



Center for Regional Economic Research

CRER White Paper
Number 12
December 2025

How Does High-Speed Broadband Benefit a Community?

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Summary

Chattanooga was the first city in the country to roll out citywide gigabit-speed broadband in 2010, and the benefits of this infrastructure have been widespread and substantial. The benefits have come in the form of greater economic output and local taxes, along with benefits to consumers and to the region as a whole through media coverage. A recent study (Lobo and Plank, 2025) estimated that the value of high-speed broadband to the community exceeded \$3.9 billion over the period 2011-2025. The effects are manifest in smart city initiatives and economic development, as well as technological innovations in public works, healthcare, education, and entertainment.

Introduction

In 2005, EPB, the local electric utility, began planning for a fiber optic network in its 600-square-mile footprint to install a smart electric grid.ⁱ Smart grids rely on fast, reliable, two-way communication between utilities and infrastructure (e.g., meters, sensors, substations). They generate large volumes of data that need high-speed transport to and from central systems. Fiber is less susceptible to electromagnetic interference and is harder to tap, making it more secure and stable for such critical infrastructure.

It became clear that the fiber infrastructure would also support community-wide high-quality broadband. The infrastructure was built out in Chattanooga and Hamilton County, TN by 2010 at a cost of \$396 million (Lobo, 2020).ⁱⁱ Two major lines of business emerged from the fiber optic infrastructure: a) the smart electric grid, and b) community-wide high-speed broadband.ⁱⁱⁱ Based on a recent study (Lobo and Plank, 2025)^{iv}, this white paper explains how high-speed broadband, a foundational communications infrastructure, can impact a local community.

Why do we need fiber optic infrastructure?

Fiber optic infrastructure refers to the network of cables, equipment, and systems that use fiber optic technology to transmit data as light signals. It is the backbone of high-speed internet, telecommunications, and data transfer systems. Fiber optics provide far greater bandwidth and speed compared to copper or wireless alternatives. It can support symmetrical gigabit and even terabit speed transfers. This is crucial for modern internet use (e.g., streaming, video calls, cloud apps) where a typical U.S. household has at least 20 connected devices.

A contributing factor in the expansion of broadband was the Covid pandemic, which resulted in a major shift in work norms and the disruption of schooling. It drew attention to “last mile” connectivity to people’s homes and led a Brookings Metro’s COVID-19 Analysis to conclude that the pandemic “...*isn’t making broadband essential, it is exposing that it always was.*” Working from home and teleconferencing, telehealth, voting by mail or online, digitally shopping for groceries, distance learning, etc. require robust, reliable and speedy internet connectivity. People, businesses, and devices have all become data factories that are pumping out incredible amounts of information to the web each day (Lobo, 2020). High-quality broadband is essential to support human activity. According to the 2024 Broadband Insights Report, average household bandwidth consumption in 2023 exceeded 650 GB each month.

You don’t *absolutely* need fiber for every broadband or smart grid application, but it is a foundational

technology for delivering high-performance, scalable, and future-proof infrastructure, especially in urban and industrialized areas. It is this infrastructure that positions EPB and Chattanooga to offer a robust quantum network in the years ahead.

High-Speed Broadband Implementation in Chattanooga

In 2010, EPB rolled out symmetrical gigabit speed internet, the fastest internet in the western hemisphere at the time. Shortly thereafter, the “gig city” moniker began to be applied to Chattanooga. Initial studies indicated it would require a 30-35 percent subscription (or take) rate for the investment to breakeven. The EPB broadband service crossed the 35 percent threshold within three years. By 2025, 70 percent of homes and over 40 percent of businesses were subscribed to the EPB broadband service as seen in **Fig. 1**.

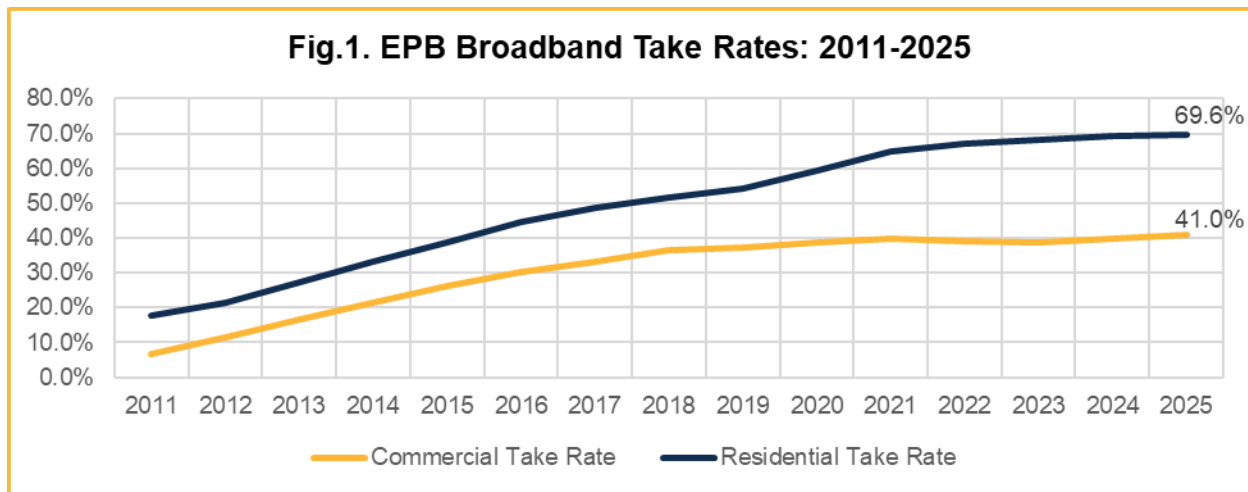
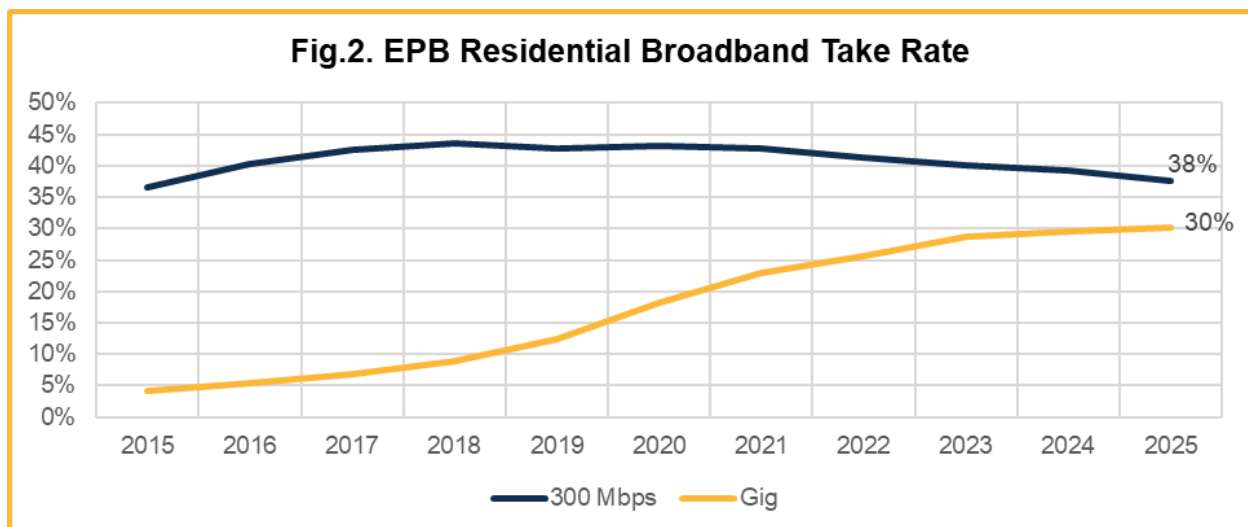
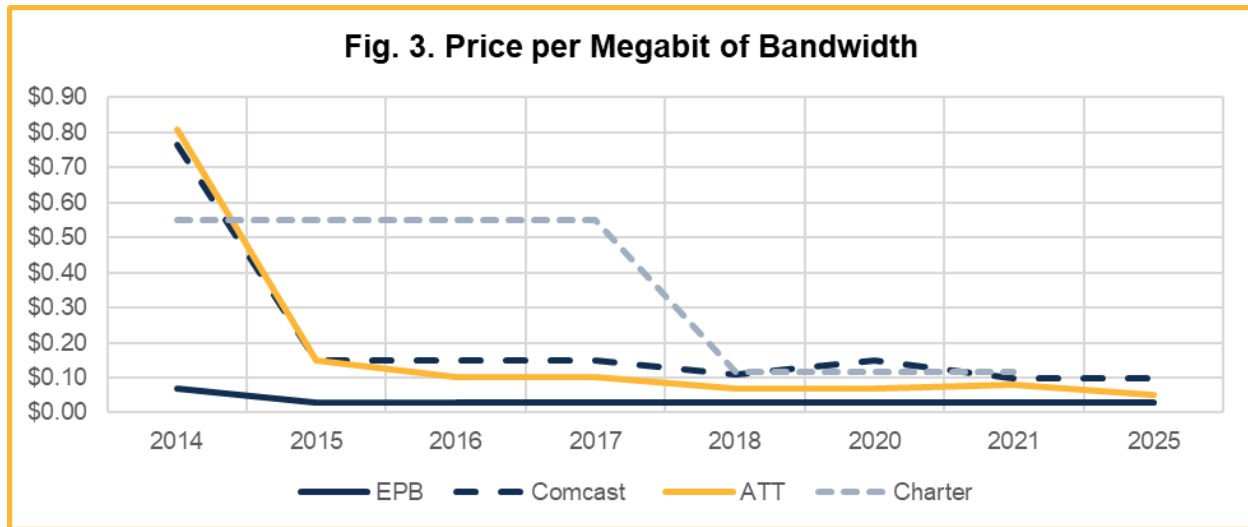


Fig 2 shows that the gig take rate in particular has steadily increased while the growth in the “slower” 300 Mbps has slowed reflecting the value of greater bandwidth. As of June 2025, the 300 Mbps take rate had

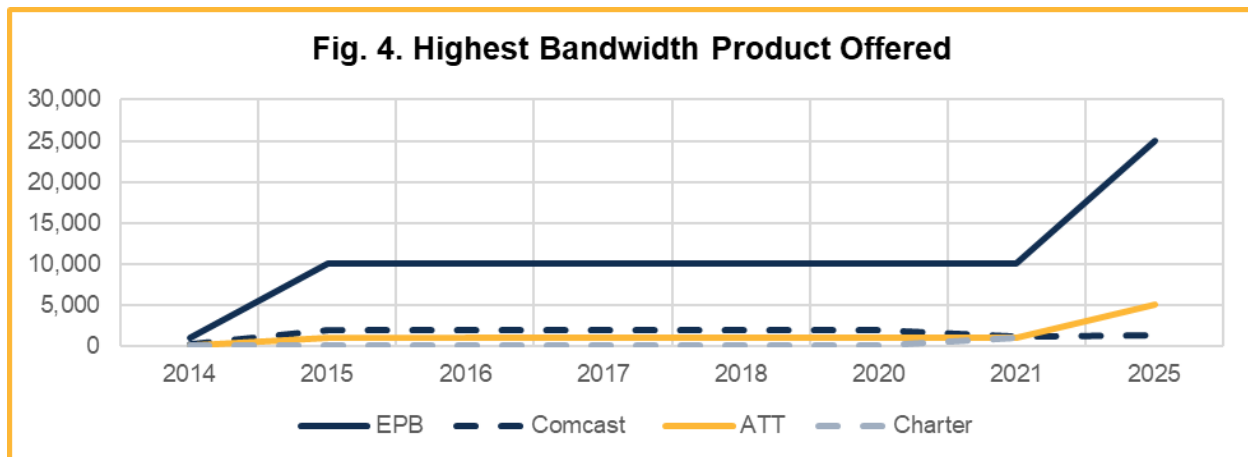


dropped to 38 percent, while the take rate for the gig had grown to roughly 30 percent marking a potential future shift in the most adopted speed tier.

Since the introduction of EPB Fiber other providers have elected to drop their prices and increase their service offerings and improve quality. **Fig. 3** shows prices per megabit for the highest bandwidth product offered in the Chattanooga area by various providers.



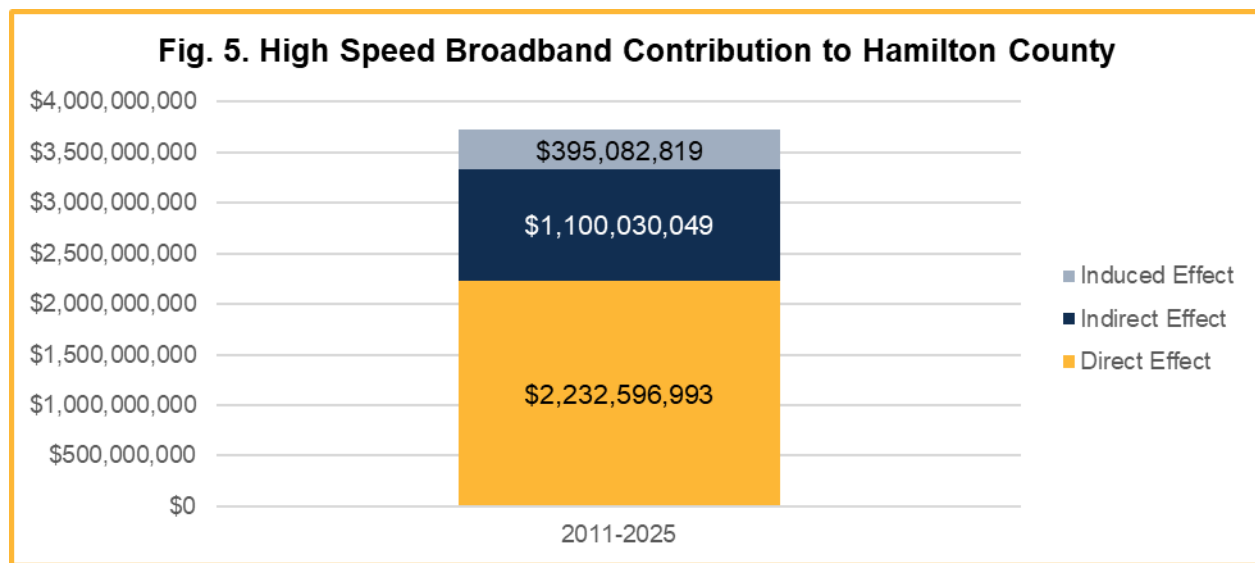
It is clear that prices have declined sharply since 2014 (in line with the rest of the country), but prices for Comcast (Xfinity), AT&T and Charter remain higher than EPB's price point.^v **Fig. 4** shows the highest bandwidth product offered from 2014 to 2025 by various providers. In 2014, EPB offered 1000 Mbps, while Comcast, ATT and Charter offered 150, 100 and 10 Mbps, respectively. By 2021, EPB's highest bandwidth product was 10 Gig (10,000 Mbps), where Comcast, ATT and Charter offered 1200, 1000, and 940 Mbps, respectively. As of May 2025, the highest bandwidth products that EPB, Comcast and AT&T offer are 25 Gig, 1.3 Gig and 5 Gig, respectively.



The Economic Impact of High-Speed Broadband

Lobo and Plank (2025) provide estimates of the value of fiber-delivered symmetrical high-speed broadband to Hamilton County TN over the period 2011-2025. They used an Industry Contribution Analysis (ICA) method in IMPLAN to examine how an existing investment/industry contributes to the economy in the defined region. The effects were calibrated based on total revenues of EPB's Fiber Division, i.e., revenues that would not be available if EPB had not brought high-speed broadband to the community.^{vi}

The high-speed broadband contributions to the community are summarized in **Fig. 5**. Direct contributions result in multiplier effects reflected in indirect effects of business-to-business spending spurred by the fiber contribution, and induced effects from household spending on goods and services. The total output effects are the sum of direct, indirect and induced effects in the community.



The estimates indicate that high-speed broadband contributed as much as **\$3.73 billion** to the county over the period 2011-2025 in the form of output, income and taxes. The output multiplier was 1.67 meaning that every dollar of fiber division revenue generated an additional 67 cents of economic activity elsewhere in the county economy. For perspective, the high-speed fiber broadband contributed approximately one percent of Hamilton County GDP every year on average. These output effects reflect increased business investment, more efficient business operations, and revenues for local government.

The additional 67 cents per dollar were seen throughout the county, as summarized in **Table 1** below. It lists the industries that saw the biggest indirect and induced impacts from high-speed broadband.

Table 1. High-Speed Broadband Impact by Industry: Indirect and Induced Effects 2011-2025

Industry (top 10)	Indirect Effect (\$Mil)	Industry (top 10)	Induced Effect (\$Mil)
429 - Motion picture and video industries	\$281.87	449 - Owner-occupied dwellings	\$51.18
472 - Employment services	\$100.59	490 - Hospitals	\$20.06
432 - Cable and other subscription programming	\$94.25	483 - Offices of physicians	\$17.57
447 - Other real estate	\$73.45	447 - Other real estate	\$17.27
499 - Independent artists, writers, and performers	\$68.81	444 - Insurance carriers, except direct life	\$14.17
431 - Radio and television broadcasting	\$52.74	510 - Limited-service restaurants	\$13.50
465 - Advertising, public relations, and related services	\$27.43	509 - Full-service restaurants	\$11.74
527 - Federal electric utilities	\$18.23	448 - Tenant-occupied housing	\$11.34
434 - Wireless telecommunications carriers (except satellite)	\$17.34	441 - Monetary authorities and depository credit intermediation	\$8.88
455 - Legal services	\$17.17	413 - Retail - Nonstore retailers	\$7.75
All Other Industries	\$382.66	All Other Industries	\$309.19
Source: Lobo and Plank (2025)			

Other Benefits of High-Speed Broadband

Consumer Surplus

The value of high-speed fiber broadband is tied to the economic impact of the internet because high-speed broadband improves internet access. That is, it adds value by improving consumers' experience and efficiency when shopping from home; conducting work and job searches; accessing entertainment, news, health care, and personal finance advice; social networking; planning travel, obtaining an education, and interacting with the government. The measurement of additional value for consumers is complex because so much of the impact of the internet has no observable market prices. In such cases, consumer surplus, the difference between what a consumer is willing to pay (WTP) and what they actually pay for a good or service, provides a more direct measure

Lobo and Plank (2025) estimated the consumer surplus of the fiber-delivered symmetrical high-speed broadband in Hamilton County over the period 2011-2025. As reported in **Table 2**, based on the benefits they received, consumers were willing to pay about \$126.84 per month for 300 Mbps service, but paid only \$57.99.^{vii} Similarly, they would have paid \$127.02 for 1,000 Mbps service, but were charged only \$67.99. Adding up the gains across nearly 119,000 households meant a total gain in consumer surplus of more than \$98 million per year

Table 2. High-Speed Broadband Consumer Surplus

	300 Mbps service	1,000 Mbps service
WTP for high-speed broadband	\$112.90	\$123.08
WTP for greater reliability	\$13.94	\$13.94
Price paid	\$57.99	\$67.99
# Households	66,892	51,738
Annual Consumer Surplus (\$Million)	\$55.3	\$42.8
Source: Lobo and Plank (2025). Annual Consumer Surplus = (WTP – Price) * # Households *12. WTP based on median income household; Customers were willing to pay \$13.94 for greater reliability, i.e., fewer outages [Boyce, 2024 Table 5].		

Regional branding and publicity

The fiber optic infrastructure, and high-speed broadband in particular, have been garnering global awareness and media coverage. This coverage has given the area national and global visibility and attracted firms and talent. Major national media outlets, including the New York Times, CBS Morning News, the Washington Post, The Economist, the Wall Street Journal, among others, have featured Chattanooga and its branding as Gig City.

This high-quality exposure helps draw the attention of vibrant and innovative workers and entrepreneurial talent to the area. It also draws business investment to the area. Lobo and Plank (2025) estimate that over the period 2010-2024, the features of the fiber optic infrastructure, high-speed broadband and the smart grid, and more recently, the quantum initiative, have brought media attention to Chattanooga and Hamilton County in the form of about 3,400 print articles, blogs, or radio spots which are estimated to have reached over 7.8 billion unique viewers/readers/listeners resulting in about \$82.1 million in advertising-equivalency value to the community.

Conclusions

The fiber optic infrastructure in Chattanooga has brought very high-speed broadband to the region. The value to the community can be measured as described in this white paper and summarized in **Table 3**.

Table 3. High-Speed Broadband Value to the Community 2011-2025

Source	\$ Millions
High-speed broadband contribution (output, income, taxes)	\$3,727.7
Consumer surplus	\$98.1
Media exposure	\$82.1
Source: Lobo and Plank (2025)	

The benefits stretch across various facets of the community, not only improving what is already here, but making new innovations possible. For instance, the fiber infrastructure has been a cornerstone of

Chattanooga's efforts to transform into a leading smart city. Ultra-fast and reliable internet is essential for smart city traffic-management that relies on real-time data transmission. Spearheaded by the efforts of The Chattanooga Smart Community Collaborative and UTC's Center for Urban Informatics and Progress (CUIP), fiber-enabled high-speed broadband helps improve transportation safety and efficiency via connected vehicle-to-everything (C-V2X) systems and adaptive traffic signals which enable real-time traffic management to reduce congestion and emissions.

The CUIP website says: *"The city of Chattanooga has emerged as a pioneer in urban renewal and sustainable development. As part of this renewal an extraordinary infrastructure has been put in place that includes high-speed, high bandwidth information networks that connect a large number of citizens to the internet. This infrastructure provides the foundation for the collection and exploitation of large amounts of heterogeneous data intended to improve city services. It allows for more effective transportation systems, energy efficiency, production and delivery, and for improving quality of life in general, including human wellness and health management and care delivery."*

The Police Department and Public Works are among the largest users of bandwidth which supports their Real Time Intelligence Center. In 2020, the city was recognized as a model smart city and was named the winner of the North America Smart Cities Award in the *"Police and Law Enforcement and Emergency Management"* category. In 2021, CUIP's innovative *Pedestrian Analysis* project was a winner of the Smart 50 Award, placing the project in the Top 50 in the world for the third straight year.

When COVID-19 made regular school impossible, EPB (along with public and private partners) launched *HCS EdConnect* as a new initiative to provide 100 Mbps internet services to about 28,500 economically challenged students in Hamilton County Schools in the Greater Chattanooga area. The program has been hailed as a national model because it guarantees year-round internet access at no charge to every family with students in need for at least 10 years. A Boston College study found that parental involvement remains consistently strong even after four years and participants use their connectivity for school coursework, online learning, parent-teacher interactions, applying for jobs, remote work options and telehealth. They also found that students with stronger home internet connections were more inclined to utilize the internet for learning new concepts and accessing information, which led to changes in their perspectives, in contrast to those with merely decent or poor connections.

To the extent that broadband access affects socioeconomic factors such as education and employment, both of which have important implications for health outcomes, broadband access has been characterized as a *"super-determinant"* of health. COVID-19 had a profound and lasting impact on telehealth usage in the U.S.

and is now in many ways a routine part of clinical care especially in family medicine, behavioral health, and chronic disease management. Locally, Regional Obstetrical Consultants (ROC), a high-risk obstetrics practice in Chattanooga pointed out that each teleconsultation takes about 15 minutes less than a normal face-to-face consultation/visit, and telemedicine patients miss fewer appointments compared to in-person patients (Lobo, 2020).

High-speed broadband is also essential to enjoying 21st-century entertainment. When the Chattanooga Convention Center became the first in the world to offer 25 Gig service, it attracted e-gaming competitions, live streaming events, and digital media conferences, boosting local entertainment and tourism because of the seamless 4K/8K streaming, live event broadcasting, and multi-device usage capability. Given the expected sharp increase in connected devices per household by 2030, the multi-gig infrastructure in Chattanooga seems poised to be a cornerstone of life in the region and a source of significant business efficiencies and consumer surplus.

Finally, Chattanooga is an emerging national leader in quantum networking. In 2022, the nation's first commercial quantum network, known as the EPB Quantum NetworkSM was established, leveraging Chattanooga's advanced fiber-optic infrastructure to support quantum computing and networking.^{viii} The 2025 Heartland Summit think-and-do tank, Heartland Forward, honored Chattanooga as a *Secret Sauce Community* with a citation that noted that “Chattanooga continues leveraging its first-of-its-kind publicly owned gig internet network to drive tech innovation and entrepreneurial growth, now becoming a hub for quantum and AI.” By 2035, it is likely that the moniker “Quantum City” will apply.

ENDNOTES

ⁱ EPB was created by the Tennessee legislature in 1935 as a nonprofit municipal utility owned by the City of Chattanooga. EPB operates in a 600-square-mile service area and serves 6 counties, three in Tennessee (Hamilton, Marion, Sequatchie) and three in Georgia (Catoosa, Dade, Walker). About 90 percent of EPB's service territory comprises Hamilton County, TN.

ⁱⁱ Lobo (2020): Ten Years of Fiber Optic and Smart Grid Infrastructure in Hamilton County, Tennessee. Available [here](#).

ⁱⁱⁱ Till recently, EPB was organized in two divisions: Electric and Fiber Optic. The latter refers to legacy telecom, and video and internet lines of business. In 2023, EPB restructured its operations into two division: Energy & Communications, and Strategic Initiatives. This restructuring was geared toward allowing EPB more flexibility to explore new energy and quantum technology opportunities in the future.

^{iv} Lobo and Plank (2025): From Gig City to Quantum City: The Value of Fiber Optic Infrastructure in Hamilton County, TN 2011-2035. Available [here](#).

^v At the time of writing, EPB is the only provider with no data caps or installation fees attached to their service.

^{vi} Note that Fiber division revenues are from community-wide broadband. Smart grid effects are captured in the Electric division.

^{vii} See Boyce (2024). Available [here](#).

^{viii} Fiber optic cables are ideal for transmitting quantum bits encoded in photons because they help preserve the coherence of quantum states during transmission. Compared to other media, they offer low noise environments and minimal signal degradation, which is crucial for maintaining quantum entanglement.