The Aspirational City

Investigating Broadband Investment in American Cities

- FINAL REPORT –

September 6, 2017

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Executive Summary

Successful cities continually strive to offer quality of life and economic opportunities to compete and attract people and businesses. Like clean water, good roads, and reliable electricity, high-speed internet (broadband) access is an essential service for local governments, households, businesses, and organizations. Cities that aspire to ensure affordable and ubiquitous broadband, along with smart city services, enhance quality of life and create an environment people will choose to live and work.

This research study provides insights and includes details on how cities across the United States are addressing gaps, barriers, and opportunities for broadband. The study's key findings below can help cities that have already started taking steps toward broadband challenges, as well as those cities considering upgrading their broadband.

Network Drivers and Planning

- Having an economic development authority engaged in broadband issues helps focus city broadband efforts on economic development as a driver. Unfortunately, only 59 percent of smaller cities have the benefit of a local economic development authority.
- Eighty-one percent of cities surveyed have some type of asset (utility and/or network) that could be leveraged to help facilitate the build out of a municipal network.
- Although 28 percent have completed a feasibility plan and another 28 percent have undertaken other broadband research studies, almost one in three cities (32 percent) have not undertaken any type of broadband planning or analysis.

Network Financing

- More than 63 percent of cities do not have any of the following: annual funding to support broadband, a city broadband office, nor broadband adoption and training programs.
- Overwhelmingly, a lack of city funding has been the key element preventing cities from moving forward with broadband network investments. Half the cities surveyed also say a lack of external funding has prevented them from building municipal networks. This suggests that a majority of cities are looking for external solutions.
- Thirty-six percent of the cities report that a lack of political leadership has prevented them from addressing their broadband needs and taking action.
- Most participating cities do not have a broadband office and thus, may not have dedicated personnel that can focus on driving economic development, community vitality, and other strategic initiatives through broadband.
- Almost three-quarters of the cities that have a municipal network built it to serve government facilities and community anchor institutions.
- Of those cities that have networks, more than 55 percent pay for it in whole or in part with government general funds.

Network Use and Value

- Smart city applications are growing but remain largely an untapped opportunity, especially for smaller (less than 25,000 population) cities. Smart city applications are many, varied, and not completely understood. Cities should consult with each other and with industry experts to harness the benefits of applications.
- Only half of cities consider their broadband speeds excellent or very good. Only two in five rate their city's broadband value for money as excellent or very good. This indicates that the private sector is not sufficiently keeping up with demand. Municipalities recognize this and are beginning to act and take steps to address their broadband issues.
- Unserved and underserved areas continue to challenge cities of all sizes. Three in five (60 percent) of cities surveyed reported that underserved and unserved populations are a significant or extremely significant problem.

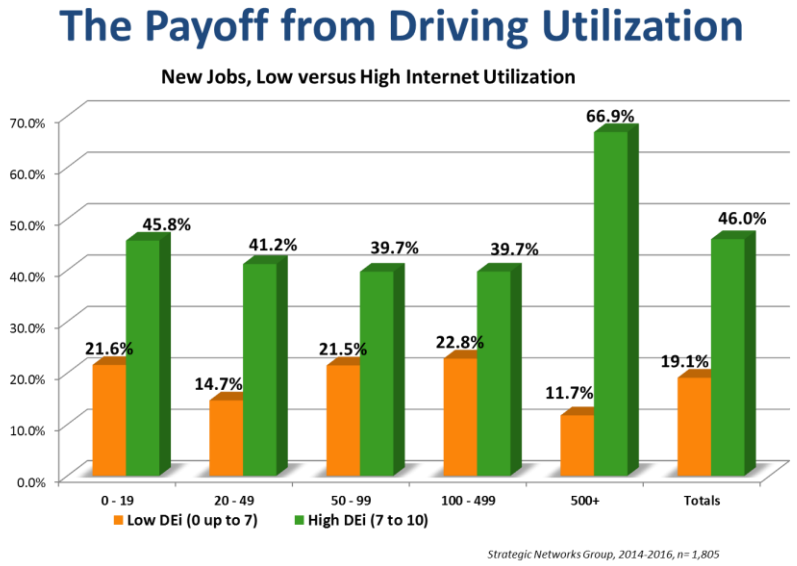
Some Lessons Learned

City responses and follow-up interviews with selected respondents reveal that local leadership is essential to moving broadband initiatives forward as local leaders set priorities and budgets. A common theme from interview feedback shows that municipal leadership, especially political leadership, is important to initiating and following through on broadband efforts.

Leadership can and should act to not only drive availability but utilization as well as it is key to economic development and good-paying new jobs. As most participating cities do not have a broadband office, cities may not have dedicated personnel than can focus on driving economic development, community vitality, and other strategic initiatives through broadband.

Rather than taking a "build it and they will come" approach, cities need to assign strategic planning resources to drive local growth and create new opportunities. This is critical because in terms of job creation, SNG research shows that 70 percent of local businesses underutilize the broadband they have.

SNG research shows that businesses that effectively use online business applications create twice as many jobs compared to businesses that underutilize online business applications —see prior chart – raising awareness and driving utilization with individual local businesses, particularly small to medium-sized businesses.



A majority of cities surveyed are looking to invest more in building or expanding broadband and require more funding (private and/or public) to pursue their plans. However, 55 percent believe that more private investment is needed. Almost 52 percent believe that more public investment is needed. Understanding and focusing on the economic benefit broadband provides can help public entities make the case for needed funds. Smart city services further enhance quality of life and community vitality – further increasing the community return from investing in broadband.

The research and follow-up interviews have provided four main takeaways that local leaders need to understand and act on:

1. City leadership has a critical role in addressing broadband issues – they have to take ownership of their broadband future.
2. To sustain growth and job creation and ensure future economic opportunities, cities need to ensure they have robust, affordable and ubiquitous broadband. Communities need to consider all funding sources and all options to solve these problems as it is highly unlikely that the private sector will step in with 100 percent of the funding needed.
3. Raising awareness and driving community and economic benefits from broadband networks is needed to realize local economic and community benefits. We can build highways to people's front doors, but how many will use to those highways if we don't teach people to drive nor give them maps?
4. Cities should consider better broadband (which includes fiber and wireless networks) to achieve the kind of capacity needed to provide smart applications and services their residents value.

Next Steps

Findings from this study clearly show that city leaders see the role they have in addressing broadband in their cities. It is also clear that mayors, city council members, etc. need more information and insights to address broadband issues, starting with assessing the economic feasibility for investing in broadband – which include:

- What options does the city have?
- How will the city pay for what it needs and wants?
- Are the city's ideas and plans economically feasible?
- Will broadband investment pay for itself?

SNG recommends that findings from this report and other supporting information be shared with civic leadership associations (e.g. League of Cities, the Association of Mayors, etc.) and economic development agencies (e.g. municipal, regional, state) through webinars, newsletters, articles, on websites, etc., as well as at conferences. With better information on options to move forward with broadband, cities can more quickly and cost-effectively achieve the aspirations of their citizens and businesses to have affordable and ubiquitous broadband.

1. Introduction

On the heels of SNG's comprehensive states report on broadband activities[1], SNG took the same research approach to American cities to understand how they address broadband gaps, barriers, and opportunities. With insights into what cities are doing regarding broadband and what has enabled some cities to excel at attracting people and businesses, the Aspirational Cities Study is an opportunity for cities across the United States to share with and learn from others. This report can also help by providing evidence for setting internal priorities within cities.

In undertaking this important research, SNG was pleased to partner with Corning, Henkels & McCoy, Fujitsu Network Communications, and Power & Tel, without whose support this study would not have been possible.

Conducting this type of research requires outreach that will drive participation and response rates to collect the necessary data. We would like to acknowledge the contributions of organizations that assisted in reaching out to cities across the United States to encourage their participation in this important research:

- Next Century Cities
- Intelligent Community Forum (ICF)
- National Association of Telecommunications Officers and Advisors (NATOA)
- Broadband Communities
- National League of Cities
- StateScoop.com
- Graybar
- Corning
- Fujitsu
- Henkels & McCoy
- Power & Tel

[1] The Fifty States of Broadband: http://sngroup.com/states/

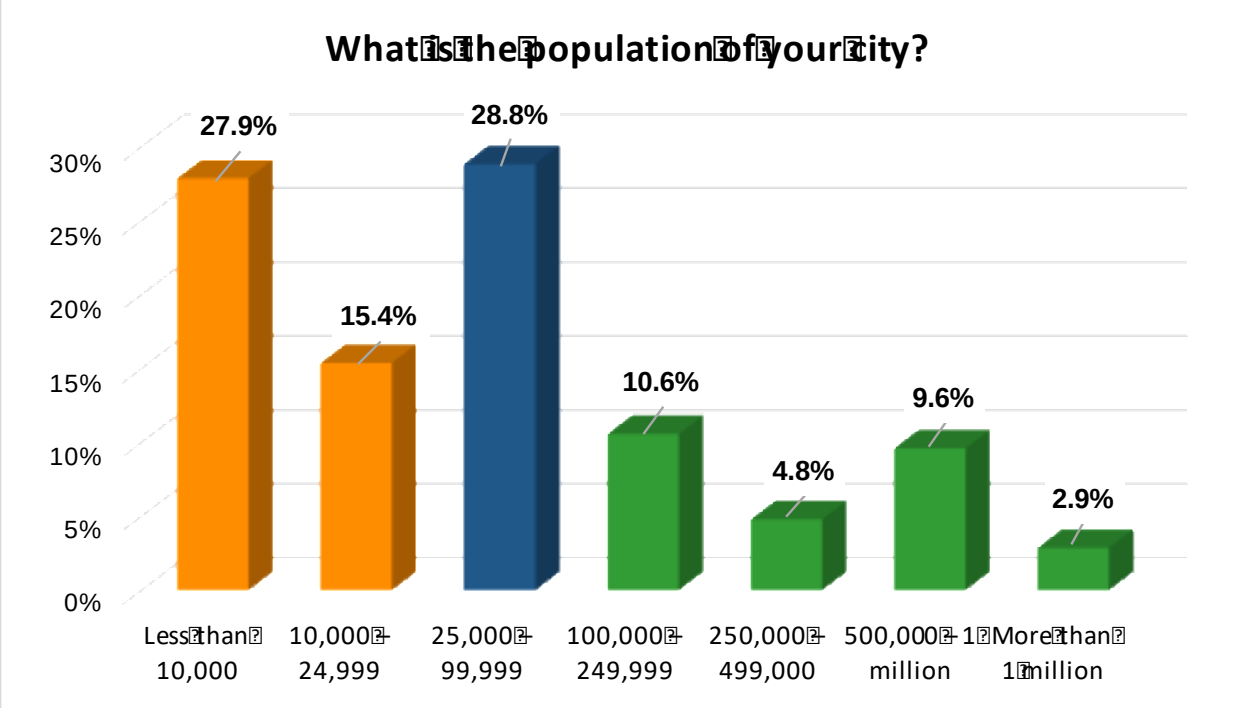
A total of 104 cities, representing a range of populations, in 38 states participated.

Agawam, MA
Alexandria, VA
Amarillo, TX
Ammon, ID
Angier, NC
Ashland, WI
Atlanta, GA
Austin, TX
Baltimore, MD
Beckley. WV
Bemidji, MN
Bettendorf, IA
Blacksburg, VA
Blakely, GA
Bloomington, IN
Boston, MA
Bowling Green, KY
Brownstown, IN
Cedar Rapids, IA
Cerritos, CA
Chattanooga, TN
Chesterfield, MA
Chicago. IL
Clarksburg, WV
Clarkston, MI
Clarksville, TN
Clay Center, KS
Columbus, OH
Concord, NH
Conway, AR
Cupertino, CA
Dalton, GA
Decatur, TN
Deptford, NJ
Detroit Lakes, MN
Dublin, OH
Eitzen, MN
Eugene, OR
Evans, GA
Galax, VA
Gettysburg, SD
Glastonbury, CT
Hagerstown, MD
Hayesville, NC
Highlands, NC
Holland, MI
Indianola, IA
Jonesboro, AR
Kearney, NE
Kenmore, WA
LeRoy, MN
Leverett, MA
Lexington, KY
Lincoln, AL
Lloydminster, Alberta*
Louisville, KY
Malta, MN
Mason, NH
Menomonie, WI
Santa Ana, CA
Milwaukie, OR
Mission, KS
Montrose, CO
Mount Vernon, WA
New Albany, OH
New Auburn, WI
New Orleans, LA
New Salem, MA
New York, NY
North Canton, OH
North Miami, FL
Oakwood Village, OH
Omaha, NE
Opelika, AL
Owingsville, KY
Reno, NV
Richmond, VA
River Falls, WI
Rock Hill, SC
Rosemount, MN
Salisbury, NC
San Leandro, CA
Santa Ana, CA
Scottsdale, AZ
Seattle, WA
Slayton, MN
South Portland, ME
St. Louis, MO
Stockton, CA
Tullahoma, TN
Tucson, AZ
Veedersburg, IN
Viroqua, WI
Washington, DC
Waterloo, IA
Waynesville, NC
West Memphis, AR
Wilson, NC
Wilton Manors, FL
Winthrop, MN
Yuma, AZ

**Although Lloydminster is a Canadian city, we include its response because we consider it equally representative of the activity and issues relevant to all North American cities.*

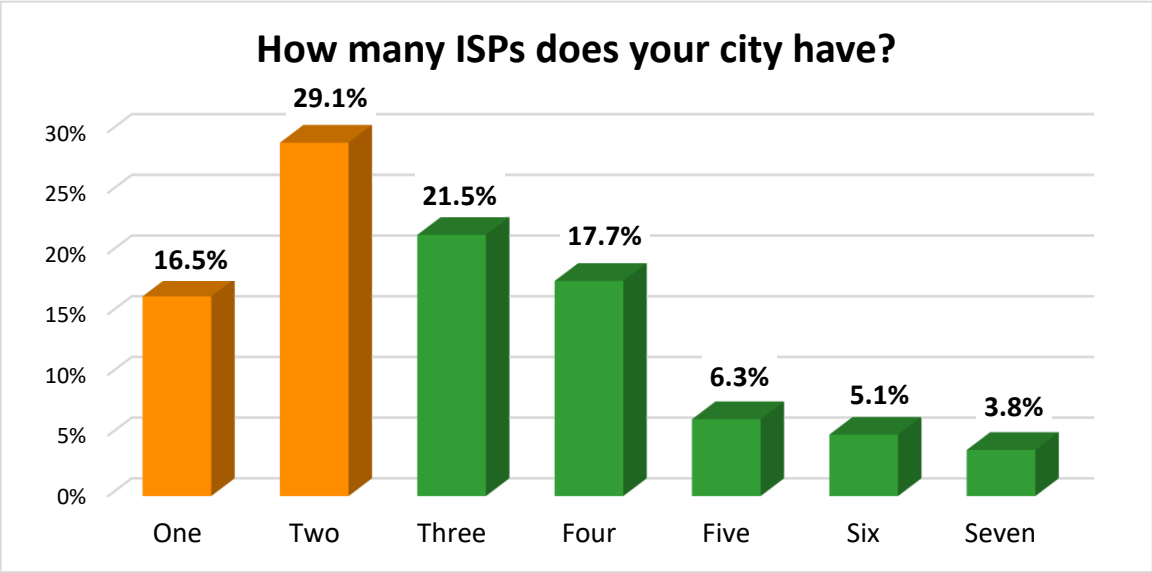
Population of Participating Cities

More than two in five (43%) of the cities surveyed have fewer than 25,000 residents; 28 percent have a population of more than 100,000.

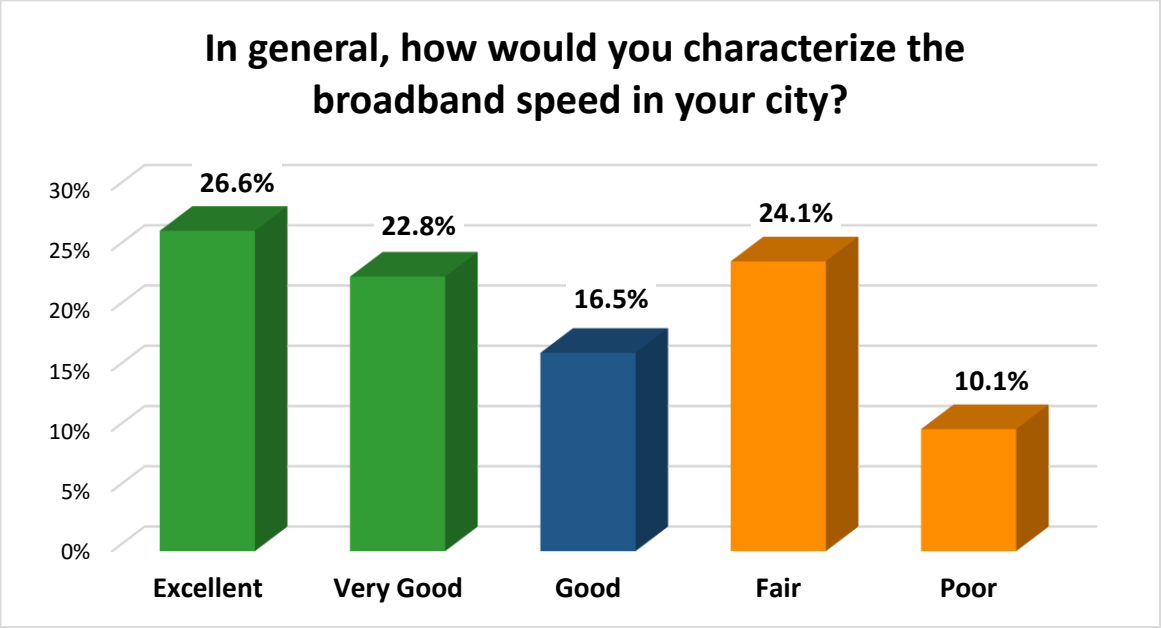


2. Current State of City Broadband

Of the cities surveyed, almost half (45.6%) have only one or two ISPs providing internet service. This signals a lack of competition to drive better and faster service for lower prices.



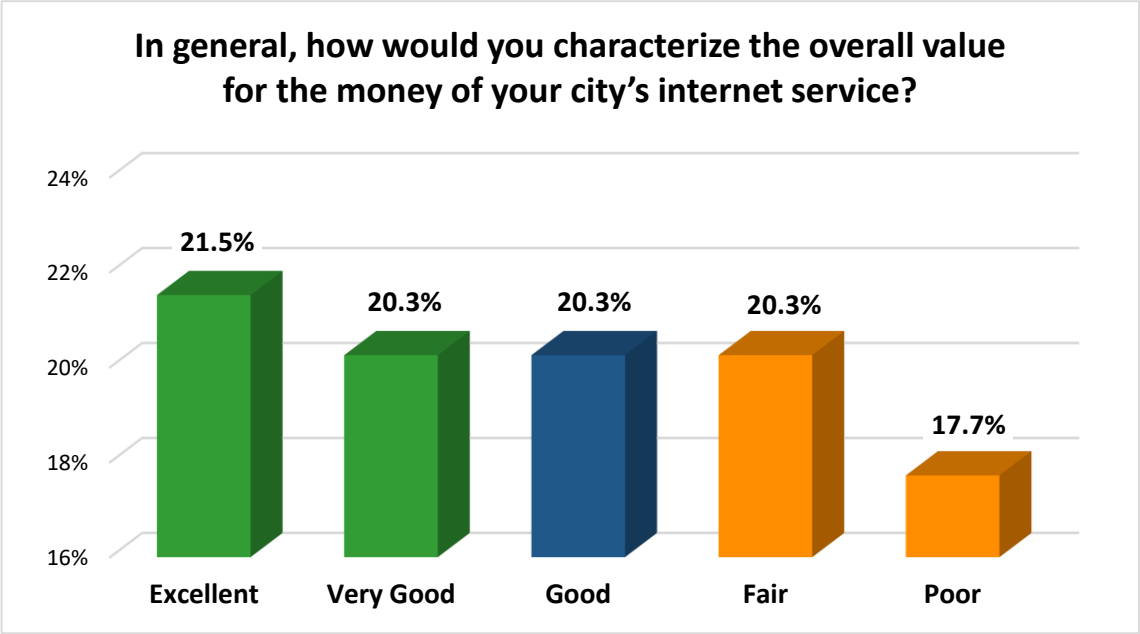
Though slightly more than a third (34.2%) characterize speeds available in their city as "fair" or "poor," nearly half say their service is either "excellent" or "very good." This indicates a sizable divide* between the haves and have nots in terms of cities with adequate broadband.



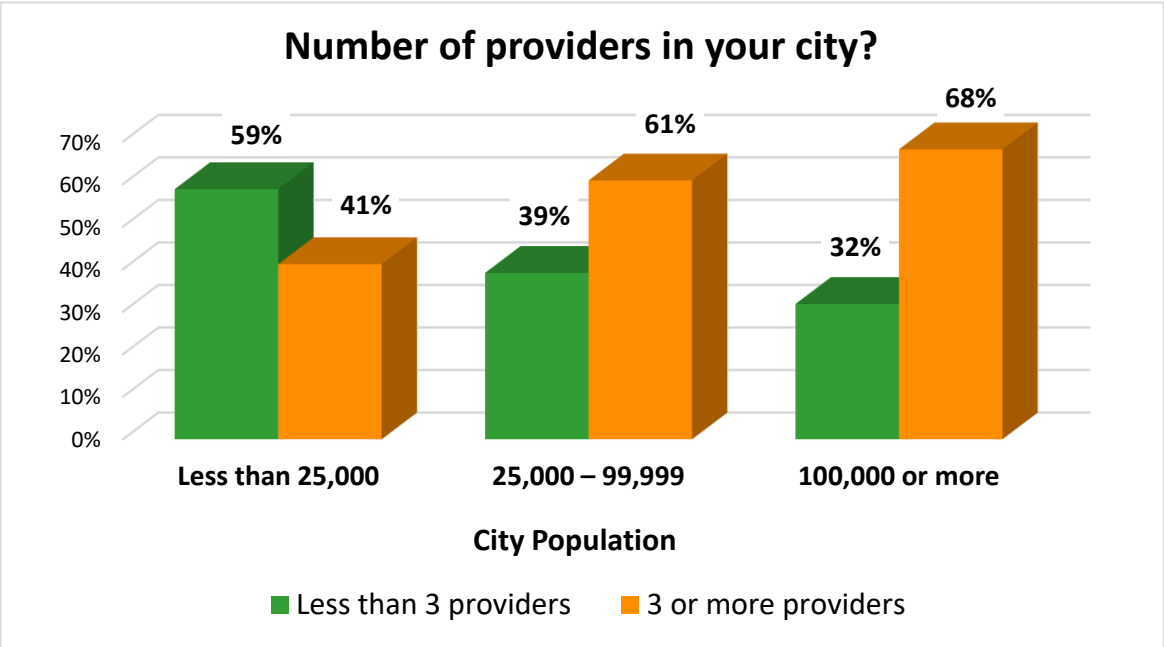
**When asking about internet speeds, we did not ask for specific download or upload speeds so answers are, by design, subjective characterizations of speed.*

Value for Money

The cities surveyed were split on the value for the money their current internet service providers deliver; more than a third rated value as "fair" or "poor."



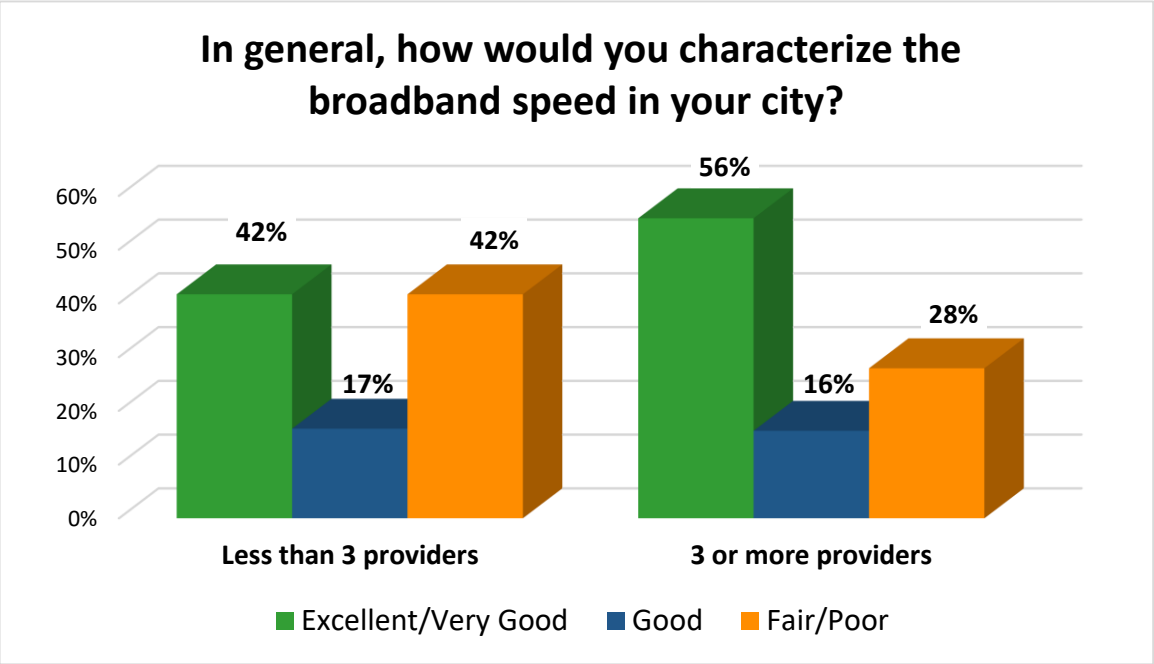
It can be expected that there is a relationship between available speeds and the size of a city and the number of providers it can attract and support because larger markets are better able to support competition and a variety of technologies. Indeed, three in five (60 percent) smaller cities have fewer than three providers compared to one in three for larger cities.



Broadband Speeds

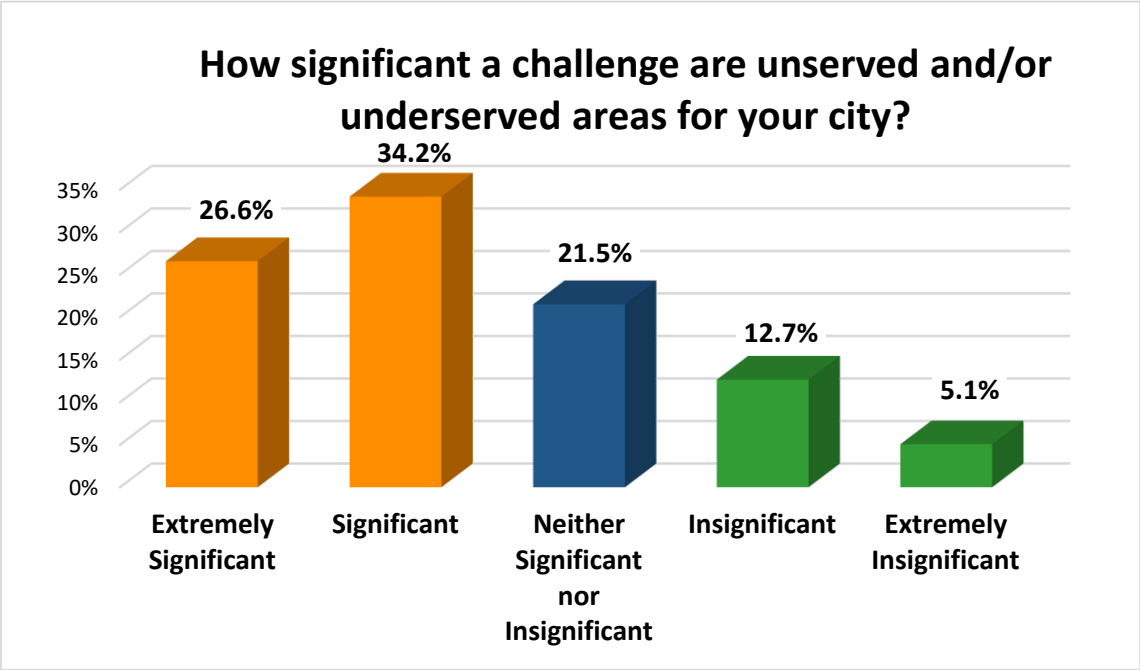
Does the number of providers and increased competition affect broadband speeds?

According to the feedback SNG received, cities with fewer than three providers were evenly split between having "excellent/very good" speeds and "fair/poor" speeds. For cities with three or more providers, there were twice as many reported "excellent/very good" speeds as "fair/poor" speeds.



3. City Broadband Gaps and Barriers

Three in five cities surveyed face the challenge of populations underserved and/or unserved with broadband.

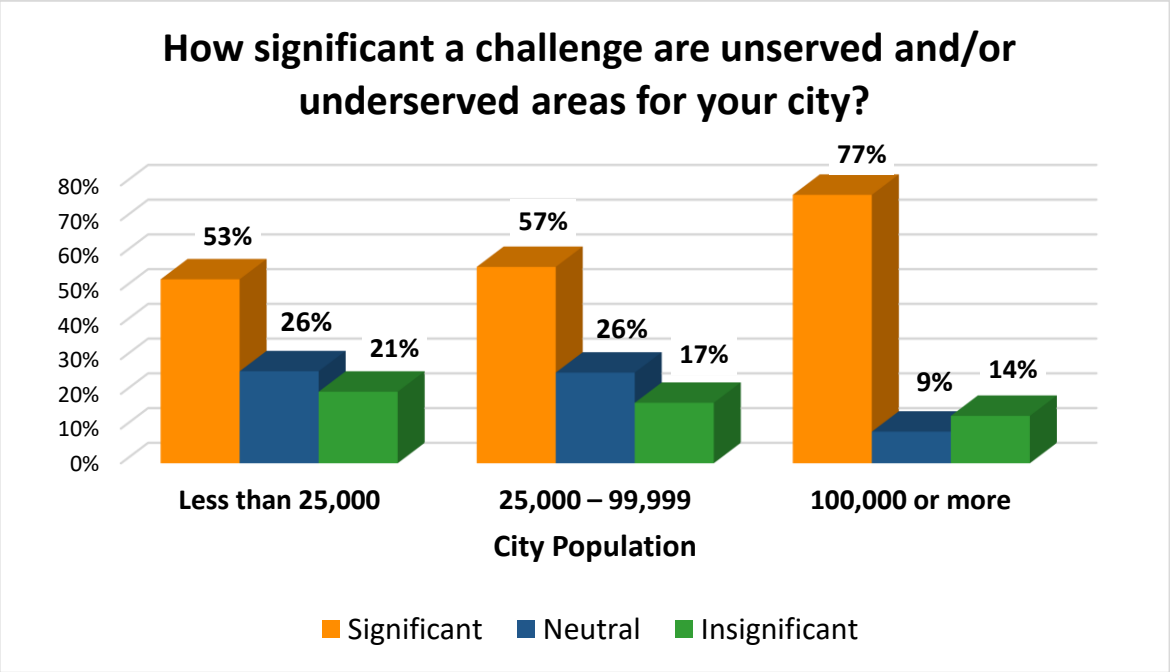


Only 17.8 percent of respondents (fewer than one in five) said underserved and/or unserved populations are “insignificant” or “extremely insignificant” challenges for their city. This shows that adequate high-quality broadband coverage remains an issue for many cities of all sizes.

Unserved and/or Underserved Areas

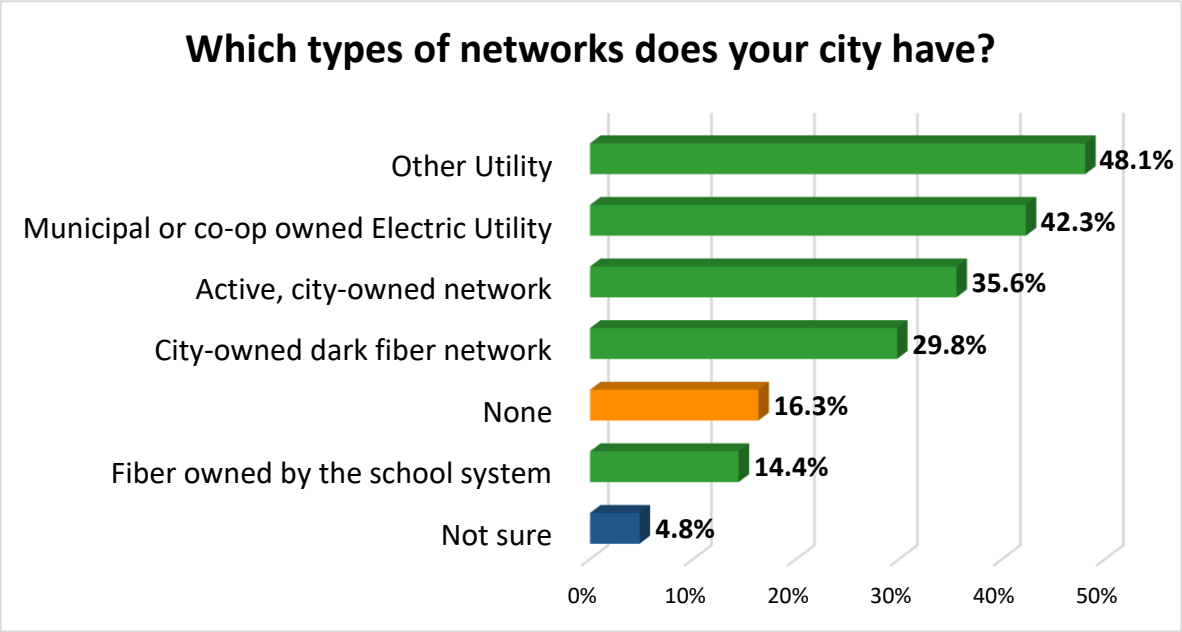
Unserved and underserved areas can have a significant impact on a community's ability to compete for economic development, population retention/attraction, and local quality of life. Does the challenge of unserved and underserved areas vary by population size?

Somewhat surprisingly, a higher proportion of larger cities report unserved and/or underserved areas as a challenge compared to smaller cities. Despite having larger markets and typically more service providers, unserved and/or underserved populations for larger cities tend to be related to low income or disadvantaged areas. For smaller cities, unserved and/or underserved populations are frequently related to remote, sparsely populated areas. Though the reasons may vary, all point to a common challenge stemming from the business case not able to interest service provider investments.



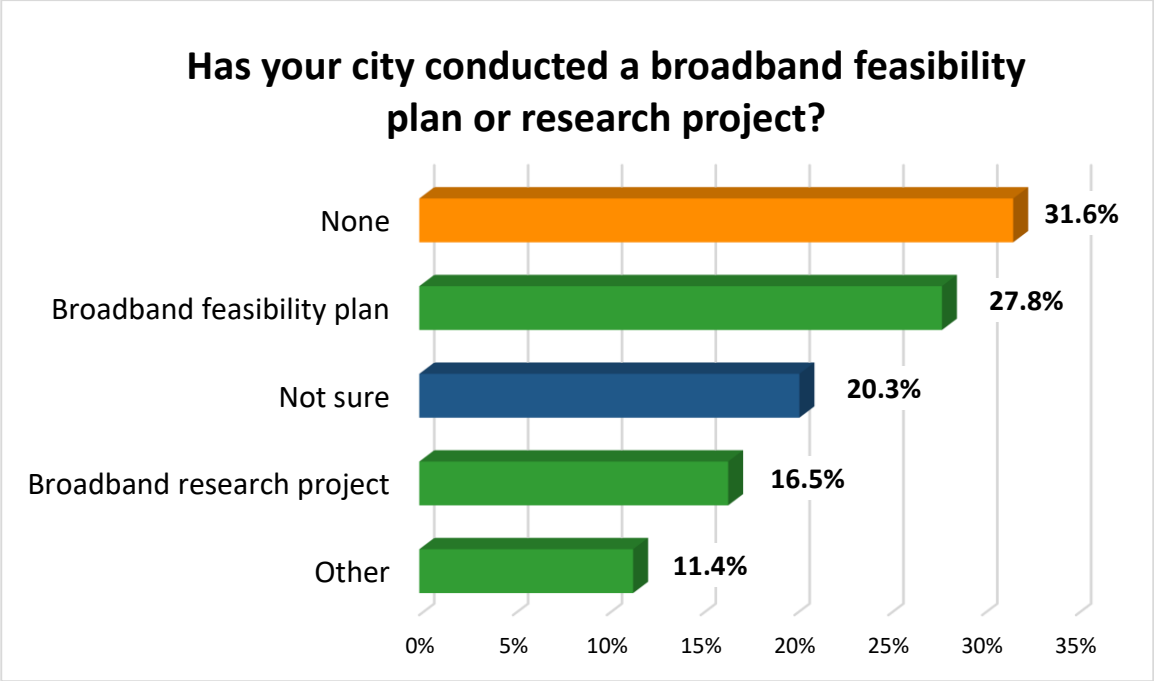
Municipal Broadband Assets

Of cities surveyed, only 16 percent have no assets to help facilitate a municipal network. Most have one or more assets that can be leveraged.



Broadband Planning and Research

Many cities with a municipal network have not undertaken a feasibility study.

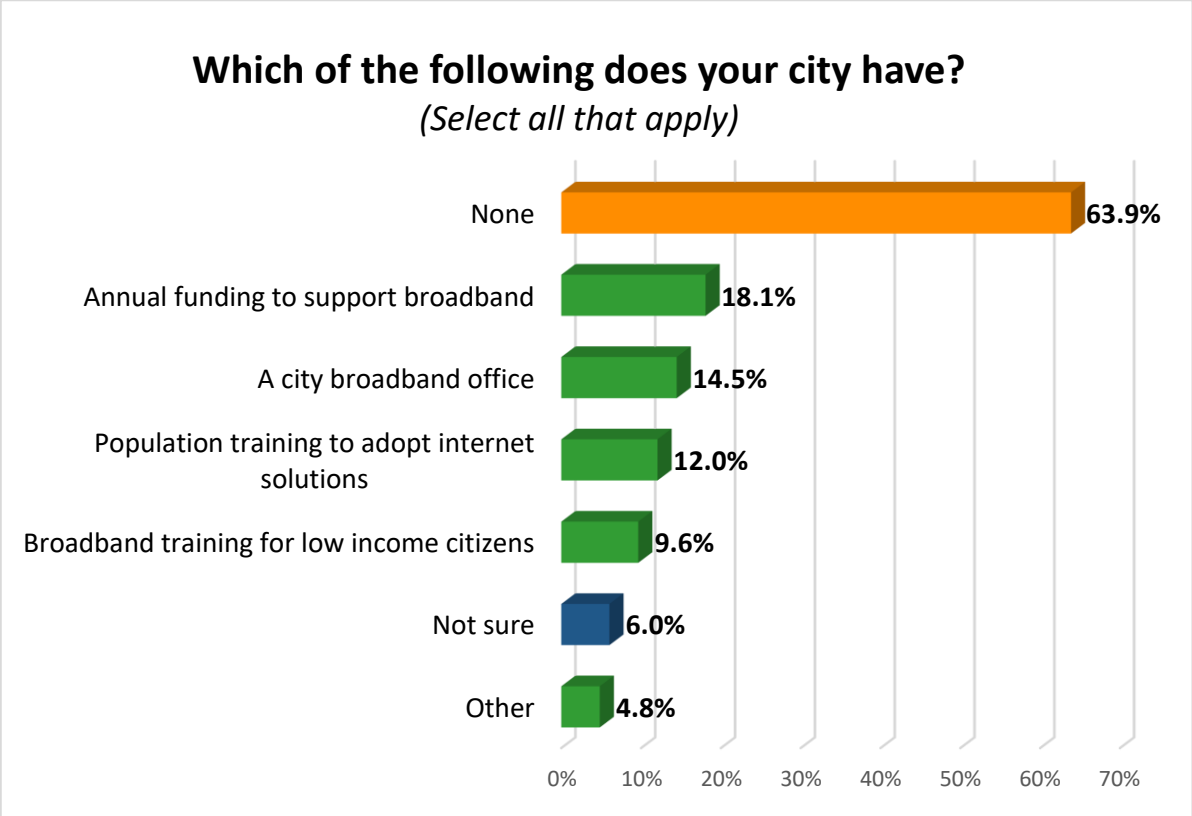


Other research projects cities said they had undertaken:

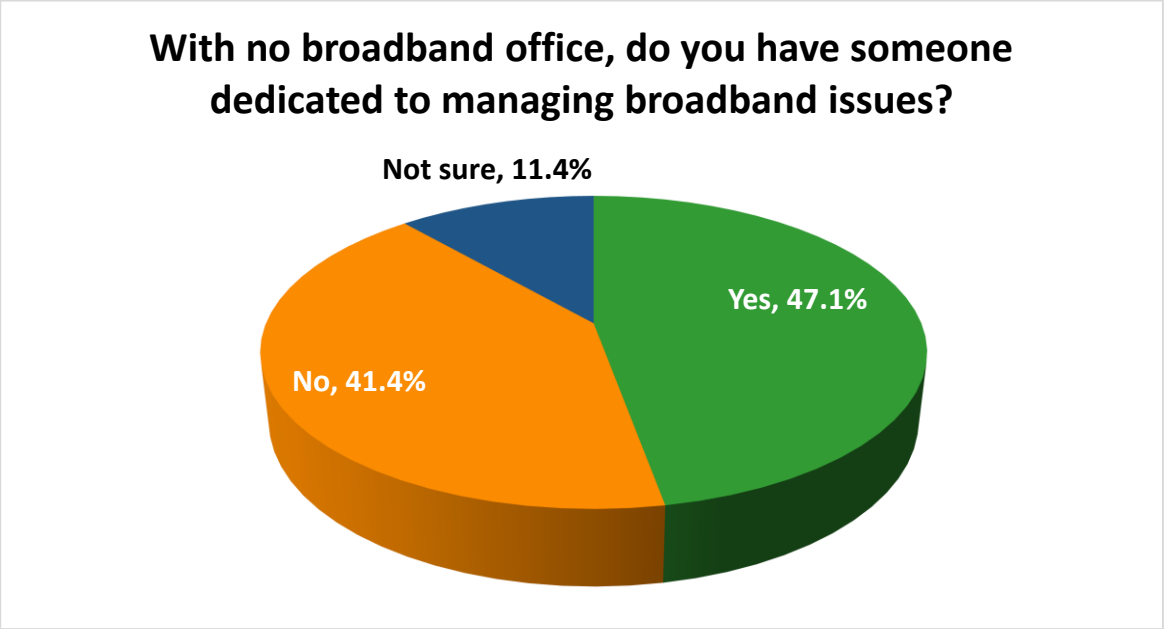
- Fiber inventory analysis
- Broadband business plan
- Public-private partnership RFI
- Regional implementation plan

Managing Broadband Issues

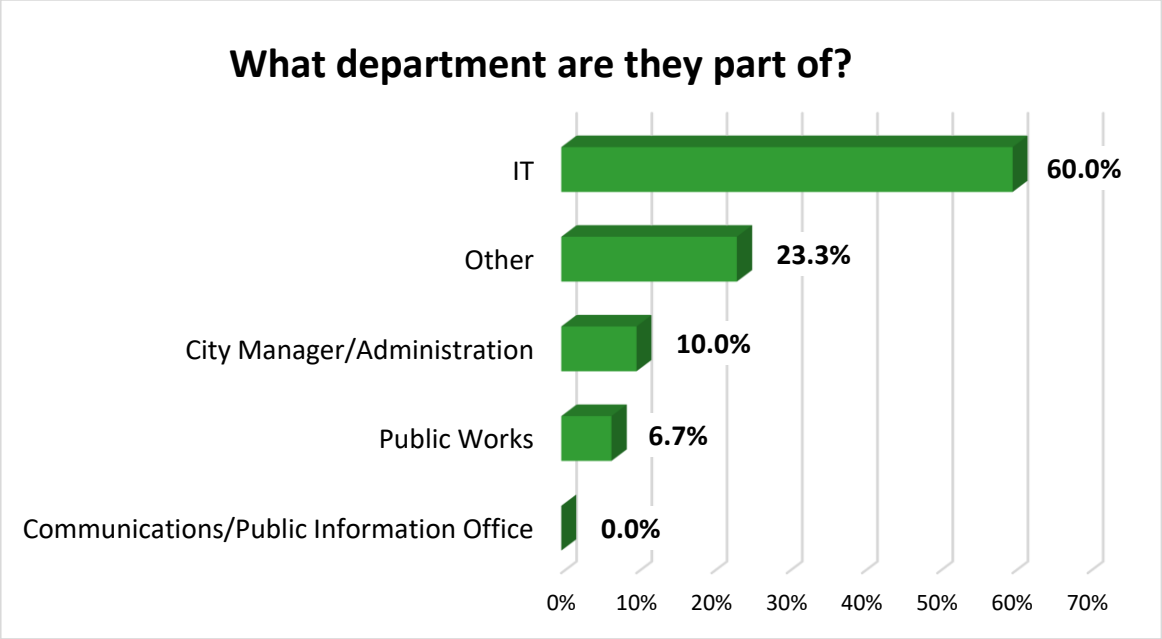
Nearly two-thirds (64 percent) of cities do not have any of the mechanisms, organizations, or programs in place to help drive the economic opportunities broadband provides a community's economy. **Only 14.5 percent have a city broadband office.**



In cities that have no broadband office, less than half (47 percent) have someone dedicated to municipal broadband.

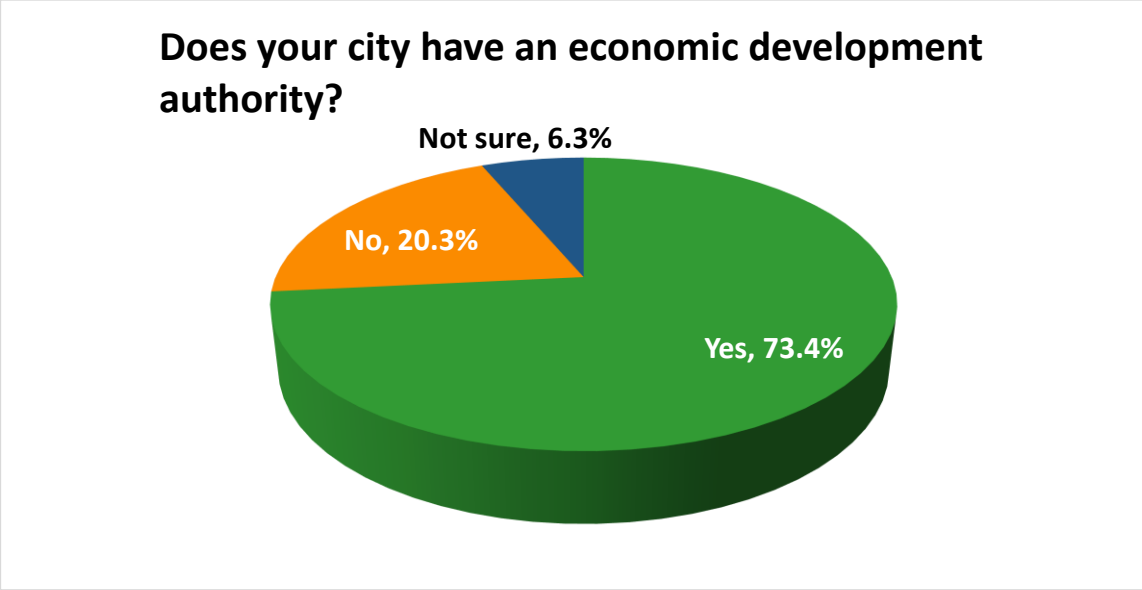


In the 60 percent of cities without a broadband office, the role of managing broadband issues falls to the IT department.

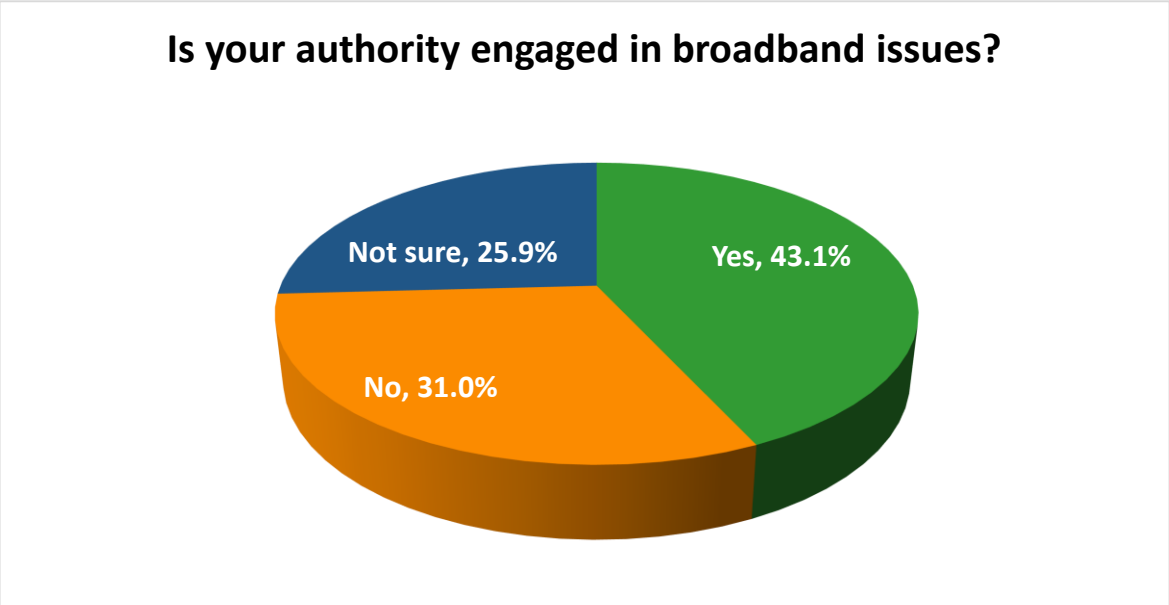


Other departments identified by cities addressing broadband issues include: Electric power board and city information technology departments; Community development; Municipal light plant board and manager; Local telecommunications company.

Given broadband's potential to positively impact local economies, cities were asked if they have a local economic development authority. Nearly three-fourths (73%) of all cities reported having such an authority. This skewed very strongly toward larger cities (population over 100,000) of whom 95 percent have an economic development authority, whereas only 60 percent of smaller cities (population under 25,000) have one.

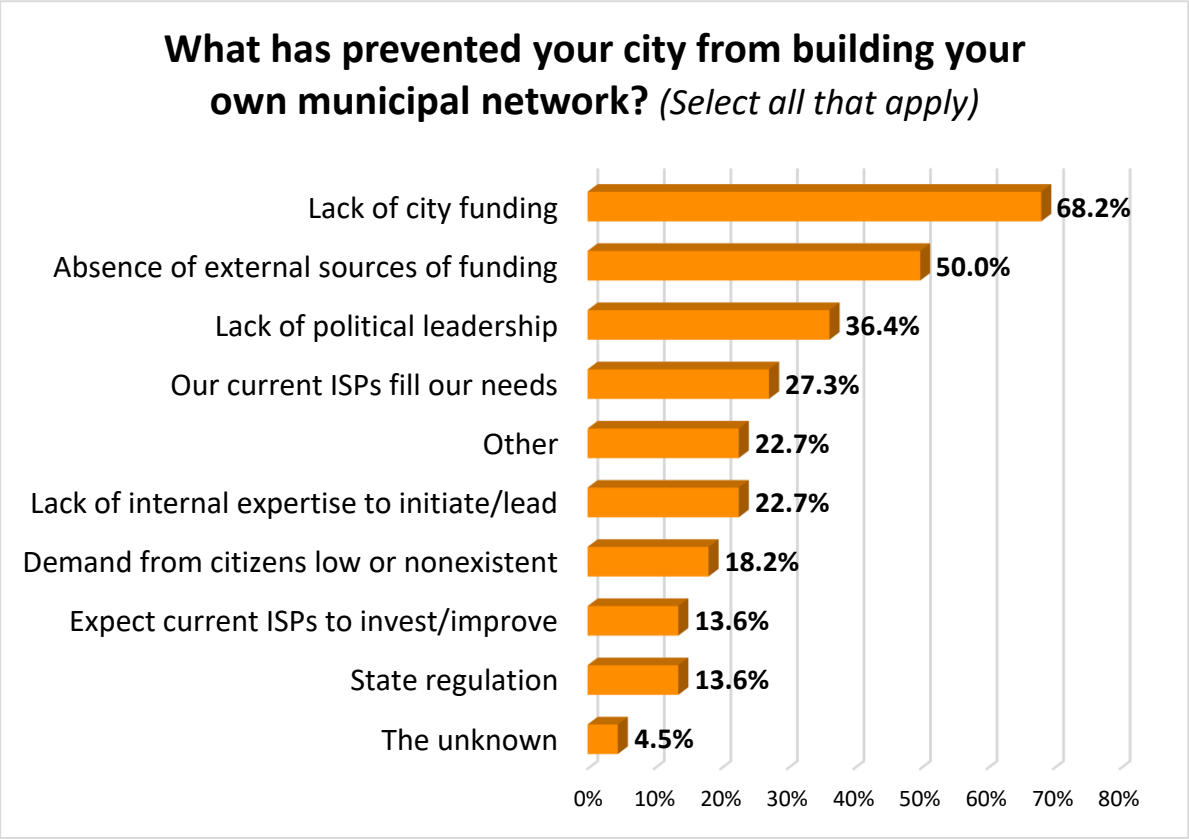


A missed opportunity seems to exist as less than half of these organizations are engaged in broadband activities.



Financing Broadband

Overwhelmingly, a lack of internal funding (68 percent) and a lack of private/external funding (50 percent) stand in the way of cities doing more with broadband.

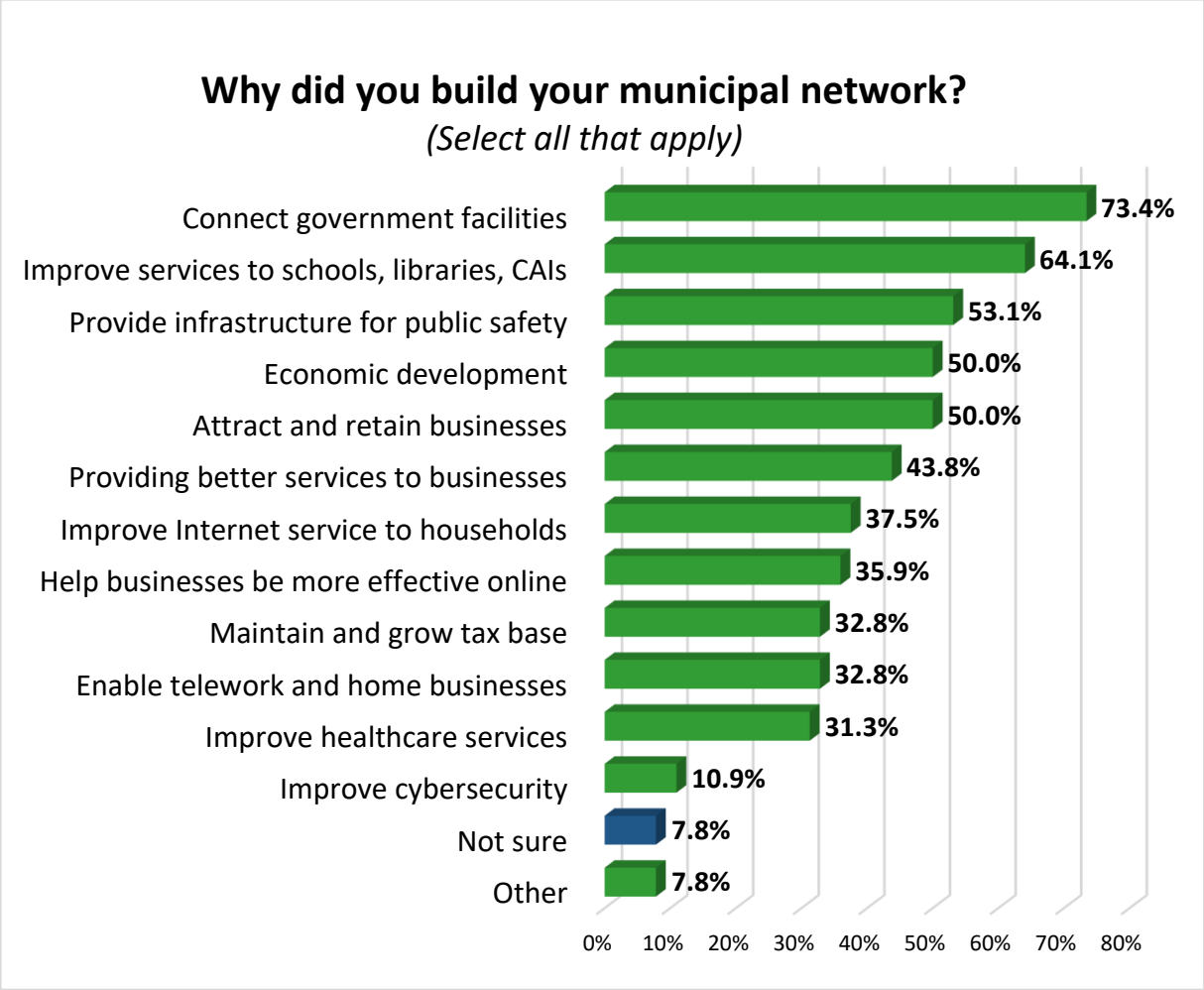


Other barriers identified:

- Changing criteria for state funding
- Limited resources (pop. 325)
- Focusing on other priorities
- Waiting for a private provider to build
- Changing personnel

4. Cities with Municipal Networks

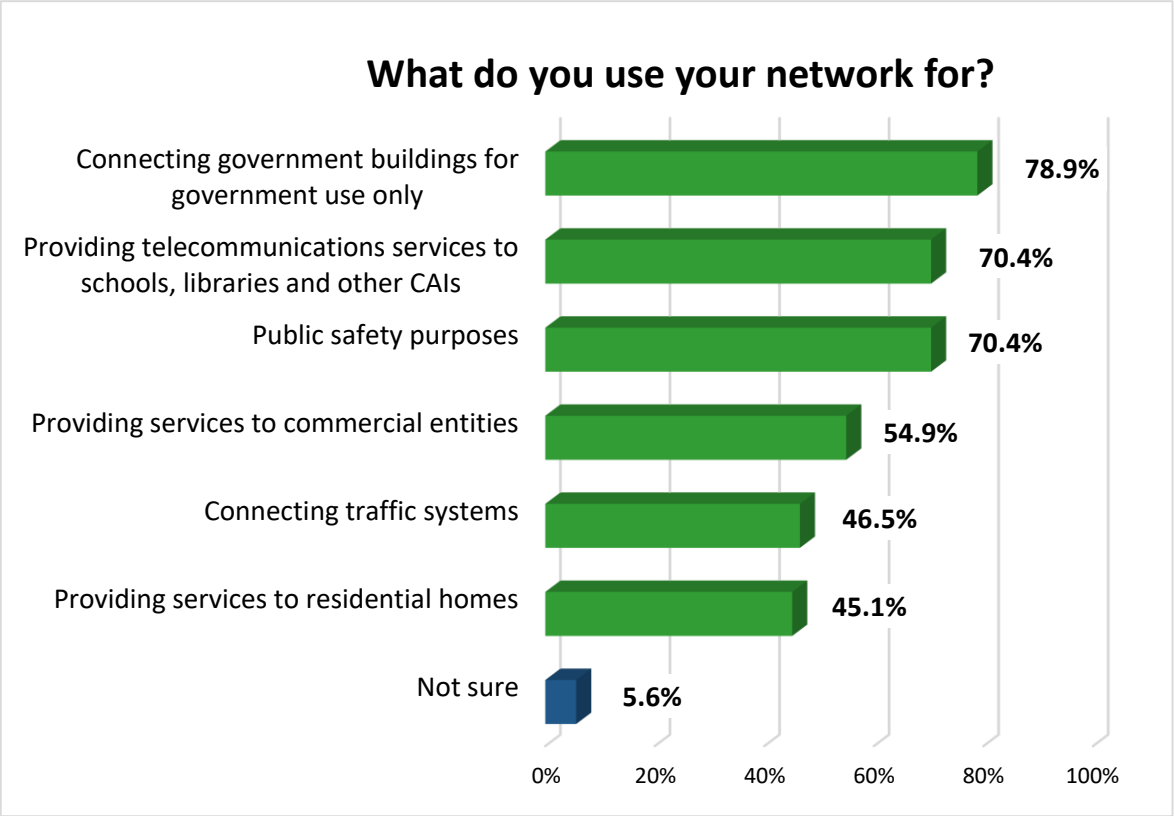
Most municipal networks were built with an eye toward public service and connecting a government's own network. Only half saw economic development as a goal for the build.



"Our best outcome is enhanced connectivity to our local businesses. We have found that local companies simply demand good connectivity, both for Internet and for location-to-location connectivity. We are currently experiencing a significant growth in business connections and are working on options to enhance low cost options to drive growth in small business and residential services." (POP 25,000 – 99,999)

Network Uses

Public services account for 54 percent of network use; 45 percent of networks provide services to businesses and homes respectively.

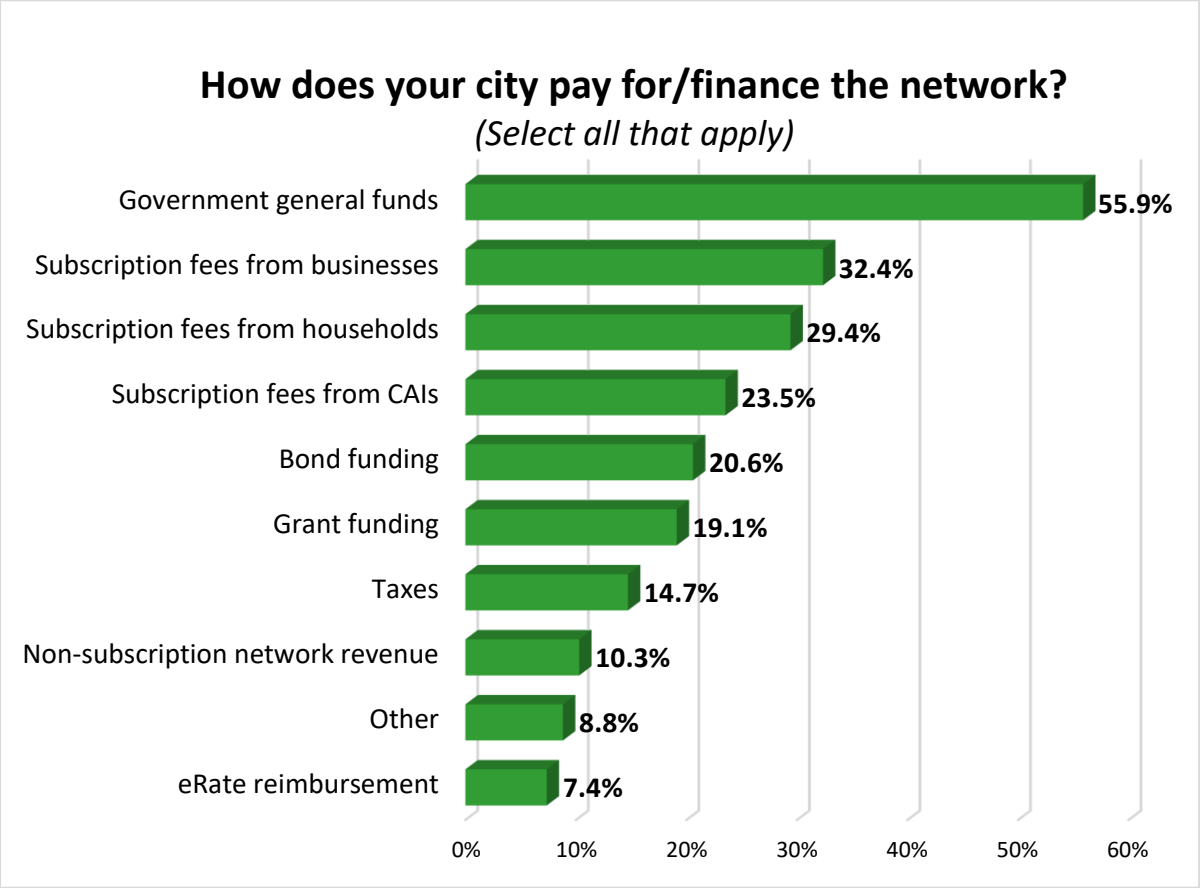


"Having fiber has enabled all public agencies to benefit with having a great institutional network with huge cost savings back to each public agency for facility-based connections. Health care has a fantastic 10 G network now; everything with them is real time, and that is so valuable. Businesses have located here for the value of a small town with big cost savings for bandwidth." (POP 25,000–99,999)

"The City provided support and capital for a co-working initiative [named as] the number one co-working facility in the world. This is just one example of the initiatives which … has seen success. We have the trust of our public to take risks and move forward on initiatives which are leading the city's growth." (POP 10,000 – 24,999)

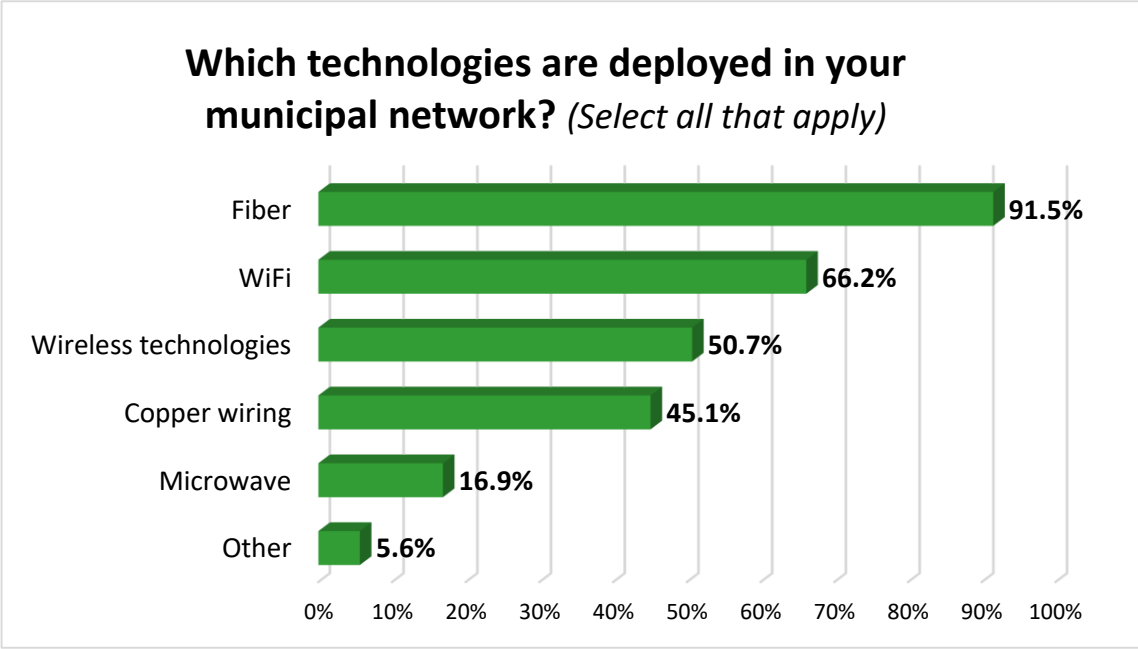
Network Financing

For the cities surveyed that do have some sort of municipal network, a majority (56 percent) are funded with government dollars. The second most frequent funding mechanism is subscription fees from businesses.

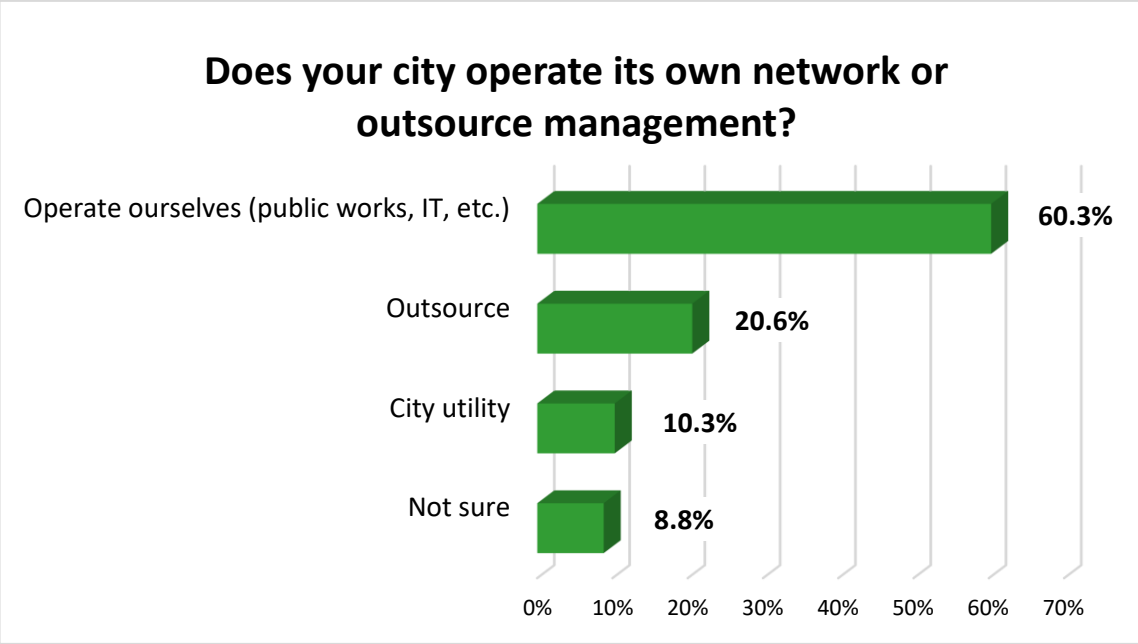


Network Technologies

Most cities surveyed that have a municipal network rely on fiber with wireless as the second most prevalent technology. Not shown in the chart but interestingly, 97 percent of cities that employ wireless technologies also rely on a fiber network while only 54 percent of cities with fiber networks have also deployed wireless technologies.

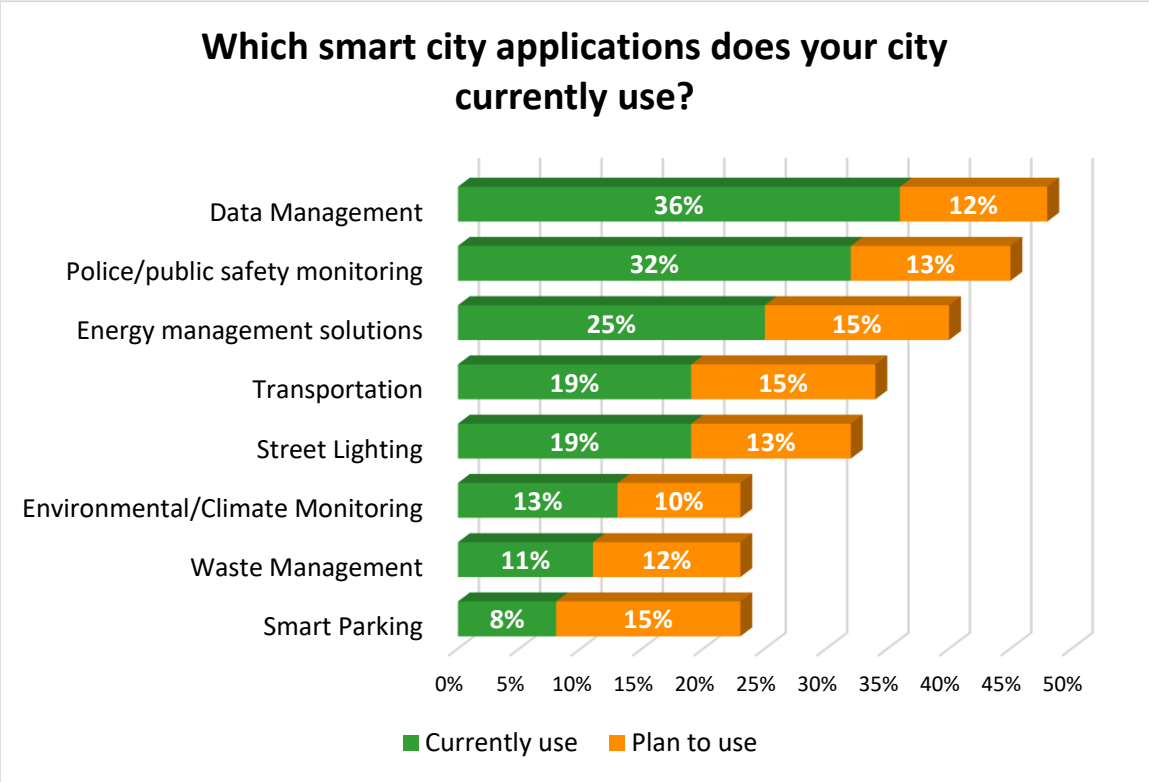


A majority of cities (60 percent) operate their own network, but outsourcing and relying on a utility are also popular solutions for network management.



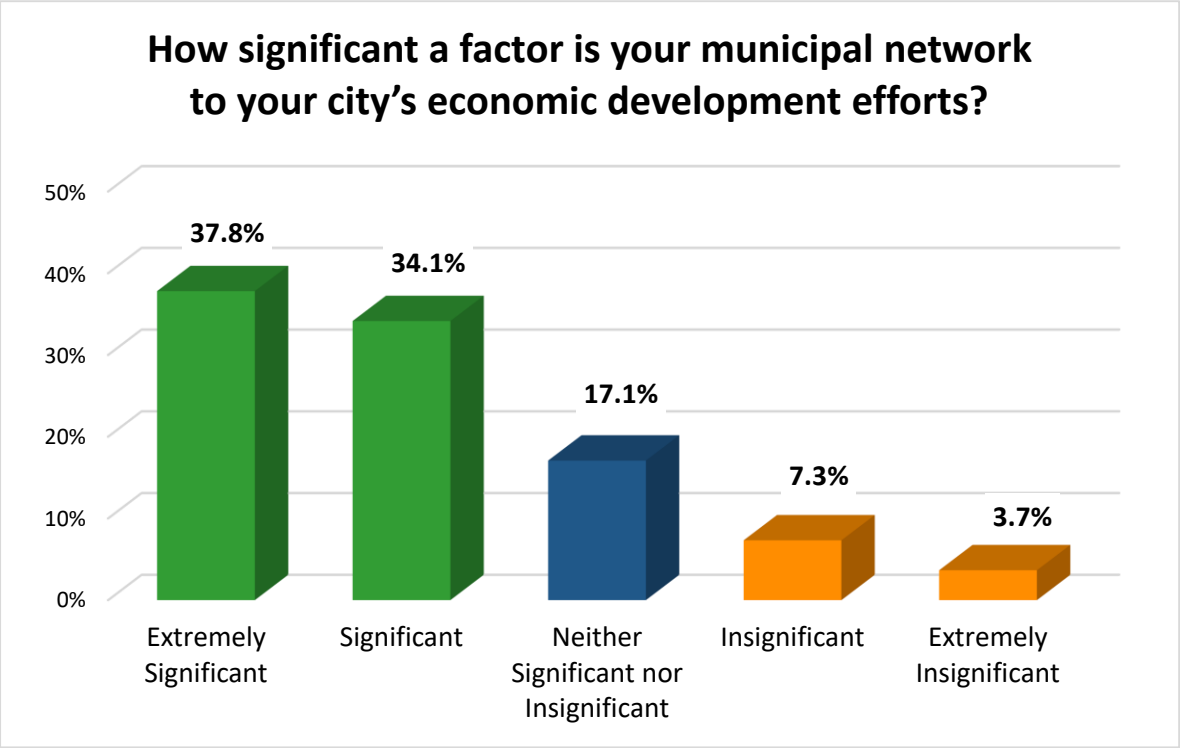
Online Applications

More than 72 percent of cities with a municipal network currently use at least one smart city application. However, use of any one individual online applications does not exceed 36 percent. Furthermore, slightly more than one-third of smaller cities have yet to adopt any smart city applications. For those cities using smart city, they average using 3.26 applications.



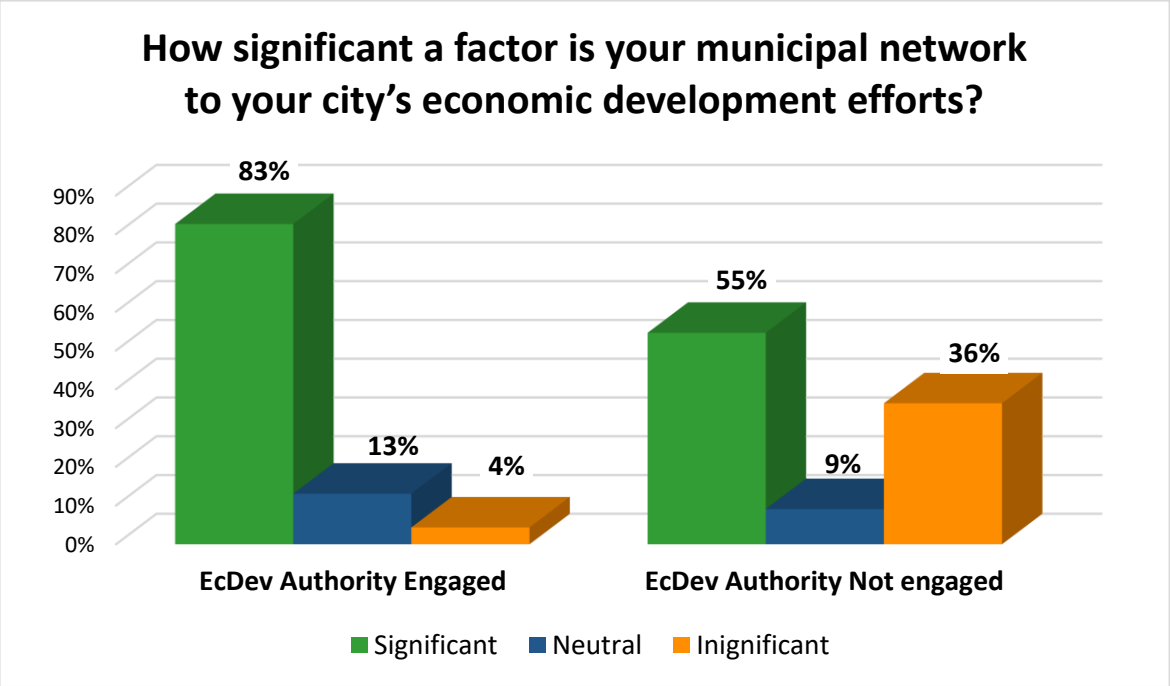
Economic Impact of Networks

Nearly three in four (72 percent) of municipalities say that their network has a significant impact on their city or town's economic development efforts.

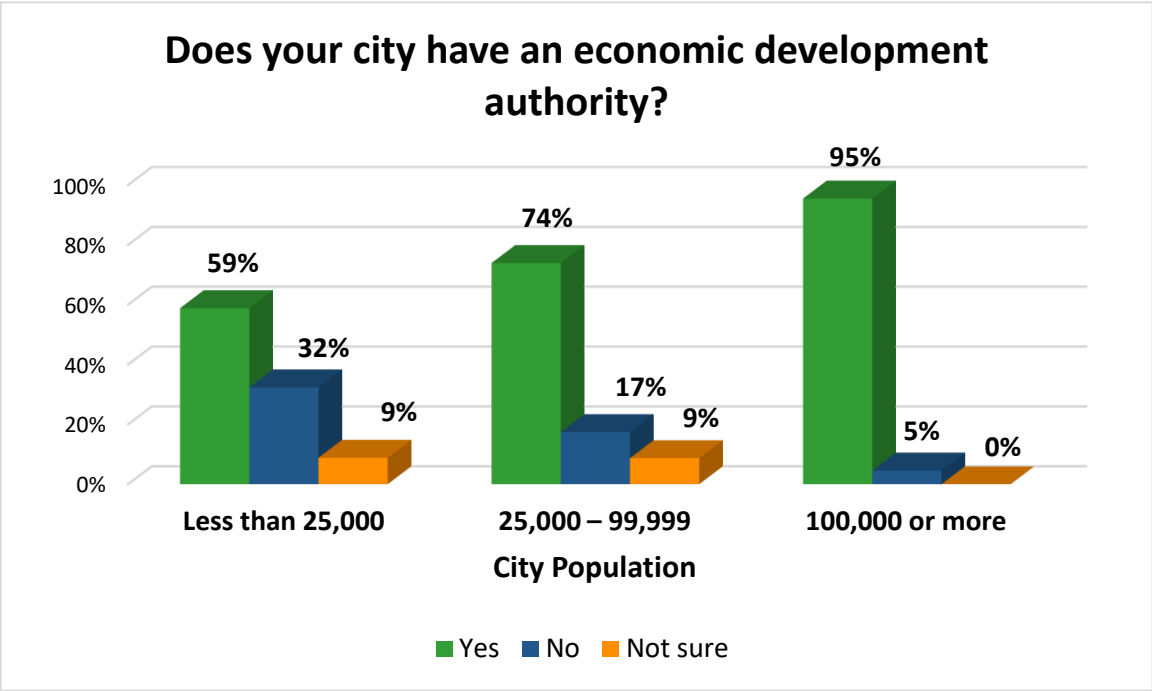


"In 2011, [we] launched a unique public-private partnership … that brought 10 gigabit high speed internet connectivity to certain sections of our industrial zones. The fiber was provided by a local technology company, using city-owned conduit. This network was then later expanded thanks to a … federal grant from the Economic Development Administration. This project has significantly assisted our city's economic development and business retention efforts by allowing local businesses, all public schools, and City Hall and Police Department offices to have access to fast fiber." (POP 25,000 – 99,999)

SNG sees a higher proportion of cities that say their network significantly impacts economic development when an economic development authority is engaged.



In addition, those that report insignificant economic development impacts are dramatically fewer when the economic development authority is engaged in broadband issues (4 percent). This dynamic takes on greater importance when one considers that smaller cities are less likely to have an economic development authority at all. Only three in five (60 percent) of smaller cities have such an authority compared to 95 percent of larger cities.



Feedback from Cities

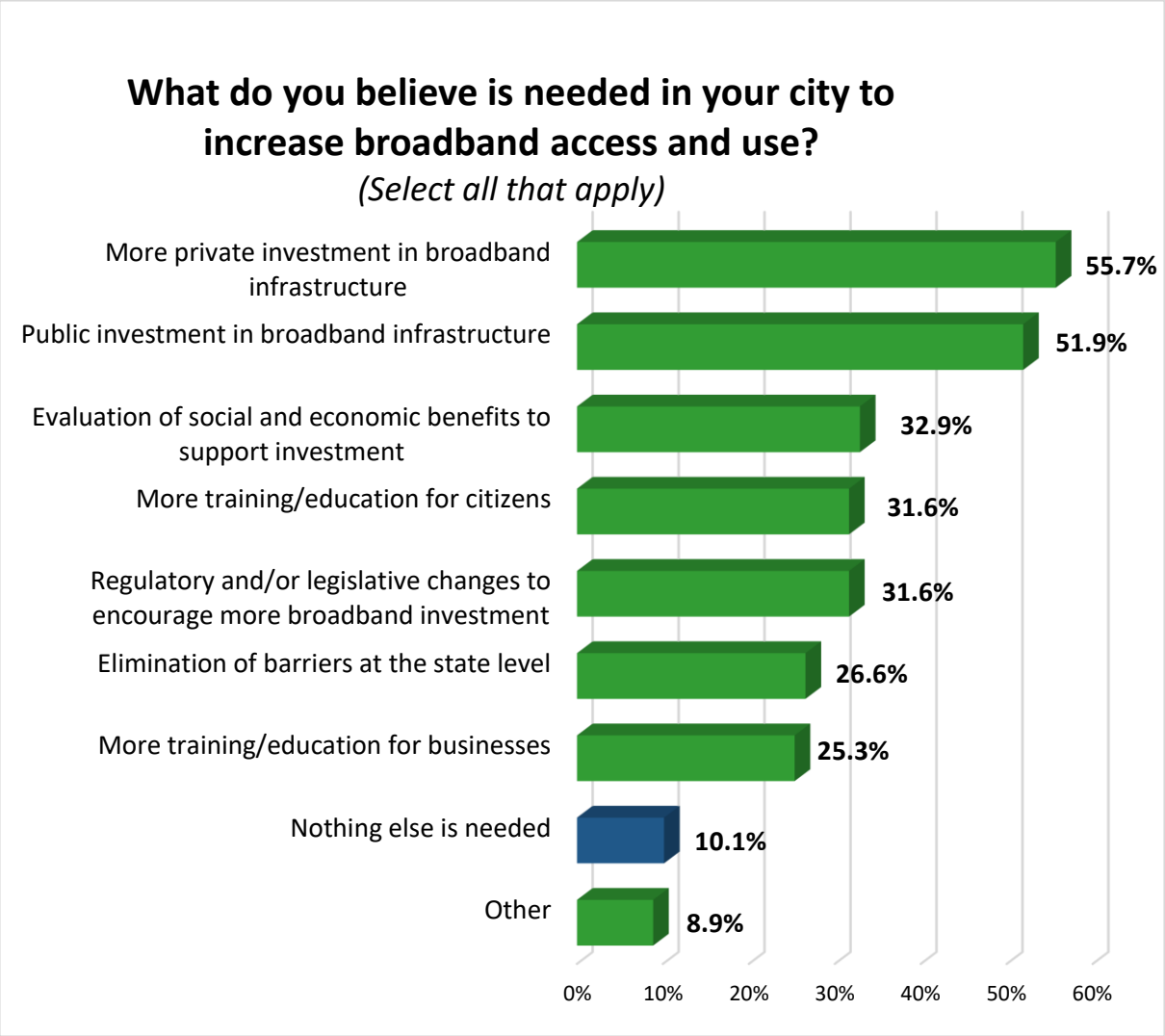
A common theme from additional feedback received is that municipal leadership is critical to initiate action and investment in broadband. Political leadership that recognizes the importance of broadband for economic development can mobilize the city and other organizations, as well as overcome resistance from incumbent providers that are protective of their market.

How did you succeed in getting approval to build your network and drive the project to completion?

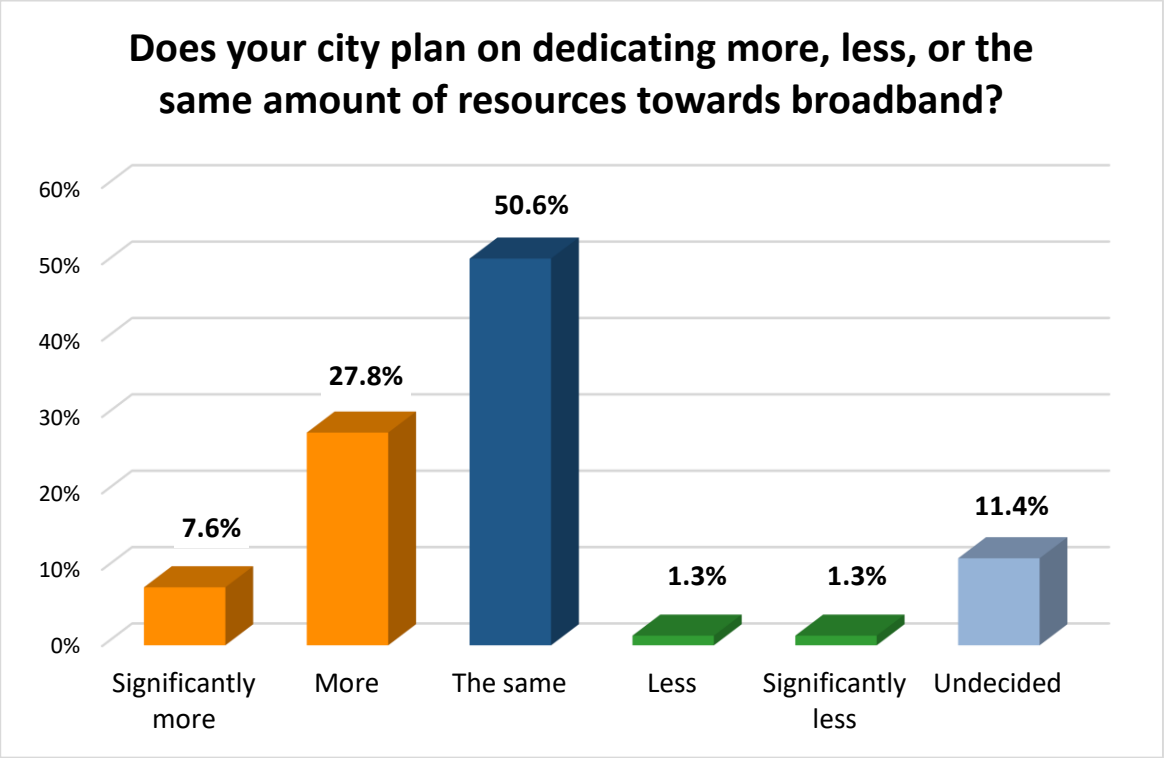
> *"City Council Mandate - The city set broadband as priority #1 last year. Since we have a track record of revenue from our fiber, we can feel more assured about return on investment with future builds."* (POP 25,000 – 99,999)
>
> *"By building a coalition of community leaders who realized the great need for increased availability and affordability of broadband service. Our City Council identified this as a top goal and enabled municipal staff to make it happen."* (POP 10,000 – 24,999)
>
> *"It started with having a Mayor and IT Director 20 years ago with a passion to drive this to have every City facility connected by fiber. The vision then took off to then connect all the public agencies and in just a couple years from the beginning the focus shifted to allowing access to businesses."* (POP 25,000 – 99,999)
>
> *"In the mid 2000's a business model was adopted and implemented. The city leaders at the time decided to move forward with the project."* (POP 25,000 – 99,999)

5. Looking Ahead

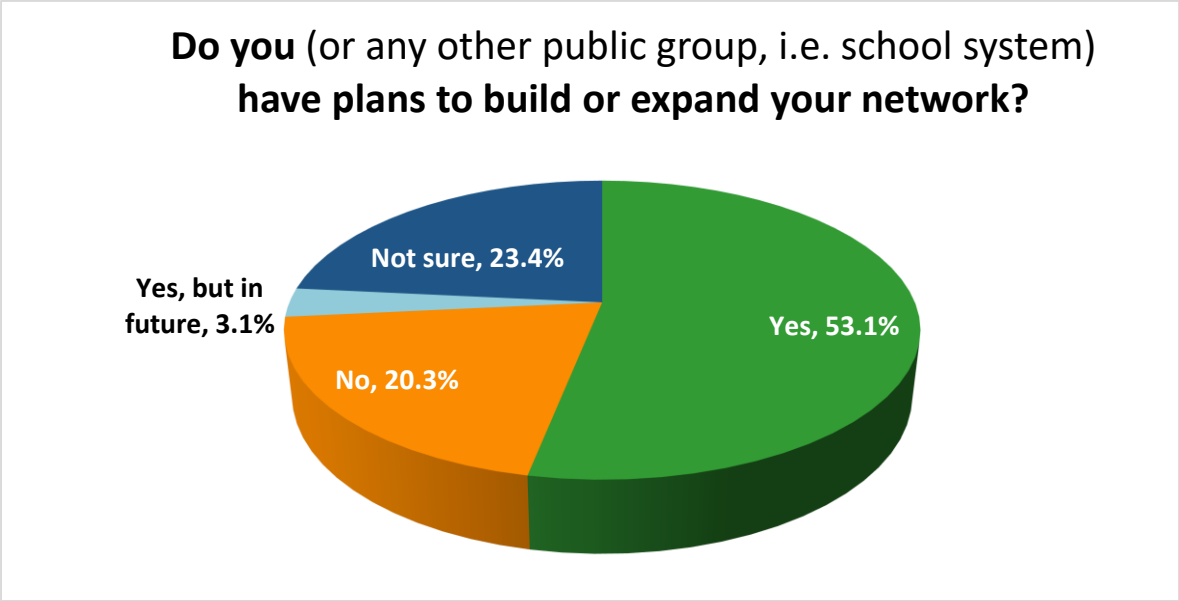
Cities are looking for both private and public investment to spur broadband activity.



Only slightly more than a third (36%) of cities are increasing their investment in municipal broadband in the foreseeable future.



At the same time, more than half (53%) of cities surveyed plan to build or expand their broadband infrastructure going forward, indicating a strong recognition of the value of such investments. Of the cities in the below chart that are "not sure" or not planning to build or expand (44%), a majority (54%) are smaller cities with populations less than 25,000.



6. Project Team

SNG will update this report on an annual basis. If you have thoughts or input on questions to ask or groups to invite as participants, please email cities@sngroup.com.

About the Research Team
SNG's core business is measuring how businesses, organizations, and households use broadband. This includes obtaining micro-level data to develop strategies that advance the economic opportunities at a community, regional, or state level.

Key contributors to this initiative:

- Doug Adams, Strategic Networks Group
- Michael Curri, Strategic Networks Group
- Lori Sherwood, Vantage Point Solutions
- Gary Dunmore, Strategic Networks Group

Doug Adams
VP Communications, Strategic Networks Group Inc.

Doug Adams oversees SNG's communications efforts and numerous state-level and nationwide efforts. He has more than 20 years of technology marketing experience and is uniquely qualified to help move products and services across the technology adoption life cycle and "cross the chasm" to become widely adopted. Doug's broadband experience includes OneCommunity, the Knight Center of Digital Excellence, and Gigabit Squared. His research background includes serving online research pioneer InsightExpress, Walker Research, and Direct Opinions. Doug earned his M.B.A. in marketing from the University of Connecticut and holds a B.A. in communications from DePauw University. He lives in Boulder, Colorado.

Michael Curri
Founder and President, Strategic Networks Group Inc.

Michael Curri founded Strategic Network Group, Inc. (SNG) in 1998, and as president, he leads a group of broadband economists who develop strategies for most effectively leveraging broadband investments. SNG looks to enable businesses, communities, and regions make the most of the transformational impacts that broadband can make. SNG helps states and regions utilize broadband for economic development, social advancement, increased productivity, and competitiveness. SNG's approach is based on research that shows that for broadband to be effective and transformational, the compelling, powerful e-solutions it can offer must be used. Michael has a master's in economics from the University of Waterloo, Canada. He is based in Ottawa.

Lori Sherwood
Director of Broadband Development, Vantage Point Solutions

Lori Sherwood is an attorney who has actively worked in broadband and telecommunications in the municipal space for more than 15 years. She previously served as Of Counsel with the Denver law firm Kissinger & Fellman, P.C., where she specialized in local governments, information technology, telecommunications, community broadband networks, legislation, lobbying and federal affairs. She is a nationally recognized leader in telecommunications and broadband policy and currently serves on the board of directors for the National Association of Telecommunications Officers and Advisors, representing local government interests in telecommunications. Lori has a B.A. in anthropology from American University and is an honors graduate of the University of Baltimore School of Law.

Gary Dunmore
VP, Client Services, Strategic Networks Group Inc.

Gary Dunmore is an electrical engineer and a business analyst with more than 20 years of experience in the telecommunications industry and a proven track record in helping service providers define new business opportunities for service deployment. He has proven leadership skills in project planning, team management, and project management developing successful business cases for a wide variety of telecom and internet operators across North America.

Since 1994, Gary has worked on telecommunications services and service deployment planning with telecom service providers. For a variety of clients, from established incumbent providers to new start-up operators, he has developed project plans, written proposals, mobilized internal and external resources, and engaged clients to develop practical solutions for new service deployment with a focus on business goals and vision. To assist decision making, he has helped clients identify new opportunities for growth, market, and revenue potential; develop the best solutions for their networks; and construct solid business cases and risk analysis for investment decisions.

Gary has experience in voice telecommunications networks and emerging IP-based services in North America and international markets. He has an electrical engineering degree from the University of British Columbia.

7. Underwriters

SNG wishes to thank the following underwriters for supporting this research.

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Fujitsu Network Communications, **Inc.**, based in Richardson, TX, is a reliable, full-service integration partner who can help you transform your community into a prosperous and sustainable smart city. We can collaborate with you to understand your situation today and plan the way forward. Fujitsu network solutions draw upon a vendor-agnostic approach and extensive partner ecosystem to evolve your network along the right path for you. Whether you're looking for smart broadband infrastructure and applications, data analytics, cloud platforms, cybersecurity or managed network services, Fujitsu will work with you to understand the problem, define the solution, and make every step the right step. For more information, visit http://us.fujitsu.com/telecom or connect with us on LinkedIn at www.linkedin.com/company/fujitsu-network-communications.

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