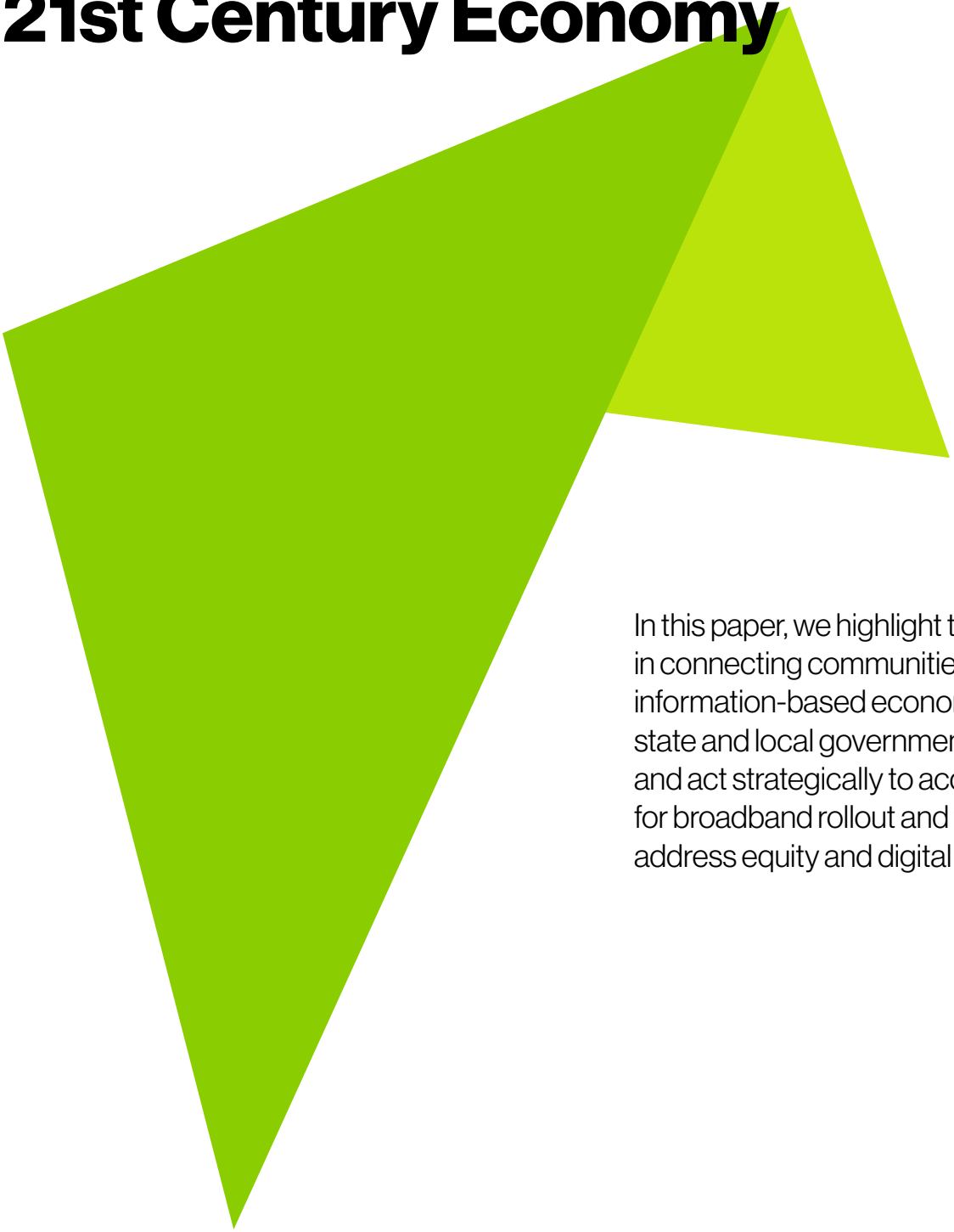
Guidehouse
Outwit *Complexity*

Broadband: Infrastructure for the 21st Century Economy



In this paper, we highlight the role of broadband in connecting communities and supporting information-based economies. We outline how state and local governments should plan early and act strategically to access federal funding for broadband rollout and tune their efforts to address equity and digital inclusion.

I.

Closing the Digital Dive with Broadband Investments

There is an increasing body of evidence that higher levels of broadband adoption lead **to economic growth, higher incomes, and lower unemployment**. As a result, communities without reliable high-speed internet report a gap in resources and opportunities compared to those with access to reliable high-speed internet. The COVID-19 pandemic has only exacerbated the impact of this digital divide, as more people rely on internet access—particularly for vital functions like online education, telemedicine, and telecommuting to work. As the Federal government allocates enormous new funding streams to help improve broadband access, state and local governments have a once-in-a-generation opportunity to improve digital equity and economic vitality in unserved and underserved regions.

II.

COVID-19 Heightens Need for Broadband

Since 2010, the National Telecommunications and Information Administration (NTIA) has invested $4 billion in **building out broadband infrastructure** and improving internet access for all Americans. Yet, even with these investments, the Federal Communications Commission (FCC) estimates at least **21 million Americans** still lack broadband access.

> **According to the FCC, broadband is....**
>
> "the transmission of wide bandwidth data over a high-speed internet connection" (classified as a minimum of 25 Mbps download and 3 Mbps upload speeds) via multiple types of technologies, including fiber optics, wireless, cable, DSL, and satellite."

Since the start of the pandemic, individuals and families are relying more heavily on the internet to participate in the economy and access social services, including remote learning, working from home, and telehealth. A **recent survey** found that roughly half of US adults (53%) have said the internet has been vital during the pandemic. In this same survey, approximately one-in-five parents (22%) said it is very or somewhat likely their children will not be able to complete their schoolwork because they do not have a reliable internet connection at home. These concerns are almost twice as prevalent for low-income and working-class families (43%).

Digital inequities are a longstanding issue, and disproportionately affect lower-income individuals and rural neighborhoods. In a **recent study**, policy analysts found that low-income neighborhoods are especially vulnerable to predatory practices such as digital redlining, or the practice of using digital technologies to create and perpetuate inequities in marginalized communities. The FCC has made attempts to limit this predatory behavior, but internet service providers (ISPs) have reportedly found loopholes, such as revenue-sharing schemes and bulk billing arrangements. In turn, ISPs can increase prices, monopolize internet services, and lower service quality at the cost of the consumer.

In response to COVID-19 and in recognition of the need to prioritize equitable broadband investments, the Federal government has recently introduced over $17 billion of funds across multiple pieces of legislation to improve broadband access, affordability, reliability, and transparency. Additionally, the White House's American Jobs Plan recommends $100 billion to reach 100% high-speed broadband coverage. As state and local governments grapple with addressing the digital divide and serving their most vulnerable residents, they can leverage these new funding streams to expand broadband access and spur economic recovery in their jurisdictions.

III.

Broadband is a Critical Infrastructure Asset in the 21st Century

While highways and power lines were the economic infrastructure of the 20th century, broadband serves that purpose today in linking regions, suppliers, and consumer markets.

Broadband investments drive economic development and promote regional economic resiliency. In the short and long term, these investments create employment and business development opportunities by connecting businesses and individuals to the global marketplace. The rise of remote work has already increased access to employment opportunities for many, including persons with disabilities, working caregivers, and people who require a location-independent model. Broadband can also help communities diversify their economic base by attracting remote workers and new businesses.

The economic benefits of adopting broadband can be organized into direct, indirect, and induced benefits *(shown in Figure 1)*.

Figure 1: Benefits of Adopting Broadband

Benefit Type	Benefit Description	
Direct	**Direct job creation**	
Indirect	**Enabler of increased productivity**	Bridges information asymmetries
		Develops social capital
		Makes a local product global
Induced	**Enhanced quality of life**	Avoids brain drain and keeps taxes local
		Promotes telemedicine
		Enhances municipal services

GH-137 WP Infrastructure for the 21st Century Economy_001

- **Direct Benefits:** This is the most obvious impact of any broadband project; the design, installation, and maintenance of fixed and wireless broadband networks creates jobs for engineers, technicians, and planners. This is often a time-limited benefit, as the direct benefits occur only during the planning and construction phase, and act as a stimulus to a local economy.

  When we talk about the benefits of broadband, however, we are really talking about the disruptive effect that digital interconnectedness provides to communities, as a platform for learning, service provision, and commerce. These benefits can be understood as indirect and induced.

- **Indirect Benefits:** Access to the internet, powered by broadband connectivity, makes a vast array of information available to all, which reduces competitive disadvantages caused by asymmetric information. The internet also enables the development of remote connections and social networks.

  For example, many businesses currently conduct recruiting and hiring online, which expands businesses' hiring pool and allows applicants to easily find and apply for jobs. Internet connectivity enables e-commerce and provides access to global markets and customers. While we often think of this as Amazon Prime deliveries to a remote area, this can also be the example of someone selling a homemade creative product on Etsy, Facebook Marketplace, or other e-commerce platforms, as a source of income. Broadband reduces the friction between suppliers, consumers, and other stakeholders in the economy.

- **Induced Benefits:** Finally, broadband adoption can enhance a community's quality of life.

  Telemedicine, enabled by broadband, increases access to healthcare; this is not just about being able to read about a set of symptoms on WebMD – it allows healthcare providers to conduct remote diagnostic and consultation work. Having high-speed internet encourages businesses and people to stay local, helping to maintain community vibrancy. Expanding on that, we have seen the rise of remote work as a result of COVID-19; cities that were otherwise bedroom communities are realizing that the provision of broadband can be an incentive to keep and attract talent, and avoid brain drain to the cities that have otherwise been magnets for that talent. Finally, municipal services benefit from the ability to reach more citizens and leverage data using various forms of connectivity from technologies such as Internet of Things (IOT) sensors and cloud computing.

Expected Economic Impacts of Broadband

Broadband investments should not be seen as a discrete, siloed initiative. In the same way that electricity and highways catalyze economic activity across other sectors, the impacts of broadband ripple throughout the entire economy, and in particular, boost the productivity of the information, professional, scientific and technical services, educational services, and healthcare and social assistance sectors.

More generally, there are five key reasons why communities would want to invest in broadband infrastructure:

- Innovations in remote monitoring, tracking, and systems management.
- Increased access to digital services in both the public and private realm.
- Enhanced customer experience through the expansion of digital service offerings.
- Improved productivity and connectivity for sectors affected by remote work.
- Creation of a dynamic marketplace for ISPs and broadband providers to compete and offer a wide range of choices for consumers.

To policymakers, it is important to understand how broadband improves the productivity of economies. *Table 1* outlines the expected impacts of broadband.

Table 1: Expected Impacts of Broadband

Economic Sector	Expected Impact	Economic Value-Added Multipliers	% of Total US GDP
Healthcare and Social Assistance	Telemedicine has grown significantly over the past few years with the recent advent of cloud computing, expanding internet access, and regulatory changes. During the COVID-19 pandemic, telehealth services have become even more critical, and public adoption has skyrocketed. Individuals are likely to continue using telehealth options after the pandemic, especially for chronic illness and disease management, and non-urgent care visits for "lifestyle" conditions such as skin care and hair loss. Additionally, online platforms for public sector social assistance programs may improve the user experience and expand constituent access.	2.6x	8%
Educational Services	Digital education has been vital in responding to the COVID-19 emergency, particularly for K-12 students. Across the nation, schools have swiftly adapted to remote learning and shifted their programs online. Even with the reopening of in-person facilities, schools, colleges, universities, and training centers, the development and use of online learning platforms is likely to continue.	2.2x	1%
Information Technology (IT)	Over the past several decades, the information sector has grown rapidly. More recently, IT and digital technologies have been vital to disaster response efforts. From coordinating efforts with the National Guard, to sending health data across global information channels, cities and states have relied on the ability to communicate information both quickly and easily. As more economic activities are shifted online, the demand for information goods and services—such as cloud computing, online public services, and digital learning tools—will likely increase.	2.5x	5%
Professional, Scientific, and Technical Services	This sector is composed of industries such as legal work, computer services and engineering, management occupations, and research services. Affected industries are expected to experience increased productivity through telework and increased employment access to telecommuting work opportunities. Many of these jobs are location-agnostic and typically require a high level of expertise and training. Over time, increased broadband access may improve employment inequities by offering lower- and middle-income individuals greater access to high-paying jobs.	2.4x	9%
Finance and Insurance	Across finance and insurance industries, online platforms will likely expand access to services and improve customer experience. Broadband investments may attract corporate investment and promote local business development. In turn, communities may see an increase in banking, investment, and insurance activities.	2.8x	8%
Transportation and Warehousing	Areas adopting broadband may experience improved productivity and logistics management through innovations in tracking and monitoring. This trend coalesces with the rise of e-commerce, as more individuals buy and sell electronically. The movement of people and goods (both public and private) will likely have improvements in user experience and productivity through the expansion of digital infrastructure and future mobility innovations.	2.6x	3%
Utilities	Both public and private utilities, such as electricity, gas, water, and sewage, may experience innovations in remote monitoring that will likely enhance utility offerings and customer experience.	2.7x	2%

Sources: US Bureau of Labor Statistics, North American Industry Classification System US Census Bureau, Guidehouse analysis

Expected Impact Low Moderate High

Economic Sector	Expected Impact	Economic Value-Added Multipliers	% of Total US GDP
Construction	The construction sector will likely have local and regional economic growth in areas that invest in broadband infrastructure (e.g., fiber, towers, and conduit) and other IOT devices).	2.6x	5%
Agriculture, Forestry, Fishing, and Hunting	This sector is expected to improve yield and logistics management across most industries through innovations in remote monitoring and deployment of IOT technologies.	3.1x	1%
Arts, Entertainment, and Recreation	Digital entertainment (notably the growth of streaming services), arts, and recreation services will likely expand access and have an increase in both consumer and business demand.	2.3x	1%
Retail Trade	Retail trade has been steadily growing with the rise of e-commerce. This trend will likely continue as consumer demand increases and more people have access to online shopping platforms.	2.4x	5%
Management of Companies and Enterprises	Business types within this sector, such as corporate, subsidiary, and regional management offices, may see increased productivity through telework, and increased access and adoption of telecommuting employment opportunities.	2.5x	2%
Public Administration	Affected industries may expand access to e-government services, and, in turn, enhance customer experience and digital means of citizen engagement and participation.	1.7x	12%
Real Estate and Rental Leasing	Increased access to broadband enables online real estate browsing, such as virtual tours and digital signing. This may improve price transparency for consumers and increase market competition.	1.8x	11%
Wholesale Trade	Wholesale trade may expand the diversity of suppliers and improve logistics management through remote monitoring innovations.	2.4x	6%
Waste Management Remediation Services	Waste management industries will likely have improved systems management through innovations in remote monitoring and tracking.	2.7x	3%
Accommodations and Food Services	With the ongoing rise of e-commerce, online food delivery and other accommodation services may have a broader customer reach.	2.4x	4%
Manufacturing	The manufacturing sector may have increased demand for electronic products and IOT devices.	3.8x	10%
Mining, Quarries, and Oil and Gas Extraction	This sector may have increased yield and productivity across affected industries through improved remote monitoring, tracking, and systems management.	2.8x	1%
Other Services, Except Public Administration	The service-providing industries sector includes a wide range of job classifications, from hairdressers to mechanics. These services may expand access to digital platforms and improve the user experience.	2.6x	3%

Sources: US Bureau of Labor Statistics, North American Industry Classification System US Census Bureau, Guidehouse analysis

Expected Impact Low Moderate High

IV.

New Broadband Funding is Available – Plan Ahead To Take Advantage

It is exciting that the Federal government is realizing the benefits of broadband and its criticality to economic infrastructure and thus is committing funding and resources to allow state and local governments to bridge their broadband gaps.

Through the Consolidated Appropriations Act, enacted on December 27, 2020, and the American Rescue Plan Act of 2021, enacted on March 11, 2021, the Federal government has introduced billions of broadband access-related dollars. To maximize the impact of federal funds and facilitate short-term recovery and long-term prosperity, state and local governments should create a plan to strategically pursue, allocate, and utilize the new broadband funding.

Since several funding streams in the two acts are more targeted than the Coronavirus Relief Fund (CRF) provided through the Coronavirus Aid, Relief, and Economic Security (CARES) Act, and because there have been significant changes to other federal funding streams for the COVID-19 emergency, including Federal Emergency Management Agency Public Assistance now being reimbursed at 100% federal cost share as opposed to 75% federal cost share since the start of the COVID-19 disaster, CRFs have been freed up. In addition, the American Rescue Plan Act (ARPA) introduced additional flexible funding for state and local governments, including the Coronavirus State and Local Fiscal Recovery Funds (Fiscal Recovery Funds). State and local governments have the opportunity to strategically utilize less-restrictive funding streams for broadband investments in 2021 and beyond. Legislation stemming from the American Jobs Plan is also anticipated to increase funding opportunities for broadband efforts.

Preparing to Maximize Broadband Funds for State and Local Governments

State and local governments can maximize broadband cost reimbursement by understanding what resources are available and establishing a broadband funding strategy and portfolio. Programs and funding streams that can be used to subsidize broadband activities are summarized in *Table 2*.

Table 2: Summary of Programs and Funding Streams

Funding Stream	Total Funds*	Broadband Activities Funded	Eligible Recipients	How to Apply
Coronavirus Capital Projects Fund (CCPF)	$10B	Funds to carry out critical capital projects that directly enable work, education, and health monitoring, including remote options, in response to the public health emergency. Funds are targeted at rural America and low- and moderate-income communities.	States, territories, and Tribal governments	Not yet open – Treasury to begin accepting applications in the summer of 2021. Applicants will be required to provide a plan describing how they intend to use the funds.
Amendments to Secure and Trusted Communications Network Reimbursement Program (FCC)	$1.9B	Replacing any equipment or services determined to be a national security threat	Telecommunication service providers with up to 10 million subscribers	Not yet open

**All funds have been appropriated to States. Recipients and subrecipients have discretion to allocate funds towards eligible broadband activities.*

Funding Stream	Total Funds*	Broadband Activities Funded	Eligible Recipients	How to Apply
Connecting Minority Communities Pilot Program (NTIA)	$285M	• The purchase of broadband internet access, service, or equipment • Hiring IT personnel to facilitate educational instruction including remote instruction • Operations of minority business enterprises • Funds to provide equipment to students or patrons	Historically black college or university (HBCU), a Tribal College or University (TCU), a Minority-serving institution or their respective consortiums	Not yet open, NTIA published a final rule on June 15th, 2021 outlining rules and regulations **(link)**
Emergency Broadband Benefit Program (FCC)	$3.2B	Reimbursement subsidy for the provision of broadband service and associated equipment to qualified households via a monthly discount	Broadband service providers serving eligible households	Eligible households can apply now **(link)**
Tribal Broadband Connectivity Program Grants (NTIA)	$1B	On tribal land: • Broadband infrastructure deployment • Affordable broadband programs • Distance learning, telehealth, digital inclusion • Broadband adoption activities	Tribal government, tribal college or university, Department of Hawaiian homelands on behalf of the Native Hawaiian Community	Eligible households can apply now **(link)**
Broadband Infrastructure Deployment Grant (NTIA)	$300M	Deployment of fixed broadband service to service area broadband is not available at one or more households or businesses in the census block, as determined by the Digital Accountability and Transparency (DATA) Act	Public (State or political subdivision) - Private (provider of fixed broadband service) Partnerships	Applications currently open, Applications due on August 17th, 2021 **(link)**
Elementary and Secondary School Emergency Relief Funds	$190.5B*	Purchasing educational technology	State Educational Agencies to distribute to public K-12 schools	See note*
Governor's Emergency Education Relief Fund	$4.3B*	Costs associated with continued operation including educational technology	Governors to provide assistance to public and non-public schools	See note*
Higher Education Emergency Relief Fund	$76.6B*	Expenses associated with coronavirus including education technology	Higher education institutions	See note*
Coronavirus Relief Fund	No additional funding - Timeline extension	Broadband investments	State and local governments	See note*
Coronavirus State and Local Fiscal Recovery Fund	$350B*	Broadband investments	State and local governments	See note*
Emergency Connectivity Fund	$7.1B	Costs associated with broadband internet access and equipment to enable remote learning	Schools and libraries	Initial application window open now, applications due August 13, 2021 **(link)**
Homeowner Assistance Fund	$9.9B*	Internet service bills for homeowners	States, Territories, Tribes	
American Jobs Plan (recommended plan, not legislation)	$100M	N/A	N/A	N/A

**All funds have been appropriated to States. Recipients and subrecipients have discretion to allocate funds towards eligible broadband activities.*

Once states and local governments have identified eligible funding sources, they can create a plan to maximize the impact of federal funds. Funding strategies may include:

- **Leverage Less-Restrictive Funding Streams for Broadband Investments:** The American Rescue Plan and Consolidated Appropriations Act introduced numerous targeted programs to enable both short- and long-term recoveries. This allows state and local governments to prioritize flexible funding streams, including CRF and Fiscal Recovery Funds, toward broadband investments.
- **Prepare to Apply for Application-Based Programs:** New funding streams that are anticipated to be application-based (i.e., CCPF, Connected Minority Communities, FCC COVID-19 Telehealth Program, Tribal Broadband Connectivity Program, Broadband Infrastructure Deployment Grant, grants from the American Jobs Plan) have had a slow start, as the FCC and the NTIA had not released program guidelines at the time of this paper's publication. Governments can prepare to quickly apply for these programs by identifying eligible populations under their jurisdiction and potential broadband investments.
- **Conduct a Broadband Equity Assessment:** It is anticipated that future funding will be available for community investments to support equity and inclusion. Gathering data on broadband accessibility will ensure that governments are ready to pursue future funding when it is made available through additional appropriations.

V.

Guidehouse Capabilities and Experience

Our Capabilities

Our State & Local Government practice works with states, counties and cities across the country on a range of strategy, management, and technology issues. From economic development strategy, to broadband planning and Federal grants management and administration, we cover all bases required for state and local governments to harness Federal resources to deliver their strategic objectives.

Our team uses a robust approach to broadband strategy and implementation that combines technical expertise, change management, and stakeholder engagement. We have professionals and experts across the globe who can advise on infrastructure (e.g., fiber, towers, conduit), new technologies (e.g., 5G, IOT sensors and devices), and new coordination efforts (e.g., integrated digital inclusion efforts). We understand the socioeconomic impacts of broadband investments and will work to build a strategy that promotes both economic and social prosperity across your region.

At Guidehouse, we take the approach *(shown in Figure 2)* to building and executing broadband roadmaps.

Figure 2: Our Approach

	Capabilities	Approach	Direct Outputs
1	**Current State Assessment**	Understand the local & regional context of your community. Identify your priorities & needs.	Targeted mapping to identify unserved & underserved areas Benchmarking to similar jurisdictions
2	**Stakeholder Engagement**	Understand your constituents' & stakeholders' needs & the challenges they face.	Coordinate across stakeholders & formulate a plan to encourage citizen participation Conduct ongoing engagement & outreach
3	**Equity-Driven Strategy & Policy Design**	Begin with a clear policy direction & strategy. Deploy data analytics to enhance decision-making & promote equity.	Establish key broadband goals & metrics Research approaches to achieve goals Develop business & data governance plan
4	**Funding & Operations**	Strategically leverage funds and assess infrastructure & maintenance costs in the near & long term.	Research & analyze funding sources Create a plan to optimize & maximize funds Review fund management for compliance
5	**Change Management**	Facilitate a feedback loop through a robust evaluation program & coordinate across stakeholders.	Execute broadband plans & governance Implement impact-tracking methodology Facilitate an evaluation program

GH-137 WP Infrastructure for the 21st Century Economy_002

1. **Current State Assessment:** Every municipality and region has a unique context that will affect the outcome of broadband investments. To understand the current state of broadband access in your community, our team can conduct targeted mapping to identify unserved and underserved areas and complete a benchmarking analysis to compare your community's performance to similar jurisdictions.

2. **Stakeholder and Community Engagement:** Effective stakeholder engagement will ensure that the broadband strategy reflects community priorities and incorporates stakeholder input. Coordinating across stakeholders will be particularly important in order to develop partnerships across public organizations, private entities, and the community. Engagement should work to educate the community and build the local capacity necessary for successful infrastructure projects. Our team has worked across diverse political environments around the globe and are experts in stakeholder engagement and community outreach.

3. **Equity-Driven Strategy and Policy Design:** Our broadband strategy begins with a clear policy direction that accounts for all stakeholders and desired outcomes. We believe that successful implementations connect broadband investments to other policy priorities, including economic development, transportation, healthcare, and agriculture. Our team can deploy data analytics to enhance decision-making, and formulate solutions designed to address barriers to facilitating broadband access in unserved and underserved areas.

4. **Funding and Operations:** Our team can strategically utilize funding sources that support near-term broadband infrastructure development and long-term operations and maintenance costs. In addition, we can help state and local governments identify and leverage partnerships (including public-private partnerships) to fund long-term expansion efforts and reduce the financial burden on public entities.

5. **Change Management and Program Evaluation:** We are experts in organizational change strategies and will work to operationalize your vision. With every engagement, we develop a program evaluation and change-management process to ensure accountability and long-term success. Through this process, our team facilitates a feedback loop across stakeholders to help your community's broadband program evolve and achieve its desired outcomes.

Guidehouse
Outwit *Complexity*

Broadband Experience

Guidehouse has helped state and local entities across the US with their broadband and federal funding needs. A selection of relevant experience is included below:

- For one of the largest counties in the US, Guidehouse created short- and long-term broadband strategies during the COVID-19 pandemic. This included program design and implementation support to help bridge the digital divide. The team also completed a program evaluation to understand the effectiveness of digital inclusion measures.
- For a major metropolitan West Coast city, Guidehouse developed a broadband strategy that would identify the city's negotiating stance on carrier infrastructure buildout; improve broadband access to students, seniors, and low-income citizens; and prepare the city to build out smart city technologies and IoT platforms.
- For a major metropolitan East Coast city, Guidehouse assessed the broadband needs of the city and developed a strategy to encourage competition in the marketplace of ISPs and other broadband vendors. The team also supported the implementation planning of a high-profile digital inclusion initiative to connect many parts of the city.
- For a midsize city in the Midwest, Guidehouse assisted franchise agreements with telecommunications firms in support of broader connectivity and economic revitalization. These discussions ultimately led to increased efforts to identify fiber and broadband access in the region.
- For a federal agency, Guidehouse is developing a strategy that uses broadband as an enabling tool for the organization's broader economic development goals. This work consists of leading practices research, as well as considerable external stakeholder outreach and alignment.

Email: statelocal@guidehouse.com **Web:** guidehouse.com @guidehouse linkedin.com/company/guidehouse