



MIKE LOYA CENTER FOR INNOVATION AND COMMERCE

Broadband Expansion Business Model

Fiber-To-The-Premises Plan for El Paso, TX

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Executive Summary



DO NOTHING



POLICY



PUBLIC-PRIVATE-PARTNERSHIP(P3)

Pure Municipal
CITY OWNED

The county of El Paso can choose from different options to achieve successful broadband expansion in the county's underserved areas. The first option is to "do nothing," or a strictly market-driven approach. This assumes the county will rely on incumbent broadband providers to unilaterally upgrade their systems and provide improved speed and adequate accessibility to currently underserved areas. This passive approach will take a long time, and is not the best strategy considering the current state of broadband services in the county.

The second option is expansion through policy implementation, potentially incentivizing internet service providers to expand broadband services. New policy implementation and improvement of current public policy are necessary, such as the "Dig One Policy." This policy requires public and private excavators to coordinate with local governments when installing new fiber or conduit, and whenever ground will be broken in the public right of way. Through policy and flexibility in regulations, the county may create an environment that will make it appealing and cost-effective for internet providers to expand services.

The third option is adopting a Public-Private-Partnership (P3). Such a partnership involves collaboration between a government agency and a private-sector company that can be used to finance, build, and operate broadband expansion projects. P3 generally results in projects being completed faster, and with much better prospects for cost sustainability. Parallel to this option, is a wholesale model, where the county builds out a fiber expansion network and attracts internet service providers to market and operate the system. Cash flow to provide return on capital investment by the county comes in the form of rent or a sale of the entire infrastructure to private internet service providers.

The fourth option is a purely municipal model where the county of El Paso enters into the business of building out and providing Internet and added services across a publically owned fiber infrastructure. This would be similar to other public utilities such as water and environmental services, supported by specialized, possibly semi-private county or city departments. The county will have the most control in this fourth option but carries the most responsibility, high cost, and substantial risk, all which are likely to be greatly mitigated via a partnership.

This document presents a business plan and recommendations for initiating and operating a county-owned broadband network and a Public-Private Partnership (P3). After

extensive consideration, due diligence, and multiple engagements with different entities supporting broadband expansion in our region, it is clear that a public-private partnership is the most viable alternative, in comparison to a purely municipal option.

Objective

During the COVID-19 pandemic, the county of El Paso clearly experienced many consequences of poor broadband coverage and inadequate internet speeds. Schools at all levels experienced decreased attendance rates after districts were required to send students home for safety. Those with current broadband access often struggled to keep up in video classrooms due to low internet speeds, while others without any access just disappeared. Telehealth became an increasing necessity for older segments of the population, with similar limitations becoming evident due to lack of broadband access and difficulty with available technology. The mandated closing of public areas and workplaces led to devastating increases in unemployment, with the remaining workforce transitioning to work from home if their internet connections allowed.

In response to these challenges, the county of El Paso is examining and researching broadband accessibility, coverage and expansion in collaboration with multiple entities working various aspects of the bigger picture of regional broadband status. The University of Texas at El Paso, through The Hunt Institute and The Mike Loya Center for Innovation and Commerce, have created an economic impact report, a feasibility benchmark cost analysis, and a model business plan for the implementation and operation of a P3 broadband expansion in the County.

The overall objective of this effort is to bring reliable, high-speed Internet to underserved areas of El Paso while making the best fiscal decisions through evaluation and careful consideration of opportunities and risk factors. The FCC formal benchmark for broadband internet speed specifies a minimum speed of 25 megabits per second (Mbps) download and upload of 3Mbps or faster. These speeds, however, are slow for today's demands. The new benchmark for many prosperous counties is known as gigabit speed (Gbps). Along with minimum speeds, the FCC also provides maps of regional coverage supplied by current internet service providers in their respective areas. These maps often show "excellent" coverage in the county, though they lack in-depth data due to the nature of FCC reporting standards. For example, if a single house on a block has an internet connection, it is considered a "covered" area. The Hunt Institute is currently constructing more precise and accurate maps of current broadband coverage to inform plans and capital investments necessary to appropriately and responsibly expand broadband in the region.

Broadband Market Profile

The ¹857,817-plus residents of El Paso have a common range of choices for broadband service, including:

- Cable internet, offering the most significant coverage, including ultra-fast fiber for certain subsets of the area.
- Fiber to the premises, available to about half the existing market.
- Fixed-wireless providers at varying speeds.
- Two nationwide satellite providers with restricted-data services.

In El Paso, fiber is available to only about 46% of residents through AT&T. This service offers reasonable pricing per gigabit (1,000 megabits per second) with downloads and uploads at no data cap. Cable Internet is much more widely available, bringing fast downloads but slower uploads to much of El Paso. For example, Spectrum offers download speeds from 100 to 940 Mbps, with uploads at a small fraction of those speeds, closer to 5 – 10 Mbps. Digital Subscriber Line (DSL) internet uses the oldest telecom infrastructure available in most cities - the copper telephone lines that pioneered voice calling decades ago. DSL does not deliver the fastest downloads or uploads, but often has very wide availability. The most significant DSL provider in El Paso is AT&T through its Internet Protocol Broadband (IPBB) hybrid, a system in which fiber lines bring connectivity to neighborhoods that then shift to DSL to connect to the premises.

Satellite internet works virtually anywhere and could be an alternate option for almost any residence in the El Paso area. The primary providers of satellite services are HughesNet and Viasat. Adoption of this alternative comes with accepting lower speeds of at most 100 Mbps, higher latency, and stringent data limits.

²AT&T fiber has an uncontested lead on internet speeds, with gigabit downloads that match Spectrum services and upload speeds that exceed its cable competitors by a factor of 8 to 10. Spectrum, however, has a lead in the higher coverage area, covering about 99% of the current market versus 46% for AT&T. With the increased use of multiple devices in a household, the lack of a data cap at AT&T fiber and Spectrum makes either a great choice. In addition, the absence of a data cap means constant prices on billing cycles while fulfilling the demand of multiple services provided through a single infrastructure connection.

¹U.S. Census Bureau QuickFacts: El Paso County, Texas. (n.d.). Census Bureau QuickFacts. <https://www.census.gov/quickfacts/fact/table/elpasocountytexas/POP010220#POP010220>

² Fiber Optic Internet Providers and TV Companies in El Paso Metro, TX | bestneighborhood.org. (n.d.). Fiber Optic Internet Providers and TV Companies in El Paso Metro, TX. <https://bestneighborhood.org/fiber-tv-and-internet-el-paso-tx-metro/>

The table below illustrates prices for essential internet services in El Paso at an average price of ³\$49.00. This serves as a reasonable base price for internet services to be offered by projects intended to expand broadband coverage in El Paso.

Table 1.5 Basic Service Packages

ISP	Connection	Speed	Price
AT&T	Fiber	1,000mbps	\$35.00 per month
Spectrum	Cable	940mbps	\$49.99 per month
VIASAT	Satellite	100mbps	\$50.00 per month
Windstream	Satellite	50mbps	\$60.00 per month
HughesNet	Satellite	25mbps	\$49.99 per month
Average Price			\$49.00

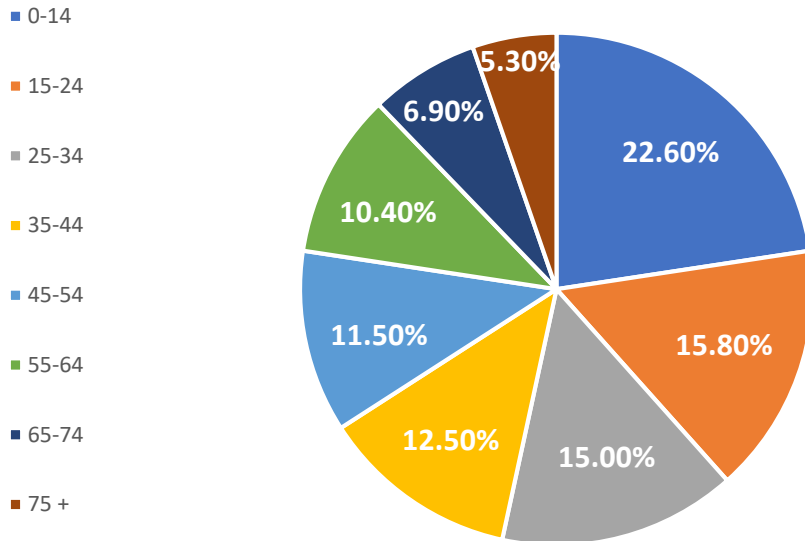
El Paso, TX – Residential Profile

⁴The 2020 El Paso population estimate is 857,817. The current percentage of the population that are students ages 5-34 is 53.4% of that total. This represents more than half of the population and an age group in high demand of adequate internet services to continue education on and off-campus. Another critical segment of the population is older age groups. In this case, we consider age brackets of 55-64 and above making up 22.6% of the total population. In general, these older citizens benefit the most from telehealth services, which offer fast service and eliminate the need for commuting to a brick-and-mortar facility. However, telehealth is only accessible through a reliable and adequate internet connection. With these two age groups alone, we can conclude that at least 76% of the population in El Paso will benefit from expanding broadband to provide wider, more reliable, more affordable internet services to the region.

³ Broadband Now. (n.d.). Top 17 Internet Providers in El Paso, TX (Dec 2021). <https://broadbandnow.com/Texas/El-Paso>

⁴ El Paso, TX. (n.d.). Population Demographics. <https://0-dnow-gale-com.lib.utep.edu/dnow/?p=DNOW&u=txshracd2603>

Population by Age 2020

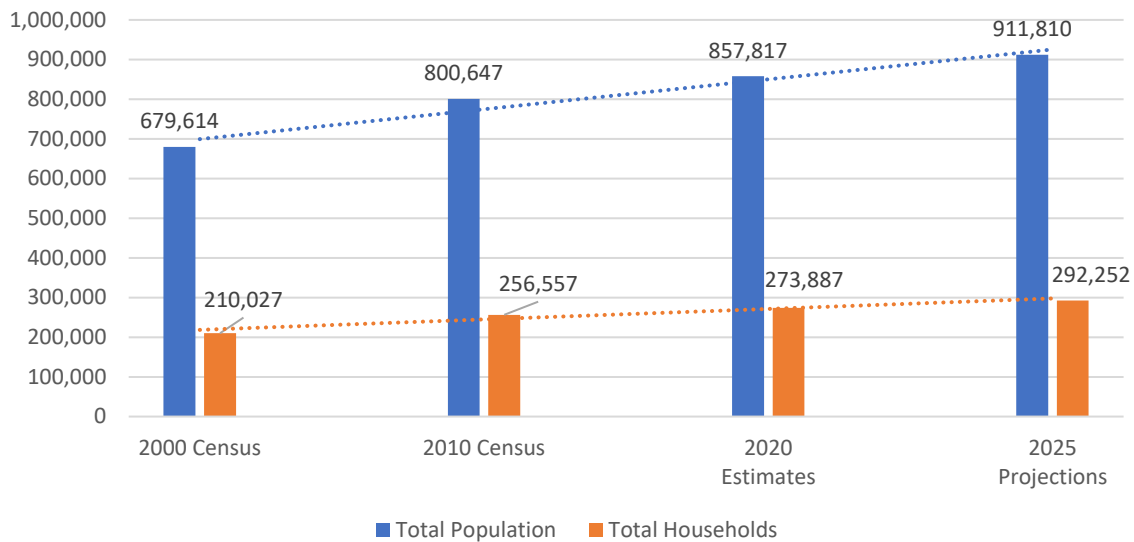


El Paso’s population is expected to grow from 857,817 to 911,810 by 2025, representing an increase of 6.29%. That growth will include an increase in population density and the total number of households, as illustrated in the table below. This population growth represents a potential increase in subscribers and more connected passings per mile depending on locations of newly constructed infrastructure relative to places where population growth is most likely to occur.

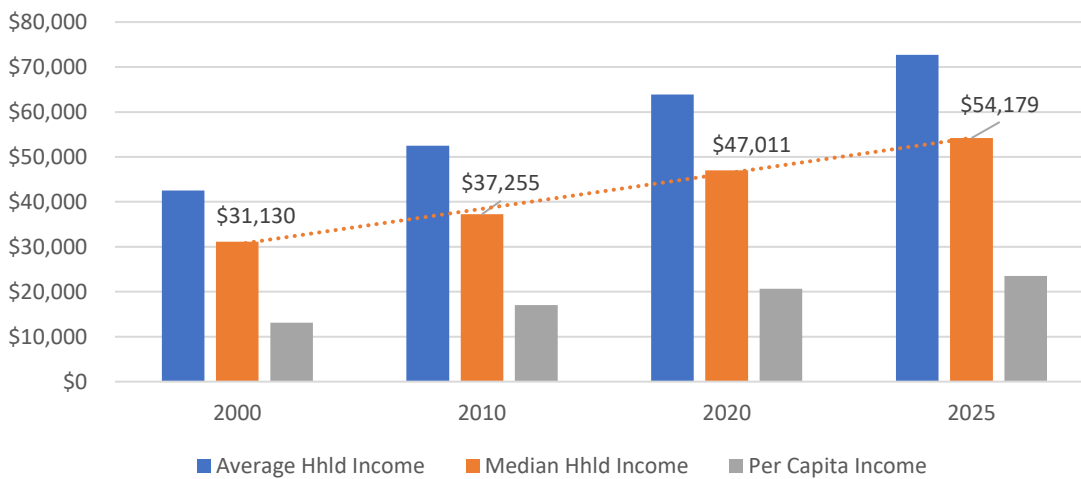
From ⁵2000 to 2025, there is a projected and relatively constant increase in the median household income from \$31,130 to \$54,179, representing an increase of 74% overall and 15% between 2020-2025. That increase in median income may indicate an increase in willingness and ability to afford expanded internet service plans.

⁵ El Paso, TX. (n.d.). Population Demographics. <https://0-dnow-gale-com.lib.utep.edu/dnow/?p=DNOW&u=txshracd2603>

Population Increase 2000-2025



Income 2000-2025

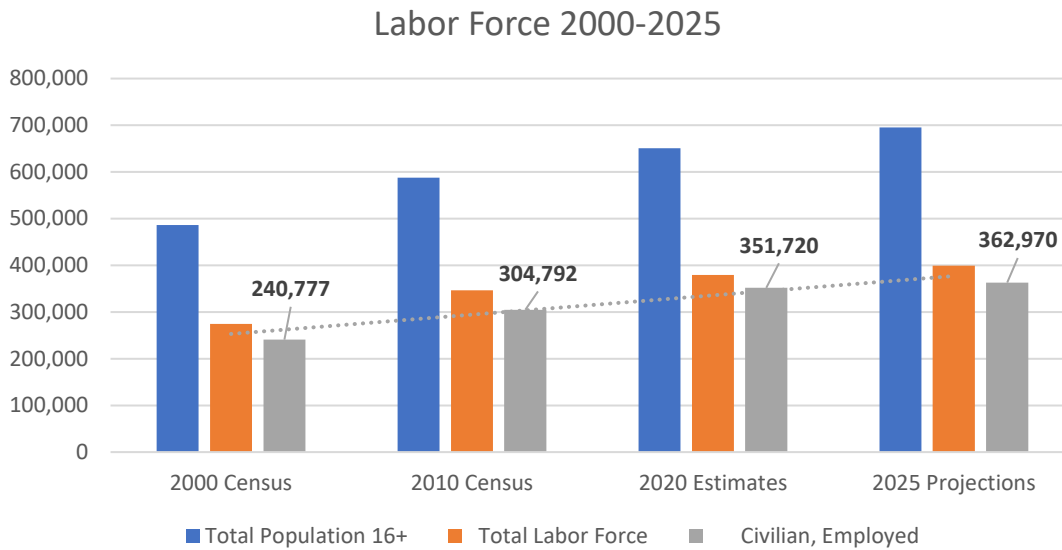


El Paso, TX – Commercial Profile

In 2020, there were 650,871 people over the age of 16 in the City of El Paso. 58.30% or 379,609 represent the total labor force; 92.7% of the labor force were employed, 3.9% were unemployed, and 3.4% were in the Armed Forces.

That labor force is expected to increase in the coming years, tracking increases in the general population. By 2025, the total population over the age of 16 will increase by 6.85% to 695,473. The total labor force is expected to grow from 379,609 to 399,403 for a 5.21%

increase. The total employed population is expected to increase from 351,720 to 362,970 for a 3.2% increase, as illustrated below.

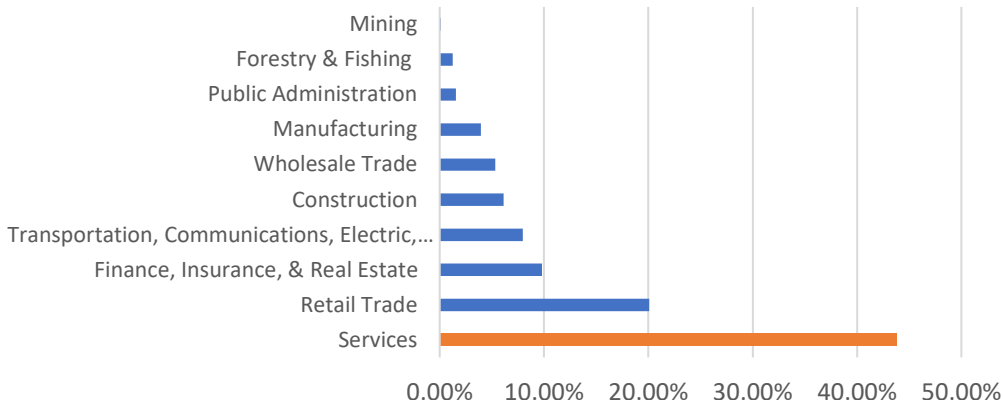


⁶The table below illustrates the distribution of market establishments based on a total of 24,126, as reported in the fourth quarter of 2020. Services represent 43.85% of the establishments in the city of El Paso, encompassing what will most likely be the most significant consumer and user of broadband services today and into the near future.

Standard Industrial Classification	Q4 2020 Establishments
Services	43.85%
Retail Trade	20.07%
Finance, Insurance, & Real Estate	9.81%
Transportation, Communications, Electric, Gas, & Sanitary Services	7.95%
Construction	6.13%
Wholesale Trade	5.33%
Manufacturing	3.93%
Public Administration	1.56%
Forestry & Fishing	1.26%
Mining	0.10%

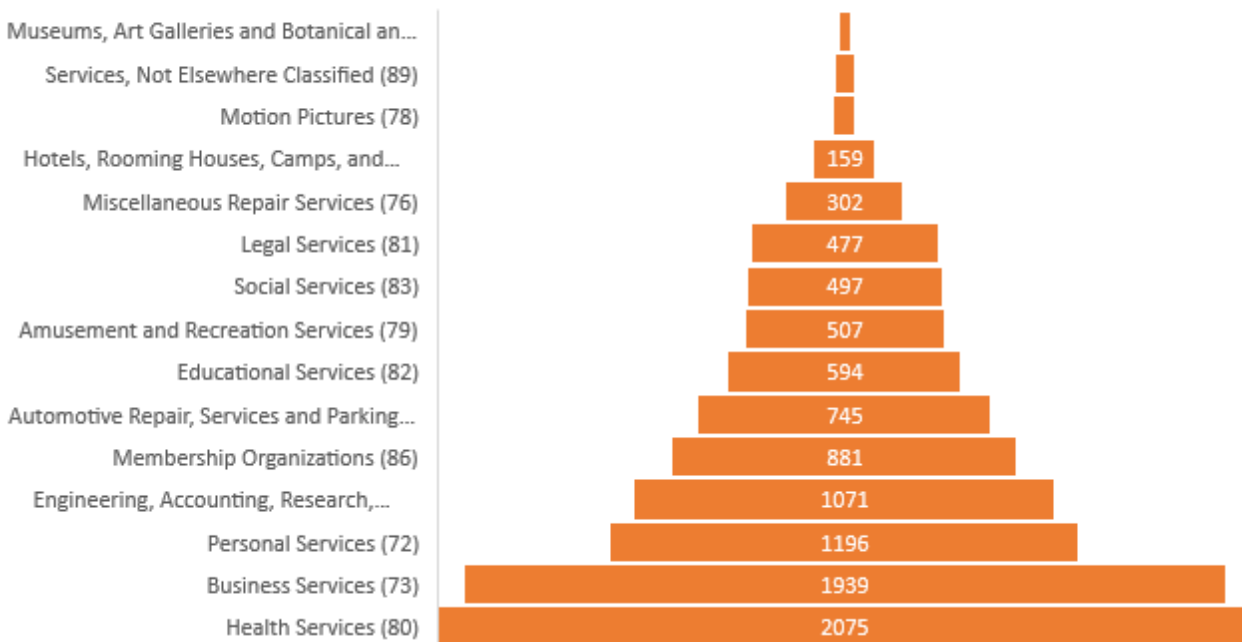
⁶ El Paso, TX. (n.d.). Population Demographics. <https://0-dnow-gale-com.lib.utep.edu/dnow/?p=DNOW&u=txshracd2603>

Q4 2020 Establishments



Under standard industrial classification, "Services" comprises multiple subdivisions, as illustrated in the table below. The most substantial category is healthcare, followed by business services which are both in great demand by the population demographics examined earlier in this section. Not only is access to these services essential to population health during a time of social distance, but access to these services via internet connection also represents growth for businesses, decreases in commute times and traffic, and a much safer alternative for the elderly population to receive medical consultations without having to leave the comfort of their homes.

Services Sub Categories



Estimating Infrastructure Miles and Cost

The Covid-19 pandemic emphasized and accentuated the importance of expanding a robust broadband service infrastructure to provide adequate and efficient internet coverage. The growing demand for telehealth services, food delivery services, integrated management systems, education from home, and intense competition to attract business through social media channels, creates a wave of potential new customers for internet services, especially as internet services continue to transition from a luxury to a basic need.

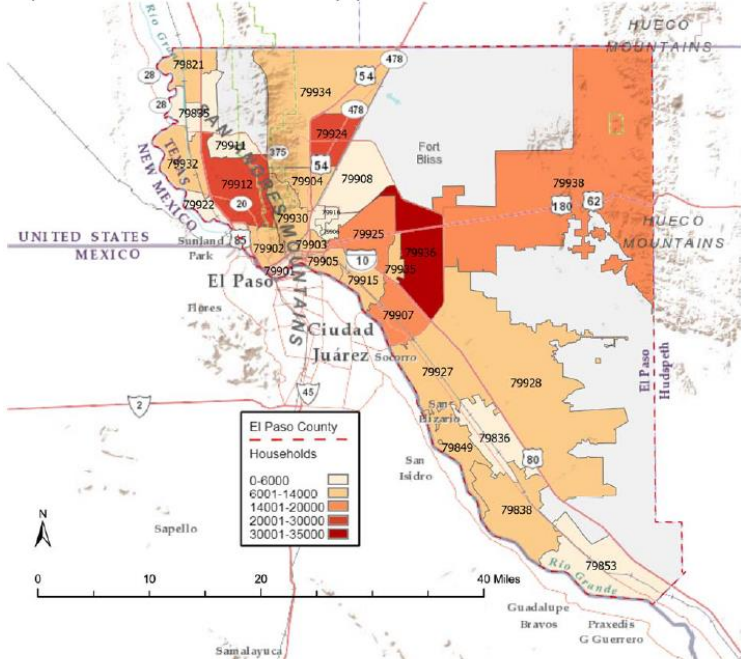
Operating effective broadband services is an economy-of-scale business, which means that operations will be more efficient with more significant numbers of customers. Penetration rate or uptake rate is the percentage of potential customers who will buy a particular service. Utilizing the most current internet coverage maps in the county of El Paso, we can determine areas that would benefit the most from expanding broadband infrastructure and consequently should have higher uptake rates.

Using population density, the number of households and establishments by zip code from current maps, we can estimate the number of premises per mile in these respective zip codes. Using these parameters, we can approximate the number of premises that will potentially be covered by the number of miles of new infrastructure constructed. As a base number, we estimate 20,000 premises to be serviced with the actual number of premises being subject to final results from the Hunt Institute's research, currently taking place at the time of completion of this report.

By aggregating map data, showing population density and households, and maps displaying internet coverage, we will recommend potential routes or locations for expanding broadband services. The most efficient combination will provide access to internet services to the most significant number of customers, simultaneously requiring the least number of miles of new infrastructure to be constructed.

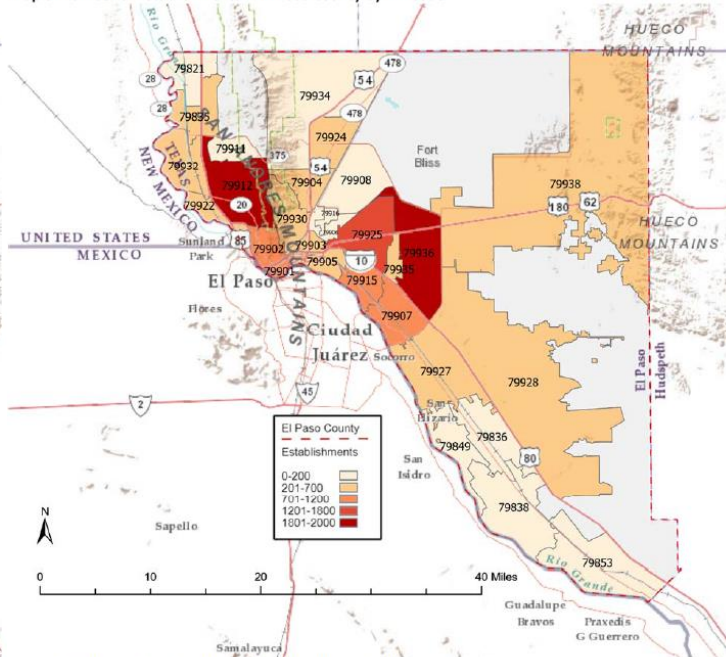
Based on our benchmark cost analysis, the average total cost per mile of new infrastructure is \$90,000. This report will use that average price as a base cost to estimate construction costs and conduct a break-even analysis for the county. Actual realized costs may vary based on future construction conditions, level of community support, and further studies from third-party organizations supporting various broadband initiatives in the region.

Map 5. Number of Households in El Paso County by ZIP Code



Source: Hunt Institute using Federal Communication Commission data.

Map 6. Number of Establishments in El Paso County by ZIP Code



Source: Hunt Institute using Federal Communication Commission data.

⁷Using the maps created by the Hunt Institute in their report "Broadband Limitations During the COVID-19 Pandemic and Impact of Expanding Internet Speed Services in El Paso County," we can observe the number of households and establishments in El Paso by zip code. The table below is a compilation of the combined results to be implemented in our estimate for premises per zip code. The median in each category was used to provide an estimated aggregated total.

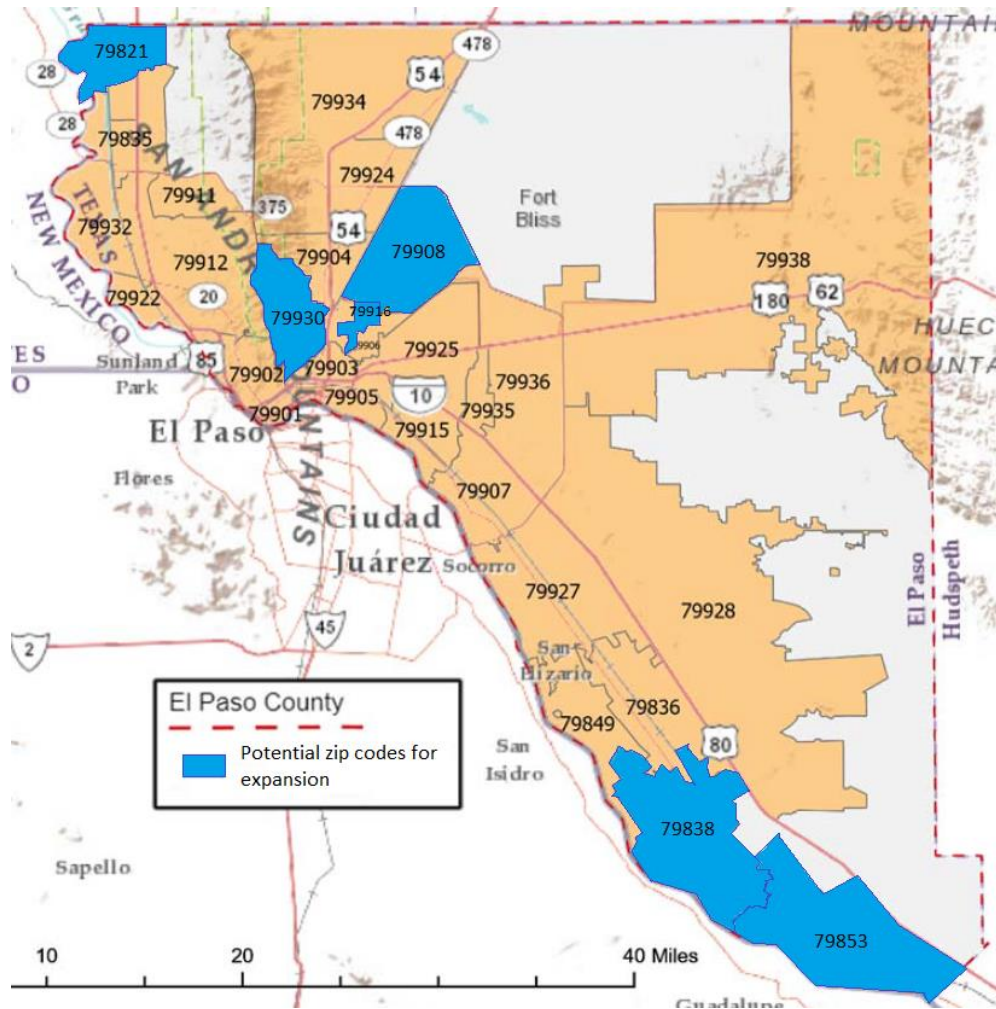
Zip Code	Number of Households	Number of Establishments	Estimated Total Premises
79835	0 - 6000	201 - 700	3450
79911	0 - 6000	0 - 200	3100
79908	0 - 6000	0 - 200	3100
79922	0 - 6000	201 - 700	3450
79901	0 - 6000	701 - 1200	3950
79836	0 - 6000	0 - 200	3100
79853	0 - 6000	0 - 200	3100
79916	0 - 6000	0 - 200	3100
79906	0 - 6000	0 - 200	3100

⁷ Hunt Institute for Global Competitiveness. (2020, December). BROADBAND LIMITATIONS DURING COVID-19 PANDEMIC AND IMPACT OF EXPANDING INTERNET SPEED SERVICES IN EL PASO COUNTY. Hunt Institute.

79821	6001 - 14000	0 -200	10100
79934	6001 - 14000	0 -200	10100
79932	6001 - 14000	201 - 700	10450
79904	6001 - 14000	201 - 700	10450
79930	6001 - 14000	201 - 700	10450
79902	6001 - 14000	701 - 1200	10950
79903	6001 - 14000	201 - 700	10450
79905	6001 - 14000	201 - 700	10450
79935	6001 - 14000	201 - 700	10450
79915	6001 - 14000	701 - 1200	10950
79927	6001 - 14000	201 - 700	10450
79928	6001 - 14000	201 - 700	10450
79849	6001 - 14000	0 -200	10100
79838	6001 - 14000	0 -200	10100
79938	14001 - 20000	201 - 700	17450
79925	14001 - 20000	1201 - 1800	18500
79907	14001 - 20000	701 - 1200	17950
79924	20001 - 30000	201 - 700	25450
79912	20001 - 30000	1801 - 2000	26900
79936	300001 - 35000	1801 - 2000	34400

Based on the number of premises per zip code and internet coverage ranging from low to high, we can recommend which areas may benefit the most from broadband expansion with the lowest possible infrastructure investment. As shown in the table below, these zip codes have low internet coverage and a high number of premises, translating to more potential customers and a higher penetration rate. These assessments include the number of miles of infrastructure required to cover the entire zip code, and assume coverage of the 20,000 premises we have initially estimate require expanded broadband coverage.

Zip Code	Estimated Total Premises	Internet Coverage	Miles
79908	3100	Low	20.26
79853	3100	Low	73.40
79916	3100	Low	15.06
79821	10100	Low	67.93
79838	10100	Low	93.84
79930	10450	Low	142.27



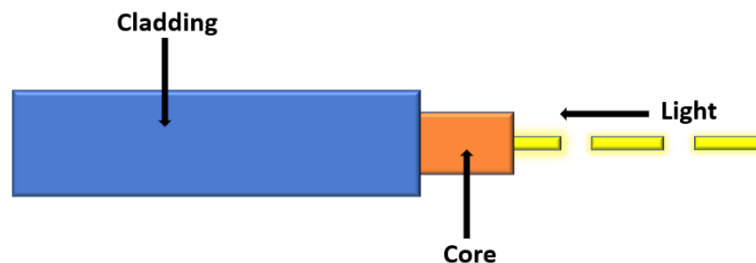
The goal of expansion for 20,000 premises in this example would be to provide full coverage for two zip codes. Zip code 79930 with 142.27 miles covering approximately 10,450 premises and zip code 79838 with 93.84 miles are covering approximately 10,100 premises. This assumption would comprise a total of 20,550 premises across 236.11 miles of new infrastructure construction. The following calculations are based on an optimistic penetration rate of 25% per year for five years, based on new 20,000 premises to be served, and proposed costs of construction along 236 miles of new broadband infrastructure.

Fiber Optics

⁸As fiber internet connections become more readily available, fiber optics communication has become the de-facto standard for internet speed and reliability across the country. Fiber internet provides access using fiber-optic cables as opposed to using the traditional copper cables or satellite signals. Fiber optic transmission lines consist of bundles of very small strands of glass or plastic. Each strand of fiber transmits data using pulses of light that travel at speeds approaching the speed of light (approximately 186,282 miles per second).

Each optical fiber has two parts:

- The core: Made of glass or special plastic - the innermost part of the fiber, where light passes through.
- The Cladding: Made of a thicker layer of protective plastic or glass and wrapped around the core.



Both parts work together to create a phenomenon called "total internal reflection" this is how light is able to move through the fibers without escaping. Light hits the glass at an angle of less than 42 degrees and reflects back as if reflecting in a mirror. The cladding keeps the light in the core because the glass/plastic has a different optical density or lower refractive index.

Light is transmitted down the fiber in LED or laser pulses representing binary data – the digital coding system that codifies everything on the Internet. Binary data is made up of bits, which are ones and zeroes. These bits codify messages in organized eight-part patterns, called bytes. One pulse means one, and no pulse means zero. These light pulses can travel sixty miles before they experience any degradation. Light pulses may go through optical amplifiers to boost their signal strength, preventing data degradation and providing for transmission across many thousands of miles.

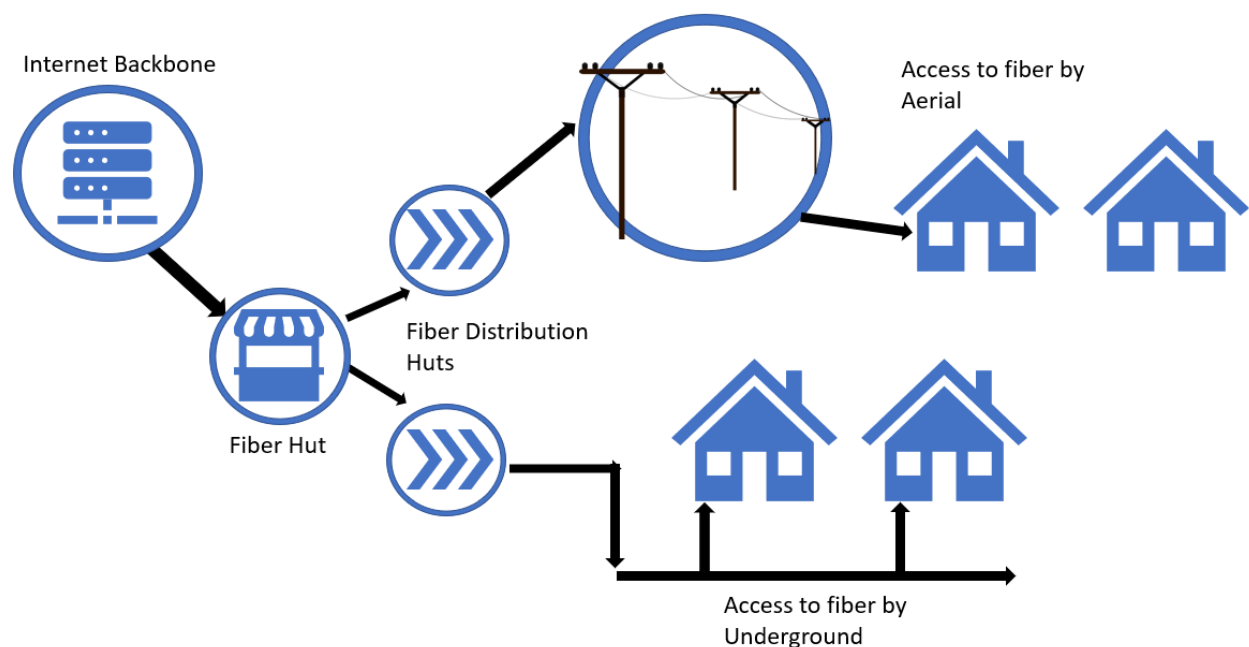
⁸ A Complete Guide to Fiber Optic Internet. (2021, May 17). OTELCO. <https://www.otelco.com/resources/a-guide-to-fiber-optic-internet/>

The Last Mile

Once light pulses travel through fiber cables and reach their destination, an optical network terminal (ONT) converts the pulses into electrical Ethernet signals. This conversion happens in the "last mile" of transmission. This is not actually a precise mile; it is just a term describing the last stretch of infrastructure that connects a premises to the fiber backbone of the Internet.

There are several options for last-mile connections:

- FFTP/FFH/FFTb: Fiber to the premises, home, or business. This is the most direct fiber connection. This option offers pure fiber straight to the premises, with no copper cables involved; however, this option is generally the most expensive for Internet service providers to install.
- FTTb: Fiber to the building. In this option, fiber lines go all the way to a large physical structure and are then distributed throughout that structure through copper wire. This option is often used in large buildings, such as apartments, hotels, schools, or central buildings, providing Internet to several entities within that structure.
- FTTC/FTTN/FTTS: Fiber to the cabinet/curb, neighborhood, or street. These are the most common fiber connections. Fiber cables are connected to a street cabinet, around 1000 feet from the farthest premises. Copper cables then distribute broadband connections to immediately adjacent locations. This option is the most affordable fiber-optic Internet connection for Internet service providers. In addition, this option requires the least investment in infrastructure to individual premises, and can be re-distributed when new residences or businesses are constructed in the area.





Operating Plan

A pure-municipal approach assumes the county of El Paso will build out an expansion fiber network to provide Internet access to underserved communities within the city. This approach also assumes that marketing, customer acquisition, maintenance, and repair of the network are all provided by a municipal utility. Customer care representatives will also be needed for successful services delivery, along with administrative and management positions to oversee network operations.

Critical factors for such a project's financial success include the capital construction cost of a network build-out, the uptake rate of offered services, and the subscription price for the service. The County could ostensibly utilize already owned assets and resources to provide customer care and marketing strategies.

Passing cost is the cost of building a network to be proximate to every commercial and residential property requiring access to the network. Installation configurations influence cost per passing. Fiber can be installed via underground conduits or aerial poles depending on city codes and needs. Underground installation increases cost, at the same time increasing reliability, reducing overall maintenance cost, and therefore reducing total capital investment over the life of the system. Based on our previous benchmark cost analysis, we estimate the cost per passing to be \$1,062. This average is more conservative than those in studies from ⁹Fort Collins estimated at \$984, and Longmont's actual cost of \$825; however, it is in line with similar electric utility costs per passing, averaging \$1,078.

Passing Cost	
Network Construction	\$21,240,000
Average Cost per Mile	\$90,000
Miles	236
Premises	20,000
Average Cost per Passing	\$1,062

Drop cost is a variable cost dependent on the number of customers who choose to uptake the service and connect to the network. The uptake rate of Internet service is the most cost-differentiating variable for premises cost, as it is not incurred until after the residential or

⁹ Municipal Retail Fiber-To-The-Premise. (2017, August 31). Muninetworks.Org
<https://muninetworks.org/sites/www.muninetworks.org/files/2017-07-Ft-Collins-FTTP-business-plan.pdf>

commercial user decides to sign up for services and a connection to the backbone of the Internet is needed to provide service.

Drop cost consists of two main components - pre-installation, and premises installation costs. Pre-installation usually includes trenching and underground installation of fiber in a conduit from the network to the premises. The premises installation is the connection of end-equipment within the premises. The cost includes materials like ONT, connectors, and hardware. This cost must also include labor cost from contract labor or county staff performing premises installations. The table below shows average prices for drop cost base on locations similar to El Paso.

Drop Cost	Average per Drop
Equipment	\$140
Materials	\$196
Labor	\$420
Average Drop Cost	\$756

The initial requirements for construction of 236 miles of new infrastructure, assuming all 20,000 premises will incur a drop cost, is approximately \$42,480,000. The 236 miles of construction is a fixed cost, while the drop cost is a variable cost dependent on the uptake rate from customers. During the initial years of a broadband expansion, the uptake rate may be low and very gradual, but with excellent customer service and effective marketing, the uptake rate would be expected to grow consistently. Similar successful projects planned for 20-30% initial uptake rates, with retentions and increased rates of 50-60% in subsequent years.

Capital Requirements	
Network Construction	\$21,240,000
Average Cost per Mile	\$90,000
Miles	236
Premises	20,000
Drop Cost per Premise	\$1,062
Total Drop Cost	\$21,240,000
Total Cost	\$42,480,000

Customer care staff are a necessary and critical component of any business. Success in this component will depend on recruiting, hiring, training, retaining, and motivating a team of knowledgeable agents, technicians, and management to service customer accounts. Total revenue in operations is completely dependent on the number of subscriptions sold and retained. Excellent customer service experiences are of the essence in this regard, given the inherently competitive broadband market and currently available options to change providers or drop services all together.

Customer care staff are required for answering incoming customer calls, handling customer inquiries in person if retail locations are added, and up-selling higher-speed services. The following table is an overview of personnel requirements to run customer service operations and installation services. Amounts shown assume a base salary not accounting for fringes. Annual salaries may need to be adjusted to align with prevailing local industry standards.

The county will have three options to provide customer care services:

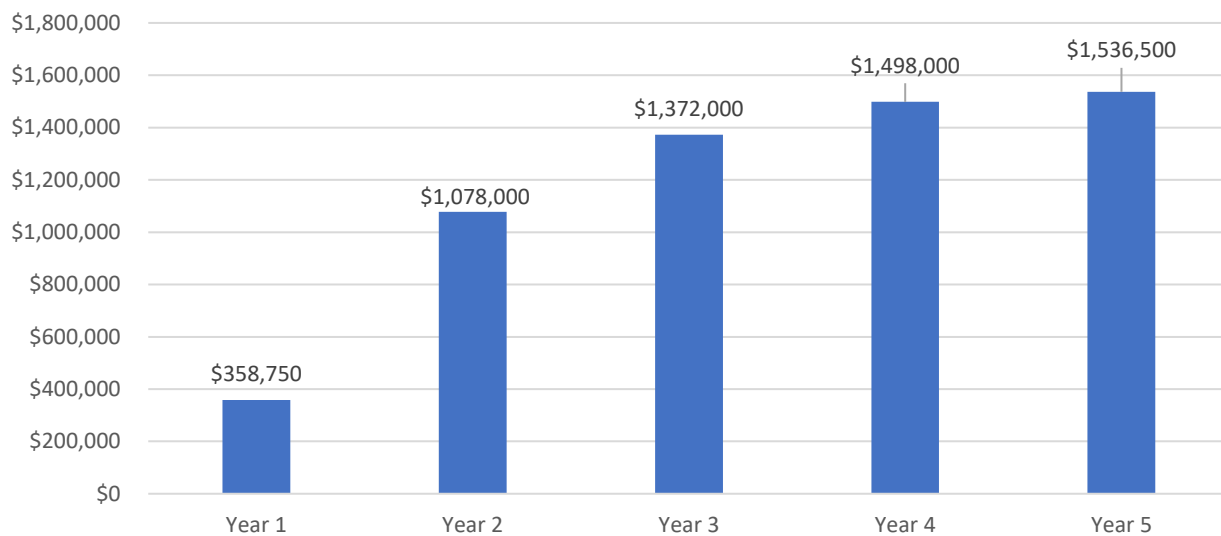
- Option 1: Customer care operations will be managed and integrated as part of an existing utility customer service center, for example water, or environmental.
- Option 2: Create a completely new department for Internet customer service, which includes acquiring an office space for retail and call center operations.
- Option 3: Outsourcing customer service to a third-party call center that provides 24-hour support for all customer concerns; there are many local vendors for this option.

Position	Annual Salary	Year 1	Year 2	Year 3	Year 4	Year 5
General Manager	\$94,500	1	1	1	1	1
Data Technician	\$73,500	1	2	2	2	2
Commercial Account Representative	\$56,000	1	2	2	2	2
Sales Engineer	\$56,000	1	1	1	1	1
Field Operations Supervisor	\$56,000			1	1	1
Marketing Coordinator	\$52,500	0.5	1	1	1	1
Multi-Dwelling Unit Account Manager	\$52,500	1	2	2	2	2
Maintenance Technicians	\$45,500		1	1	2	2
Technical Service Representatives	\$42,000		4	4	5	6
Service Technicians	\$42,000		1	3	4	4
Installation Technicians	\$38,500		3	7	6	5
Customer service representatives	\$35,000		4	5	8	10
Total Full Time Employees (FTE)		5.5	22	29	32	33

A customer service operations facility would need to accommodate at least 33 employees. This number may increase if more than 20,000 premises are being served.¹⁰ A general rule is to have between 150 and 250 square feet of office space per employee. At 33 employees, the minimum square footage needed would be 4,950 square feet. The average rental rate for office space in El Paso is currently \$22.79 per square foot, resulting in an annual cost of \$112,810. That cost could be considerably reduced if the county negotiates a better price or uses a county-owned physical space instead of renting.

Assuming the county can negotiate a better leasing price, we will assume annual rent for physical space of ¹¹\$100,000 and the cost of human capital as expressed in the table above in year five. Labor cost is expected to increase year to year in proportion to expected increased uptake rates for Internet services. In this scenario, year five, for example, will have a total cost of \$1,636,500; the table below illustrates the increased cost of operations in the first five years.

Customer Service Operating Expense



¹⁰ How Much Office Space Do I Need? (Calculator & Per Person Standards). (2021, November 5). AQUILA Commercial. <https://aquilacommercial.com/learning-center/how-much-office-space-need-calculator-per-person/>

¹¹ El Paso Office Price per Sqft and Office Market Trends. (n.d.). Commercial Cafe. <https://www.commercialcafe.com/office-market-trends/us/tx/el-paso/>

Alternate Option

The county could alternately use existing facilities and personnel to decrease the cost of customer service operations. El Paso water, for example, could be used to provide office space and an already experienced management staff. Some additional positions may still be needed, but the cost will potentially be significantly reduced. Below are the minimum positions assuming 20,000 new accounts and leveraging El Paso water customer service staff and offices.

Customer Service Operating Expense Alt.



This alternate option will mean a reduction of cost starting from year one. The county will save approximately \$307,250 during the first year and approximately \$462,000 every consecutive year until year five. Although the alternate option translates to a total saving of \$2,155,250 for the first five years of operations, it is in the cities best interests to pursue the most efficient and economical options to allow for contingencies and greater allocation of funds for a more significant expansion of Internet services to the greatest number of premises.

Revenue

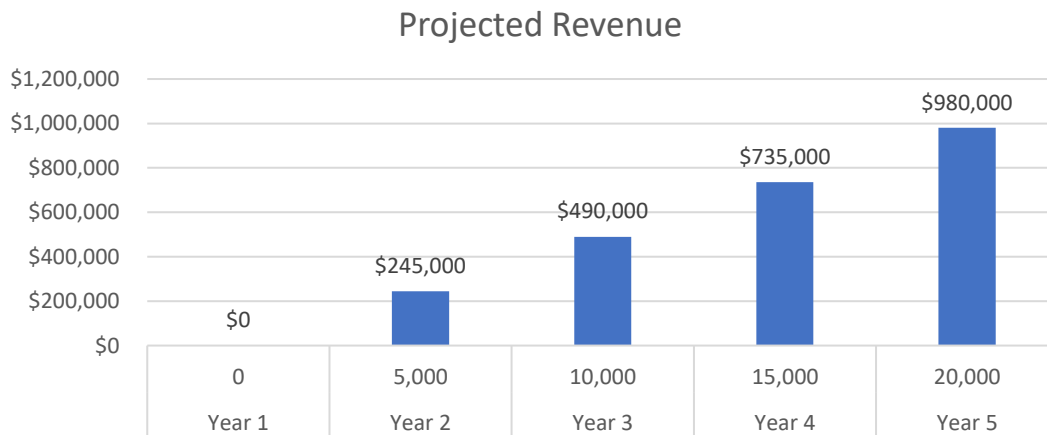
The county still has to decide precisely where expansion of broadband will benefit the most citizens while continuing to be economically feasible. Every zip code in El Paso has both residential and commercial premises. Service prices for commercial customers tend to be higher than prices for residential customers. Therefore, a market penetration strategy that includes both types of accounts is necessary to break even financially and provide the most value to the community.

In our scenario, we assume the county will expand broadband services in zip codes 79930 and 79838 in pursuit of expanding service access to 20,000 new premises. The table below illustrates the number of premises in each category, residential and commercial, for these zip codes.

Zip Code	Median Number of Households	Median Number of Establishments	Estimated Total Premises
79930	10,000	450	10,450
79838	10,000	100	10,100
Total	20,000	550	20,550

The table below shows projected revenue from residential premises at an average price of \$49.00 per premises and assuming a 25% uptake rate every year for five years. This uptake rate may need to be adjusted with a greater number of buying customers at higher Internet speed packages and prices, to achieve feasible break-even outcomes.

	Year 1	Year 2	Year 3	Year 4	Year 5
Active Residential Premises	0	5,000	10,000	15,000	20,000
Revenue	\$0	\$245,000	\$490,000	\$735,000	\$980,000

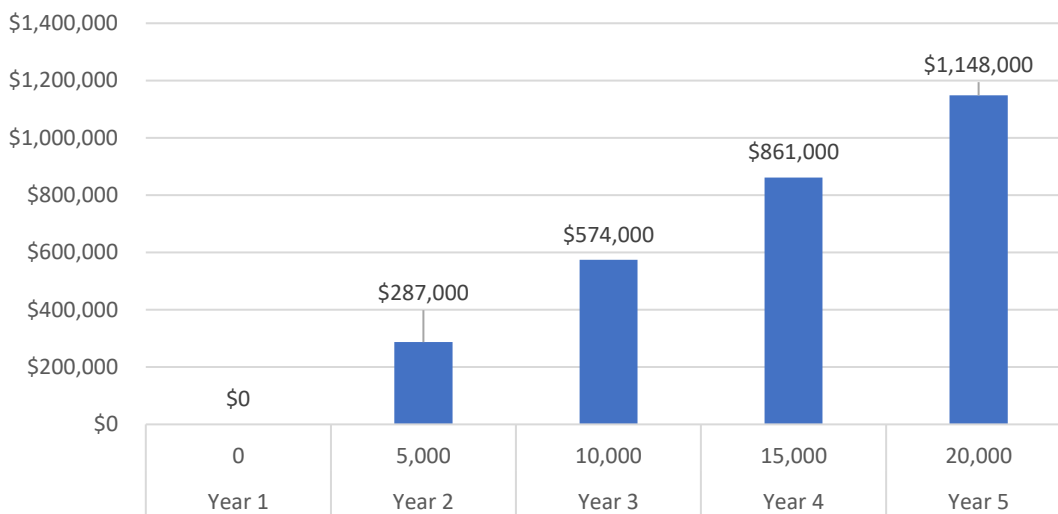




The second revenue model assumes 60% of residential customers will choose the standard option of \$49.00 a month, and 40% of residential customers will choose the premium speed package option at \$70.00 a month. This projection most closely resembles more realistic markets based on current price averages and consumer preferences. In this model, customer retention is critical to maintaining constant revenue year to year, with an increased uptake rate of 25% each year for the first five years.

	Year 1	Year 2	Year 3	Year 4	Year 5
Residential Basic Pack	0	3,000	6,000	9,000	12,000
Residential Premium Pack	0	2,000	4,000	6,000	8,000
Revenue	\$0	\$287,000	\$574,000	\$861,000	\$1,148,000

Projected Revenue 60/40 Model



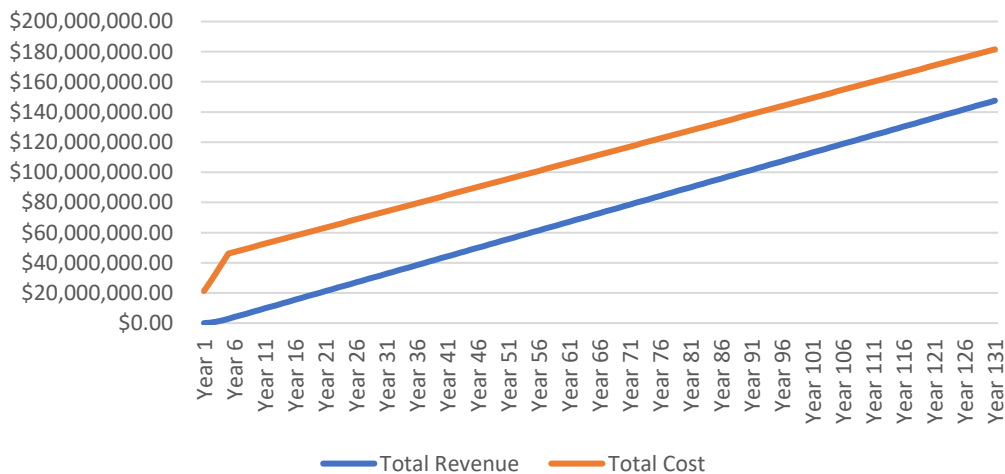
Sustainability Timeline

According to our feasibility study and benchmark cost analysis, the average time for constructing a fiber network is three years, with stable operations after five years. During the first year, the initial construction phase does not allow customers to be connected to the network. However, this is a good time for product marketing and community engagement to attract customers and start year two with an acceptable market penetration rate sets the stage for future sustainability of the project.

Considering that the county makes use of its current personnel and resources to minimize additional costs, we can create a projected timeline to positive cash flow. This assumes an initial capital construction investment of \$21,240,000 for 236 miles of new infrastructure, connecting 20,000 new premises, with a 25% uptake rate each year for the first five years, which increases \$1,062 per premises connected in the form of drop cost. The model also assumes 60% of residential customers will choose the standard option of \$49.00 a month, and 40% of residential customers will choose the premium speed package option at \$70.00 a month.

Assuming no maintenance cost, no increase in premises or workforce, and using current dollars, we can predict that a purely municipal model based solely on internet services is not feasible. This model, assuming 20,000 new premises and even a 100% uptake and retention rate does not provide enough revenue to be viable even having a two-tier price package. If, due to FCC regulations, the county were only able to provide internet services, this would create a non-feasible, non-sustainable effort. Additional sources of revenue would be needed, such as an increase in premises connected, higher-profile commercial clients, and additional bundle packages at increased monthly prices per subscriber.

Total Cost vs Total Revenue



Public-Private Partnership (P3)

Considering the above-described contingencies, nuances in the legal definition of broadband services, and regulatory barriers for expanding broadband services, the county would benefit considerably from a partnership, versus a purely municipal operation. A partnership would promote collaboration as opposed to competition, reduce the possibility of litigation by market competitors, result in better pricing for customers due to economies of scale, and result in potentially better customer service due to industry experience and extensively available existing infrastructure.

In El Paso, the leading provider of fiber Internet services is AT&T, but they only have approximately 47% coverage across the studied region. This lack of coverage translates into an opportunity for expansion. Fiber-based internet service, in and of itself, is not considered a “telecommunication service” like cable. Therefore, the county may have the opportunity to invest in fiber through such a provider, as opposed to cable services.

As in many of the communities we studied across the country, an incremental approach to expanding broadband could result in more economically feasible options. Successful negotiation with one or more market participants to create a public-private partnership will benefit the county by providing needed services at costs that are more feasible and sustainable in the long term. Such negotiation would need to be based on sharing the capital investment cost for new infrastructure construction. Generally, this is the most significant expenditure and the barrier for expansion most Internet providers face. In addition, customer service operations would be provided by current Internet service providers, considerably cutting costs for the county. The municipal revenue stream would be in the form of a percentage per customer, uptaking new services under the partnership, paid to the county as a royalty.

In this model, the Internet service provider has the incentive to expand services at a significantly reduced capital investment cost shared with the county. Both the county and Internet service providers share the same market penetration incentive to reach profitability, sustainability, and break-even points in the fastest manner possible through mutual collaboration in marketing, community outreach, and engagement. As a result, established Internet service providers can spread the total fixed costs across millions of subscribers instead of a small community that spreads costs across thousands.

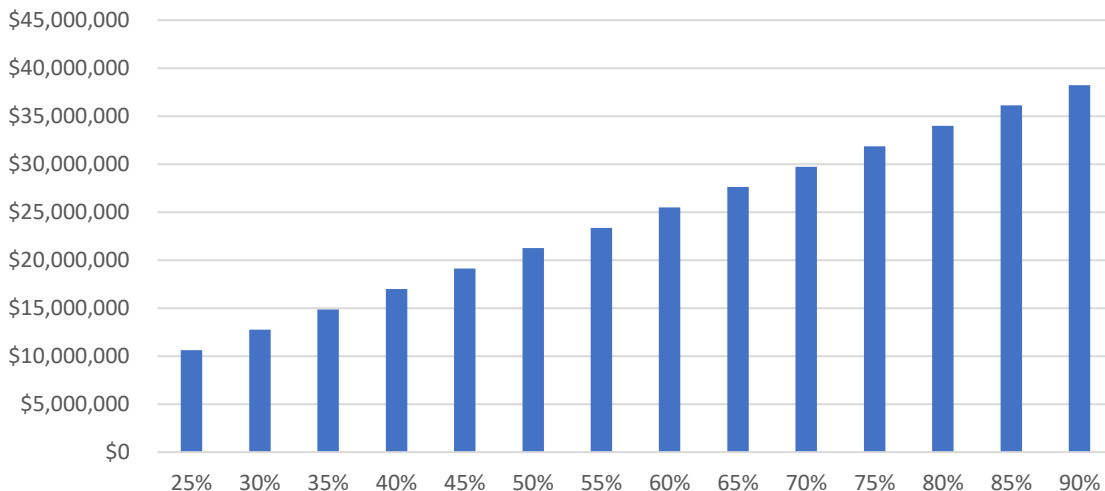
Under the assumption that the county can negotiate a deal with a fiber Internet service provider, the cost of customer service, maintenance, and equipment servicing will be passed to that service provider. The county must negotiate a deal to share initial capital requirements, possible implementation of "Dig Once" and other expansion-friendly policies, and a percentage royalty fee per subscription. The effective combination of these critical factors can result in expanding broadband to underserved communities, at affordable prices, with generally lower investment from the county, and with far greater long-term sustainability.



Capital Requirements	
Network Construction	\$21,240,000
Average Cost per Mile	\$90,000
Miles	236
Premises	20,000
Drop Cost per Premises	\$1,062
Total Drop Cost	\$21,240,000
Total Cost	\$42,480,000

To reiterate, taking only the initial construction cost for 20,000 premises and 236 miles of new infrastructure, we project a total cost of \$42,480,000. This total cost can be broken down into percentages of shared initial cost and fees per subscriber, based on customers acquired expanded networks resulting from a partnership with the county. The revenue model for this option will assume only residential subscribers under the 60/40 uptake rate used for previously estimates.

Percent Cost of Investment



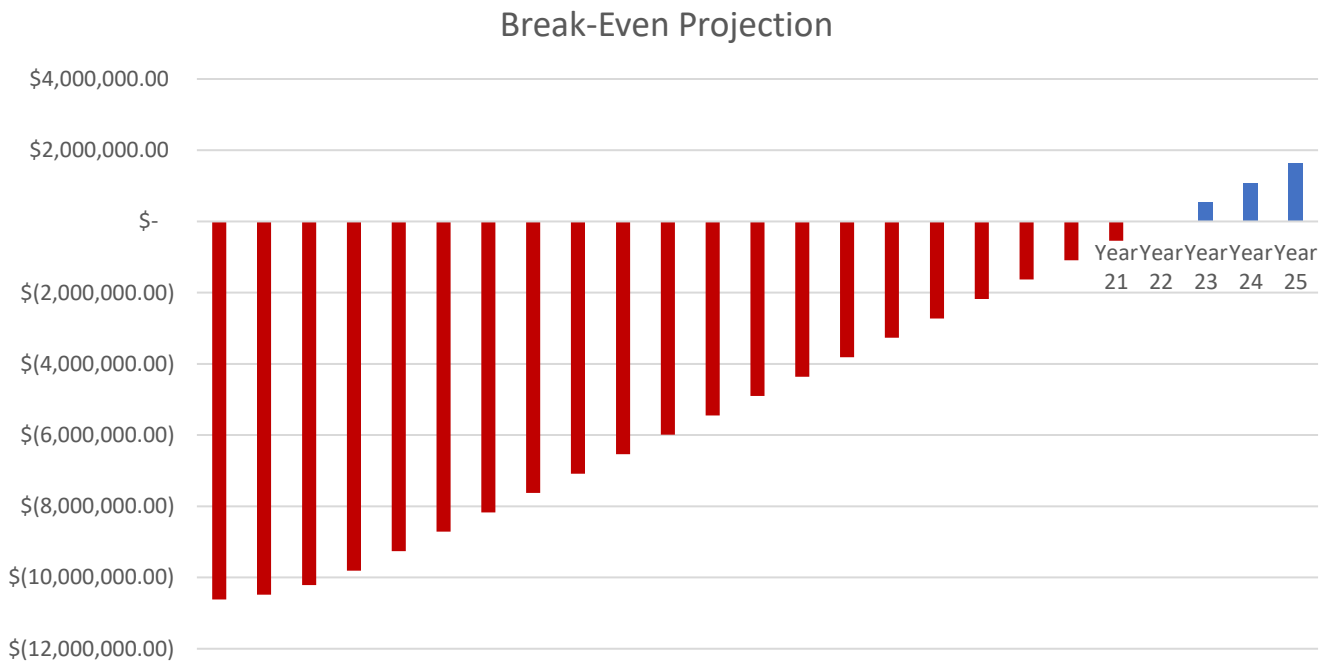
One possible solution would be contributing 25% of total infrastructure cost, including drop cost in partnership with an Internet service provider. These funds could be gathered from municipal bonds, grants from various sources, or a combination of both. An optimal model will accomplish the goal of expanding broadband services to underserved communities, at a minimum capital investment cost, minimum break-even time, and most feasible long-term sustainment cost.

The following table illustrates potential revenue at a 25% initial capital investment from the county with two potential royalty percentages.



Percent per Subscriber	Year 1	Year 2	Year 3	Year 4	Year 5
Residential Basic Pack	\$0	3,000	6,000	9,000	12,000
45%	0	\$ 66,150.00	\$ 132,300.00	\$ 198,450.00	\$ 264,600.00
Residential Premium Pack	0	2,000	4,000	6,000	8,000
50%	\$0	\$ 70,000.00	\$ 140,000.00	\$ 210,000.00	\$ 280,000.00
Revenue	\$0	\$ 136,150.00	\$ 272,300.00	\$ 408,450.00	\$ 544,600.00

A break-even analysis, based on the above projected revenues is shown below:



Conclusion

The county of El Paso's need for broader Internet coverage is irrefutable. The Covid-19 pandemic made very clear the challenges of inequitable broadband access, affordability, and technical limitations of existing services, and the customers consuming those services. Many municipalities in this and other states have successfully implemented strategies for meeting these challenges, but there is no one-size-fits-all solution. A successful publically supported broadband expansion and the strategies implemented to achieve it, are greatly influenced by local factors including population density, state and local policies, the local ISP competitive market, population demographics, community support, and available funding sources.

Considering these factors in El Paso, the most feasible approach will be through a partnership with current ISP market competitors. It will be particularly beneficial to collaborate with providers that may have substantial fiber infrastructure already in place, providing opportunity and potential for market growth without market cannibalization. In addition, such fiber infrastructure provides for municipal investment with lesser potential for litigation, since fiber-based Internet services are not considered to be telecommunication services under current FCC regulations.

The county will also benefit from early community engagement regarding broadband expansion and will need to invest in technology literacy programs that prepare underserved communities to take advantage of proposed new services. Lobbying for more expansion-friendly policies at federal, state and local levels is critical to successful expansion projects. Policies such as a "Dig Once" policy will dramatically reduce the cost of infrastructure and provide for future expansion needs through strategic placement of dark fiber.