 percent reduction (\$7.1 million) of USF funding support for rural wired telecommunication providers, with households paying higher prices so as to regenerate \$4.7 million of lost funding

In the preceding analysis we used the IMPLAN model to examine how a 30 percent reduction in USF funding would impact CTA members, assuming that these providers were unable to make up for lost revenues through raising user rates. In such a scenario, the costs of lost USF funding are borne entirely by providers.

In the remaining scenarios we once again examine the potential impacts of a 30 percent reduction in USF funding to the state's rural wired telecommunications providers, but now allow them to regenerate some of these revenues through higher rates. In these scenarios rural wired telecommunication provider would be forced to both downsize (although not by as much as scenario 2) and raise prices.

It is important to note, however, that some rural providers indicated that it would be very difficult for them to raise prices without losing substantial numbers of customers. There was some indication that the impact of losing customers would be to the provider going out of business. Such potential impacts are not fully considered here, but should be kept in mind when digesting these results.

We consider two recovery amounts: 66 percent and 33 percent. Accordingly, we model the proposed policy change as a two-phase impact. The first phase looks at how lower revenues impact providers. The second phase examines how higher prices will adversely impact the state economy, as households and businesses faced with higher telecommunications costs will now have less money to spend on other goods and services, reducing employment in allied sectors.

To do so we use a computable general equilibrium (CGE) model of the state's economy developed at CSU. A CGE model is more flexible than an input-output model, as it allows users

to initiate scenarios through relative price changes, rather than demand changes. As such, it more closely replicates the scenario of interest. The downside of CGE models relative to IMPLAN is that they tend to be more aggregated along industry lines, thus may not fully express the nuances of the wired telecommunications sector.

It is important to note because the way the CGE model is constructed, it is difficult to separate the direct and spin-off impacts. Accordingly, in scenarios 3 and 4 we describe total impacts on output, employment and household and labor income. An additional measure of impact not included above is impacts on state and local tax revenue.

In this scenario we assume that providers lose 30 percent of USF funding (\$7.1 million). However, we assume that they are able to increase prices such that households pay an additional \$4.7 million for wired telecommunication services. This means that providers are less impacted than in scenario 2, but additional negative impacts arise as households consume less of other goods and services.

Estimated Impacts of a 30 percent reduction in Universal Service Funding (all rural local wired providers), \$4.7 million regenerated through higher rates

	Total
Output	\$10,243,000
Employee Compensation	\$3,860,000
Employment	79
State and Local Taxes	\$873,000

Source: Authors' calculations using data from CDLE-QCEW, CTA member public annual reports, Universal Service Administration Company, and IMPLAN

Overall, the scenario suggests more than a \$10.2 million loss in output. This costs 79 jobs and \$3.86 million in lost employee compensation. Under this scenario state and local tax revenues decline by \$873,000 per year.

Scenario 4: Potential economic impacts of 30 percent reduction (\$7.1 million) of USF funding support for rural wired telecommunication providers, with households paying higher prices so as to regenerate \$2.3 million of lost funding

In this scenario we again assume that providers lose 30 percent of USF funding (\$7.1 million). However, we assume that they are able to increase prices such that households pay an additional \$2.3 million for wired telecommunication services. This means that providers are less impacted than in scenario 2 but more than in scenario 3. Once again, negative impacts arise as households consume less of other goods and services, but they are less impacted than in scenario 3.

Estimated Impacts of a 30 percent reduction in Universal Service Funding (all rural local wired providers), \$2.3 million regenerated through higher rates

	Total
Output	\$12,657,000
Employee Compensation	\$2,750,000
Employment	66
State and Local Taxes	\$608,000

Overall, the scenario suggests nearly a \$12.7 million loss in output. This costs 66 jobs and \$2.75 million in lost employee compensation. Under this scenario state and local tax revenues decline by \$608,000 per year.

Limitations

In this study we examine the potential economic impacts of reductions in USF funding for Colorado’s rural wired telecommunications providers and their customers. However, our study does not consider the full effects on the state’s economy. For example, our work does not quantify the extent to which rural wired telecommunications infrastructure affects rural economic development. In particular, we are unable to quantify how important these providers, and subsequently USF funding, is to the location decisions of businesses. This may be important if communities lose businesses and residents because of an inadequate telecommunication network.

While our results show the adverse effects that may arise for rural wired providers from the NBP it is important to keep in mind that they may be amplified by other FCC actions. Specifically, the FCC has also proposed reducing inter-carrier compensation, which is an important revenue source for CTA providers. Should this happen, Colorado will experience further reductions in output, income, employment and tax revenue. Quantifying these impacts is beyond this study’s scope.

Additionally, we do not quantify how the NBP will impact rural Colorado. It may well be the case that some (or all) of the adverse impacts described above will be mitigated by the proposed changes. This could happen if new providers move into rural Colorado due to the initiatives of the NBP.

Summary

In this report we document the economic contribution of small, local, rural wired telecommunication providers to the Colorado Economy. Overall, we find the state’s 26 such providers support 165 jobs, with an average compensation of \$61,300 (35 percent higher than the rural average). Through economic spin-offs, the sector generates an additional 263 jobs. Together, these 428 jobs add more than \$21.0 million to state payrolls.

We then turn our attention to estimating the impacts of reduced USF payments to these rural providers. Over all, we find that a 30 percent USF reduction would lower Colorado output by a total of \$10.0 million. Conservatively, this would lead to a loss of 17 jobs in CTA member

companies. Including spin-off effects, we estimate a total of 44 rural jobs lost, reducing rural payrolls by a total of \$2.2 million.

APPENDIX A

This appendix details the statewide economic impacts of the rural wired telecommunications workers represented by Colorado Telecommunication Association.

How to read the table

The table below details how the 165 jobs from firms CTA represents impact the state's economy, disaggregated over 2-digit NAICS. The rural wired telecommunications industry, shown in **bold**, is the direct effect from the CTA represented jobs for the state. For instance, the table below indicates Colorado has 165 jobs in CTA represented firms. The effects on every other industry, because of these jobs, are listed in the other lines. As an example, these 165 jobs in rural wired telecommunication support an additional 12 jobs in the industry of Arts, Entertainment and Recreation (primarily through employee spending). Summing across the other industries, we see that CTA member firms indirectly support a total of 263 jobs across the state.

The "total" line includes both direct and spin-off effects across Colorado, whereas the "spin-off effect total" lines are just that – the secondary impacts from rural wired telecommunications jobs.

The impacts of rural wired telecommunications jobs on the Coloradoan economy

NAICS	Industry	Output /Revenue	Spin-Off Employment ⁸	Employee Compensation	Average Employee Compensation	Total Value Added
11	Ag, Forestry, Fish & Hunting	\$81,600	1	\$8,900	\$10,700	\$39,900
21	Mining	\$96,500	0	\$19,600	\$0	\$90,900
22	Utilities	\$517,100	1	\$107,100	\$106,100	\$531,500
23	Construction	\$285,300	3	\$115,600	\$37,700	\$239,100
31	Manufacturing	\$1,029,000	3	\$221,900	\$70,000	\$520,400
42	Wholesale Trade	\$1,065,200	7	\$505,200	\$71,600	\$1,233,900
44	Retail trade	\$1,174,900	27	\$736,900	\$26,900	\$1,743,700
48	Transportation & Warehousing	\$709,700	6	\$282,300	\$43,600	\$625,300
51	Information	\$3,619,300	13	\$985,600	\$73,200	\$3,512,100
517	Telecom	\$69,108,200	165	\$10,116,000	\$61,300	\$61,023,400
52	Finance & Insurance	\$3,024,900	19	\$955,800	\$50,300	\$2,862,400
53	Real Estate & Rental	\$5,192,900	23	\$281,900	\$12,100	\$6,528,300
54	Professional, Scientific & Technical Services	\$4,679,900	52	\$2,999,000	\$58,000	\$5,540,000
55	Management of Companies	\$357,100	2	\$269,500	\$137,800	\$428,300
56	Administrative & Waste Services	\$1,328,400	24	\$718,800	\$29,800	\$1,479,200
61	Educational Services	\$83,400	2	\$53,600	\$28,400	\$88,200
62	Health & Social Services	\$1,049,700	15	\$690,100	\$46,700	\$1,087,000
71	Arts Entertainment & Recreation	\$523,700	12	\$261,000	\$22,100	\$558,400
72	Accommodation & Food Services	\$1,099,200	22	\$499,800	\$22,200	\$1,037,900
81	Other Services	\$1,030,800	18	\$528,400	\$28,700	\$1,051,400
92	Government	\$657,900	10	\$671,000	\$64,200	\$1,018,300
	Total	\$96,714,700	428	\$21,028,000	\$49,200	\$91,239,800
	Spin-Off Effect Total	\$27,606,600	263	\$10,912,000	\$41,500	\$30,216,400

Source: Authors' calculations using data from CDLE-QCEW data, Public Utilities Commission public annual reports, and IMPLAN

⁸ Employment estimates are rounded to the nearest FTE job.

APPENDIX B

Methods

This first level of analysis is based on IMPLAN, an input-output model that examines transactions between businesses, government and households. Drawing on data collected by federal and state government agencies, IMPLAN uses regional industry purchasing patterns to examine how changes in one industry will affect others. The IMPLAN model has been used as the basis for thousands of economic impact reports throughout the United States. Here we will use IMPLAN to look at 1) the current employment, wage and tax contributions of CTA to the state's economy and 2) the potential impacts on these indicators should USF funding be reduced.

Data was drawn from 3 sources. First, we used public sources, such as the QCEW data series, produced by the Colorado Dept of Labor and Employment (CDLE) and County Business Patterns from the US Department of Commerce. Second, we used information provided in the financial reports providers submit to the PUC to modify the IMPLAN model to more accurately represent the industry. Third, we worked closely with CTA meet other data needs.

The industry is defined using the North American Industrial Classification System (NAICS) code, a numerical taxonomy system that classifies businesses and organizations by their primary economic activity. Wired telecommunication carriers are included as NAICS 517110, a subset of the Information sector (NAICS 51).

APPENDIX C

This section explains the North American Classification System (NAICS).

NAICS is a basic framework for categorizing establishments and is the basis for regional economic analysis. This system allows us to arrange the economy's multitude of business types into discrete industry classifications. These classifications are numerical and hierarchical, with digits on the left defining major sectors and digits to their right specifying subdivisions. Today, much of the readily available economic data related to employment is based on such classifications.

NAICS divides the economy into 20 major sectors and recognizes 1,170 industries. Five of the 20 sectors are largely goods producing and 15 are entirely services-producing industries. The NAICS system is hierarchical and identifies sectors and industries therein with from 2 to 6 digits: the more digits, the more specific the industry identification.

New NAICS code structure

NAICS Code	Industry
11	Agriculture, Forestry, and Fishing
21	Mining
22	Utilities
23	Construction
31-33	Manufacturing
41-43	Wholesale Trade
44-46	Retail Trade
48-49	Transportation and Warehousing
51	Information
52	Finance and Insurance
53	Real Estate and Rental and Leasing
54	Professional, Scientific, and Technical Services
55	Management of Companies and Enterprises
56	Administrative and Support and Waste Management and Remediation Services
61	Educational Services
62	Health Care and Social Assistance
71	Arts, Entertainment, and Recreation
72	Accommodation and Food Services
81	Other Service (except public administration)
91-93	Public Administration

Typically, in comparative discussions of industries the NAICS codes can be used as 2, 3, 4, 5, and 6 digit codes. Discussions about manufacturing in general use the 2 digit manufacturing codes (31-33) but discussions about particular types of manufacturing use the 3-digit sub-sector codes.

Here are a couple of examples:

<i>Example #1</i>			<i>Example #2</i>	
NAICS Level	NAICS Code	Description	NAICS Code	Description
Sector	31-33	Manufacturing	51	Information
Subsector	334	Computer and electronic product manufacturing	513	Broadcasting and telecommunications
Industry group	3346	Manufacturing and reproduction of magnetic and optical media	5133	Telecommunications
Industry	33461	Manufacturing and reproduction of magnetic and optical media	51332	Wireless telecommunications carriers, except satellite
U.S. Industry	334611	Reproduction of software	513321	Paging

A Few Caveats

When using Industrial Classifications, there are a few important factors to keep in mind.

First, individual establishments are assigned an industry according to their primary economic activity. Thus, if a business produces goods that fall under two or more industries, the business is classified according to its major output.

Second, employment figures represent an industry and not an occupation. Thus, industry data does not provide a clear picture of the types of work in which employees are engaged. For example, many companies carry out some of their business services internally. Such services show up in the industry employment statistics for the whole business. For example, an accountant at a steel mill would be counted in the employment statistics for the steel industry (NAICS 3311) rather than the business service industry (NAICS 5412). However, if the steel mill hired an accounting firm to do their books, this employee would show up in NAICS 5412.

Finally, for confidentiality reasons, data is often not made publicly available when it will identify individual businesses. While county data is usually available at very aggregated NAICS levels, confidentiality concerns often arise at more detailed levels of analysis. This is especially true in smaller economic regions, such as rural counties.

More information on the NAICS system is available at www.census.gov/epcd/www/naics.html