

2-2022

State Broadband Profile - Ohio (Feb. 2022)

New York Law School

Follow this and additional works at: https://digitalcommons.nyls.edu/reports_resources



Part of the [Administrative Law Commons](#), [Energy and Utilities Law Commons](#), [Internet Law Commons](#), and the [Technology and Innovation Commons](#)

Recommended Citation

New York Law School, "State Broadband Profile - Ohio (Feb. 2022)" (2022). *Reports and Resources*. 3. https://digitalcommons.nyls.edu/reports_resources/3

This Article is brought to you for free and open access by the Advanced Communications Law and Policy Institute at DigitalCommons@NYLS. It has been accepted for inclusion in Reports and Resources by an authorized administrator of DigitalCommons@NYLS.

STATE BROADBAND PROFILE: OHIO

FEBRUARY 2022

TABLE OF CONTENTS

EXECUTIVE SUMMARY..... i

1. INTRODUCTION..... 1

2. LEGISLATIVE & REGULATORY CONTEXT..... 1

2.1 DEREGULATORY FOUNDATIONS2

2.2 RESPONSIVE POLICYMAKING3

2.3 SOLUTION-FOCUSED ACTION 4

2.4 TAKEAWAYS 6

3. THE STATE OF BROADBAND IN OHIO.....6

3.1 SUPPLY-SIDE ISSUES7

3.1.1 *Broadband Availability & Competition*.....7

3.1.2 *Speed*..... 8

3.1.3 *Open Issues*..... 10

3.2 DEMAND-SIDE ISSUES..... 11

3.2.1 *Adoption* 11

3.2.2 *Addressing the Digital Divide* 12

3.3 THE ROLE OF NON-TRADITIONAL PROVIDERS..... 12

3.3.1 *Electric Cooperatives*.....13

3.3.2 *GONs*13

3.4 TAKEAWAYS 16

4. LOOKING AHEAD..... 16

4.1 A FRAMEWORK FOR PRIORITIZING INVESTMENT IN INFRASTRUCTURE MODERNIZATION ... 17

4.2 SERVING THE UNSERVED – STRATEGICALLY TARGETING FUNDING 17

4.3 SERVING THE UNSERVED – PRIORITIZING PARTNERSHIPS WITH EXPERT ISPs 19

4.4 CLOSING THE ADOPTION GAP20

4.4.1 *Cleveland Case Study*..... 21

4.4.2 *Cincinnati Case Study* 23

4.4.3 *Columbus Case Study*.....24

4.4.4 *Dayton Case Study*26

4.5 MAINTAINING A LEVEL PLAYING FIELD28

EXECUTIVE SUMMARY

Broadband connectivity in Ohio is robust. According to the most recent data:

- Approximately 95.9% of households in the state can access a wireline broadband connection of at least 25/3 Mbps. The state estimates that about 300,000 households remain unserved by a wireline connection.
- About 99.9% of the state's population can choose from among three providers of 4G mobile broadband service, and 82% of Ohioans can access a 5G connection.
- Ohio's broadband adoption rate is 85%. However, adoption rates tend to correlate with household income: the higher the income, the higher the adoption rate.

To achieve universal broadband availability and more equitable levels of broadband adoption in Ohio via the wise expenditure of public funds, an historic amount of which is set to flow into the state via federal stimulus and infrastructure bills, this Profile recommends the following actions by the state:

1. ***Evaluate All Infrastructure Priorities.*** The state and each locality should allocate federal funds based on holistic assessments of core infrastructure needs. Even though the state will receive some \$23 billion in federal aid, it is essential that policymakers identify real needs and invest these once-in-a-lifetime funds wisely.
2. ***Prioritize Unserved Areas First.*** To bring broadband to the remaining unserved households in Ohio, state policymakers must strategically target available funding to those areas first and foremost. Prioritizing unserved areas will ensure that the state's digital divide is closed once and for all.
3. ***Leverage Private ISPs.*** The state should forge public-private partnerships (PPPs) with expert private ISPs as it seeks to close its digital divide. These entities have deep expertise in building, maintaining, operating, upgrading, and securing networks, and established track-records of success as partners in similar PPPs.
4. ***Focus Considerably More on Demand-Side Issues.*** Arguably the most pressing – and overlooked – issue in the state is the gap between those who have adopted broadband and those who have elected not to despite having a connection at the ready. The state must spend significantly more time, attention, and resources on closing these gaps, which are evident everywhere in the state but are particularly stark in cities like Cleveland and Cincinnati. The supply of broadband is not the issue in these areas; rather, it is a lack of focus on demand-side issues.
5. ***Maintain a Level Playing Field.*** With a sizable infusion of federal funding on its way to the state and with a growing array of ISPs seeking a share of those funds, Ohio must ensure that these myriad entities compete on similar terms and conditions. Failure to address the inherent advantages of certain providers could undermine the incentives of all ISPs to invest and compete for customers.

1. INTRODUCTION

As in many other states, the broadband story in Ohio is largely a positive one. Broadband is widely available, with high-speed connectivity delivered via a range of innovative wireline and wireless platforms. Well-defined pockets of unserved areas still exist, though, and challenges also persist on the demand-side, resulting in some Ohioans being offline despite having ready access to a broadband connection. Unlike many states, however, Ohio has played an active role in encouraging private Internet service providers (ISPs) to invest in their networks, fostering more innovative and tailored services to customers. The result has been steady, consumer-friendly gains across every relevant broadband metric, including availability, competition, speed, and price.

As discussed in this profile, Ohio has followed a template for bolstering broadband connectivity that has worked well and that should serve as a model for states exploring how best to do the same. Among other things, Ohio has established and maintained a mostly market-oriented regulatory approach to broadband; consistently modernized policy frameworks impacting broadband deployment; enhanced its mapping capabilities; centralized strategy development in a state broadband office; and, most recently, launched a grant program to help plug gaps in availability. Equally as important, Ohio has not sought to tip the scales in favor of a particular broadband technology or a specific class of providers, nor has it attempted to enter the market itself as a provider of broadband services. This multifaceted approach reflects a recognition by policymakers in the state that the most impactful role of government tends to be as a facilitator of broadband deployment rather than as a competitor or hands-on industry planner.

Continuing to steer broadband policy in this direction – by prioritizing partnerships with expert private ISPs to bring broadband to unserved areas; developing policies aimed at maximizing investments; and focusing considerably more resources on improving take-rates and bolstering digital literacy skills in areas where broadband is already available, a long overlooked but critical set of issues – is essential as significant federal funding makes its way into state and local coffers via recent COVID-related stimulus bills. Most states, including Ohio, are grappling with how to allocate those funds in the most efficient and impactful way possible. This profile offers guiding principles to inform how Ohio – and states generally – might respond to this historic influx of funding for broadband.

2. LEGISLATIVE & REGULATORY CONTEXT

Over the last two decades, Ohio has implemented numerous legislative and regulatory reforms that, taken together, create a strong foundation for continued growth of the state's already thriving broadband sector. A notable characteristic of these reforms is their forward-looking nature. As discussed in this section, policymakers have proactively updated the state's laws, rules, and regulations to reflect current market dynamics and trends in consumer demand across every facet of the communications marketplace. At a time when some states are exploring how to regulate broadband or otherwise meddle in

the marketplace, it is appropriate to appreciate how successful Ohio's approach has been vis-à-vis fostering organic broadband growth while tactfully leveraging its resources to address discrete issues that the market, on its own, has not been able to solve.

2.1 Deregulatory Foundations

Since the turn of the twenty-first century, Ohio has been in the vanguard of states embracing a deregulatory approach to broadband and other advanced communications services.

For example, Ohio was part of the first wave of states to adopt statewide video franchising in 2007, a move that helped to drive investment and adoption of broadband services.¹ For many years, the traditional local franchising model required video providers to secure permission to offer their services from each city they wished to serve.² The entities that advocated for shifting to a statewide model – mostly telephone companies looking to compete with cable firms for broadband and video customers – noted that this more streamlined approach would encourage investment in advanced network infrastructure and bolster competition in the provision of bundled services (*e.g.*, double- and triple-play offerings that included video, broadband, and/or voice services).³ The impact of Ohio's move to statewide video franchising on broadband investment was evident almost immediately, helping to fuel more intense intermodal competition and spur greater adoption of high-speed internet access services.⁴

Since then, Ohio has continued to revisit, revise, and, where appropriate, roll back outdated laws and regulations impacting the deployment of broadband and related advanced services. In 2010, for example, the state modernized its oversight of basic telephone service, removing a range of antiquated requirements and otherwise updating its approach to “plain old telephone service” to better reflect a world where consumers were embracing next-

¹ Ohio Senate Bill 117, 127th General Assembly, http://archives.legislature.state.oh.us/bills.cfm?ID=127_SB_117. See also Dana A. Scherer, *Potential Effect of FCC Rules on State and Local Video Franchising Authorities*, at p. 9, Congressional Research Service (Jan. 9, 2020), https://www.everycrsreport.com/files/20200109_R46077_do276c8cd298d450eabbda9fed9d43e8dccc7143.pdf (“*Potential Effect*”).

² See, *e.g.*, *Potential Effect*.

³ See, *e.g.*, Robert W. Crandall et al., *Does Video Delivered over a Telephone Network Require a Cable Franchise?*, 59 Fed. Comm. L. J. 251 (2007), <https://www.repository.law.indiana.edu/cgi/viewcontent.cgi?article=1472&context=fclj>.

⁴ See, *e.g.*, *Telecommunications Deregulation: A Policy Progress Report*, at p. 4, Digital Policy Institute at Ball State University (March 2010), <https://cardinalsolar.bsu.edu/bitstream/handle/123456789/195726/TelecommDeregulation.pdf?sequence=1&isAllowed=y>.

generation voice services, namely wireless and VoIP.⁵ This legislative action helped redirect investments from an outdated set of services – landline telephony – to broadband and other advanced services.

In the same bill that implemented these changes, the state also explicitly deregulated IP-enabled services like VoIP and broadband and reiterated its hands-off approach to wireless services, signaling to service providers across the sector that the state would not meddle in what had become an intensely competitive space.⁶ Explicitly establishing such a deregulatory posture vis-à-vis broadband and related advanced services has been found to positively impact investment in those services, a dynamic that is evident in the continued consumer welfare gains evident in Ohio (see section 3, below, for additional discussion).⁷

2.2 Responsive Policymaking

Over the last decade, Ohio has continued to adjust its laws and rules to support further broadband deployment. Many of these actions focused on streamlining access to key inputs to the construction of broadband networks.

In 2014, the Public Utilities Commission of Ohio (PUCO) acted to align its pole attachment rules with those developed by the Federal Communications Commission (FCC).⁸ Prior to this action, ISPs, particularly those building wireline networks (*e.g.*, cable), expressed frustration with the ad hoc way utility companies provided access to their poles for the purpose of building broadband networks. ISPs argued that, without PUCO action to rationalize the state’s pole attachment regime, network investment would suffer, negatively impacting consumers. In response, PUCO issued a ruling that set forth clear rules of the road, providing more predictability around access fees and other aspects of what had become contentious negotiations between pole owners and ISPs about using those poles in support of broadband deployment. As a result of these changes, broadband network infrastructure continued to expand into previously unserved areas, while served areas saw continued improvements to their broadband connections.⁹

⁵ Ohio Senate Bill 162, 128th General Assembly, http://archives.legislature.state.oh.us/bills.cfm?ID=128_SB_162.

⁶ *Id.*

⁷ See, *e.g.*, Christopher S. Yoo, *Deregulation vs. Reregulation of Telecommunications: A Clash of Regulatory Paradigms*, 36 J. of Corp. L. 847 (2011), https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=1410&context=faculty_scholarship.

⁸ *In the Matter of the Adoption of Chapter 4901.1-3, Ohio Administrative Code, Concerning Access to Poles, Ducts, Conduits, and Rights-of-Way by Public Utilities*, Finding and Order, Case No. 13-579-AU-ORD (July 30, 2014), <http://dis.puc.state.oh.us/TiffToPDF/A1001001A14G30B60416E87231.pdf>.

⁹ See *infra*, section 3, for additional discussion.

A few years later, the legislature began the process of addressing a similar set of issues impacting wireless deployment. An initial attempt in 2016 was found to have run afoul of state constitutional provisions guiding the legislative process.¹⁰ Shortly thereafter, the legislature passed a bill that updated the state's approach to allowing wireless carriers to attach equipment in public rights-of-way in cities across the state.¹¹ Specifically, the bill amended the procedures used at the local level to accommodate more rapid deployment of small cells, which are critical inputs to next-generation 5G mobile broadband networks.¹² As a result of these changes, Ohio has become a leader in the availability of 5G mobile broadband. Indeed, according to one source, Ohio is the only state in the country with two cities – Cincinnati and Columbus – in the top 10 best U.S. cities for 5G coverage.¹³ Similar gains are being made across the state vis-à-vis both 4G and 5G coverage.¹⁴

2.3 Solution-Focused Action

State action in recent years has focused primarily on supporting broadband buildout to Ohio's remaining unserved areas.

As a first step, the state in 2019 commissioned Connected Nation Ohio, a nonprofit, to develop detailed broadband coverage maps.¹⁵ These updated maps allowed the state to ensure that its actions going forward were not duplicative of efforts already underway by the private sector to deploy broadband in rural areas.

Shortly thereafter, the state launched InnovateOhio, an initiative to bring broadband to the estimated 300,000 households – or approximately one million Ohioans – that lacked access to it.¹⁶ As a first step, the initiative developed a broadband strategy that mapped out

¹⁰ *City of Bexley v. State of Ohio*, 92 N.E.3d 397 (2017), <https://www.legale.com/decision/92185870ne3d397121> (holding that the law ran afoul of the state's "one-subject" rule, as articulated in Article II, Section 15(D) of the Ohio constitution).

¹¹ House Bill 478, 132nd General Assembly, https://search-prod.lis.state.oh.us/solarapi/v1/general_assembly_132/bills/hb478/EN/05/hb478_05_EN?format=pdf.

¹² See, e.g., Alissa Widman Neese, *After Communities Sued, Ohio Lawmakers Reach Small Cell Compromise*, April 23, 2018, Columbus Dispatch, <https://www.govtech.com/network/after-communities-sued-ohio-lawmakers-reach-small-cell-compromise.html>.

¹³ Brittany McGhee, *5G Capitals: Which US Cities Have the Best 5G Coverage?*, May 25, 2021, WhistleOut, <https://www.whistleout.com/CellPhones/Guides/5g-capitals-of-the-usa>.

¹⁴ See *infra*, section 3, for additional discussion.

¹⁵ See, e.g., Carrie Ghose, *Third Frontier Grants \$900k to Connect Ohio to Update State Broadband Map*, Feb. 21, 2019, Columbus Business First, <https://www.bizjournals.com/columbus/news/2019/02/21/third-frontier-grants-900k-to-connect-ohio-to.html>,

¹⁶ *The Ohio Broadband Strategy*, at p. 6, InnovateOhio (Dec. 2019), https://innovateohio.gov/wps/wcm/connect/gov/bde9a8ce-5f93-4a04-b937-102788469bdb/OhioBroadbandStrategy_121919.pdf?MOD=AJPERES&CONVERT_TO=url&CACHEID=ROOT

major elements of a plan for connecting the unconnected. The strategy revolved primarily around the following objectives:

- Creating a state broadband office to “optimize expansion efforts and leverage federal programs to expand internet access.”¹⁷
- Continuing to reform regulations impacting broadband deployment, with a particular focus on streamlining how the state’s Department of Transportation issued permits to key rights-of-way.¹⁸
- Establishing a state grant program to close availability gaps in remaining unserved and underserved areas.¹⁹ Part of the focus on bringing service to unserved areas revolved around leveraging new technologies (*e.g.*, fixed wireless) to speed deployment.²⁰
- Bolstering availability of digital literacy programs to empower all users with the skills needed to harness the transformative power of broadband.²¹

Since release of the plan, the state has made progress on many of its recommendations. For example, in March 2020 the state established a broadband office, BroadbandOhio, to “implement the Ohio Broadband Strategy and be the point of contact for all broadband projects in Ohio.”²² In 2021, the legislature, via House Bill 2 (HB2), established the Ohio Residential Broadband Expansion Grant Program,²³ a \$250 million effort to ensure that every person in the state can access a broadband connection of at least 25/3 Mbps.²⁴ HB2 also included additional reforms to the state’s pole attachment regime, requiring electric

[WORKSPACE.Z18_MiHGgIKoNoJ0ooQO9DDDDM3000-bde9a8ce-5f93-4a04-b937-102788469bdb-mYuKib6](https://workspace.z18.miHGgIKoNoJ0ooQO9DDDDM3000-bde9a8ce-5f93-4a04-b937-102788469bdb-mYuKib6),

¹⁷ *Id.* at p. 16.

¹⁸ *Id.* at p. 12

¹⁹ *Id.*

²⁰ *Id.* at p. 13.

²¹ *Id.* at p. 14.

²² Press Release, *Governor DeWine Creates BroadbandOhio to Support Expansion of High-Speed Internet*, March 5, 2020, Office of the Governor of Ohio, <https://governor.ohio.gov/wps/portal/gov/governor/media/news-and-media/creation-of-broadbandohio>.

²³ ORC §§ 122.40 *et seq.*, <https://codes.ohio.gov/ohio-revised-code/section-122.40>.

²⁴ See, *e.g.*, Tyler Buchanan, *Budget Includes \$250M for Ohio Broadband Internet Expansion*, June 29, 2021, Ohio Capital Journal, <https://ohiocapitaljournal.com/briefs/budget-includes-250m-for-ohio-broadband-internet-expansion/>.

cooperatives to provide ISPs with nondiscriminatory access to their poles under “just and reasonable rates, terms, and conditions.”²⁵

The new grant program was established before federal legislative action responding to the COVID-19 pandemic. These federal stimulus efforts directed significant additional funding to Ohio, some of which has been used to bolster broadband availability and adoption. For example, the state made available \$50 million in funding from the CARES Act of 2020 to “provide hotspots and internet-enabled devices to students” in support of remote learning.²⁶ In 2021, the American Rescue Plan Act (ARPA) allocated a total of \$11 billion to Ohio for use on a range of economic recovery projects, including broadband deployment. Of that \$11 billion, \$5.68 billion will go to the state, with the remainder going directly to cities and counties across the state.²⁷ In November 2021, the Infrastructure Investment & Jobs Act (IIJA) was signed into law, promising to steer approximately \$12 billion to Ohio for infrastructure investment, with at least \$100 million of that total earmarked for broadband.²⁸ Discussions are ongoing regarding how these myriad federal funding streams might be used for broadband and how use of those funds might impact the state’s nascent grant program (for further discussion, see section 4).

2.4 Takeaways

Ohio is in an enviable position as it ramps up efforts to close remaining digital divides in the state. It maintains an adaptive legal and regulatory environment for advanced services like broadband, signaling to ISPs that the state will act to maintain a level playing field and otherwise assure a hospitable environment within which to continue investing. Where there are obvious market failures – like in truly unserved rural areas – the state has shown that it will marshal available resources to address those issues as quickly as possible.

3. THE STATE OF BROADBAND IN OHIO

With substantial new funding being made available for addressing broadband connectivity issues – from the state itself, via its new grant program, and from the federal government, via several COVID-related stimulus bills – Ohio must determine how to best allocate those

²⁵ ORC § 4926.03, <https://codes.ohio.gov/ohio-revised-code/section-4926.03>.

²⁶ Press Release, \$50 Million in Grant Funding Available to Help Students Gain Internet Access, Aug. 10, 2020, Ohio Department of Education, <http://education.ohio.gov/Media/Ed-Connection/Aug-10-2020/50-million-in-grant-funding-available-to-help-stu>.

²⁷ *The American Rescue Plan Act of 2021 – ARPA Resources for Communities*, Greater Ohio Policy Center (last updated: Aug. 6, 2021), <https://www.greaterohio.org/arpa2021>.

²⁸ H.R. 3684 – Infrastructure Investment and Jobs Act, <https://www.congress.gov/bill/117th-congress/house-bill/3684/text> (“IIJA”). For state-by-state funding estimates, see Jason Warner, *Bipartisan Infrastructure Legislation Enacted – Here’s What’s Included*, Nov. 9, 2021, Greater Ohio Policy Center, <https://www.greaterohio.org/blog/2021/11/8/bipartisan-infrastructure-legislation-enacted-heres-whats-included>.

dollars. To do so effectively and efficiently, Ohio's efforts – and the efforts of states in general – should be guided by data. To prevent funds from being used to support duplicative buildouts – *i.e.*, subsidizing new networks in areas that are already served – the state must use available data to ensure that its allocations are as impactful as possible.

As discussed in this section, the data make clear that (1) broadband connectivity – *i.e.*, the availability and adoption of broadband service – in Ohio is generally robust, but, even so, (2) there are well-defined challenges on both the supply-side and demand-side that are amenable to targeted interventions. This section also examines the role and uneven track-record of non-traditional providers – *i.e.*, local and county governments; electric utilities – in addressing broadband issues in the state.

3.1 Supply-Side Issues

High-speed internet connectivity delivered via an array of platforms is widely available across Ohio. As noted above, this has been the case for many years as the state has continuously adjusted its regulatory and legislative frameworks to encourage and accommodate additional investment by private wireline and wireless providers. The following provides an overview of broadband availability in the state based on the most recent data.

3.1.1 Broadband Availability & Competition

As of June 30, 2020, approximately 95.9% of households in the state had access to a wireline broadband connection of at least 25/3 Mbps.²⁹ This is up from 91.5% in 2015.³⁰

In terms of competition, about two-thirds of all households in the state – some 64.4% – can choose from two or more wireline providers for service of at least 25/3 Mbps.³¹ This figure is up considerably from 2015, when only 25.8% of households had such a choice.³² Sizeable, consistent gains in competition have been evident for many years.

The true level of competition in the state is likely understated because the data tend to focus only on wireline connections. At a time when consumers are increasingly choosing to rely on wireless connections – both fixed and mobile – the real number of choices available to consumers is likely much higher across the state. For example, including fixed wireless in the competition analysis increases the percentage of households with the choice

²⁹ ACLP analysis of FCC Form 477 Data (on file).

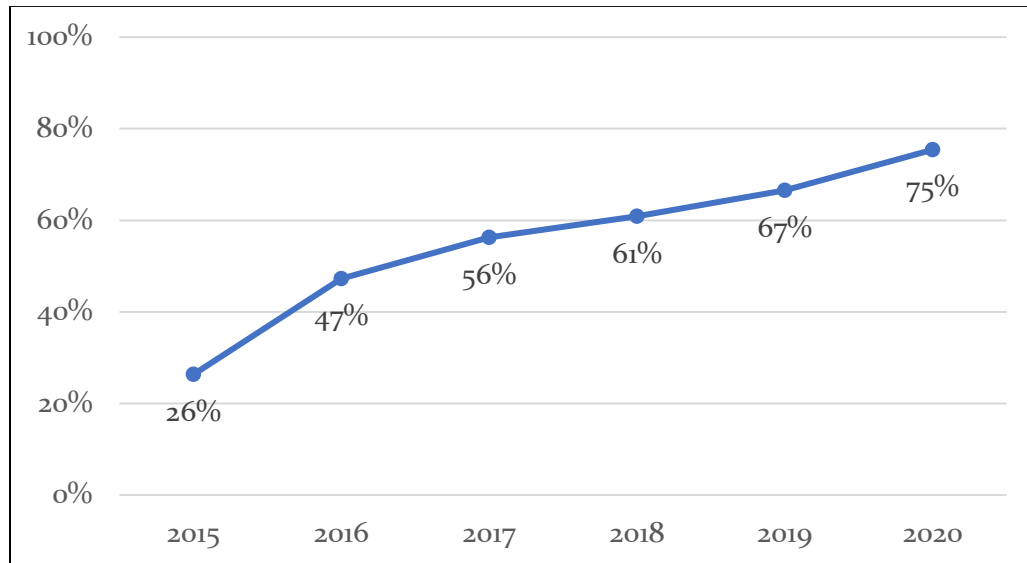
³⁰ *Id.*

³¹ *Id.*

³² *Id.*

of at least two fixed providers (i.e., wireline or fixed wireless) of broadband to 75.4%, a significant increase (see **Figure 1**).³³

Figure 1 – Households with Access to 2 or More Fixed Broadband Connections³⁴



In addition, consider that about 99.9% of the state’s population can choose from among three providers of 4G mobile broadband service.³⁵ 5G service is currently being deployed; to date, about 82% of Ohioans can access this next-generation service.³⁶ Including mobile broadband in an analysis of broadband competition is critical given (1) its outsize popularity among users of all kinds and (2) its proven ability to consistently deliver speeds exceeding 25/3 Mbps.³⁷

3.1.2 Speed

In addition to providing consumers with more options for internet access, increased competition among wireline and wireless broadband providers has resulted in faster speeds across every platform. Consider that in 2018 average download speeds on wireline networks

³³ *Id.*

³⁴ *Id.*

³⁵ *Id.*

³⁶ *Id.*

³⁷ See, e.g., Francesco Rizzato, *USA Mobile Network Experience Report – July 2021*, OpenSignal, <https://www.opensignal.com/reports/2021/07/usa/mobile-network-experience>.

in Ohio were approximately 32 Mbps.³⁸ By 2021, that figure had grown almost tenfold, rising to 278 Mbps.³⁹

Similar gains have been made on the wireless front as 5G mobile broadband increasingly competes head-on with wireline ISPs for customers. Download speeds on 4G networks average anywhere from 14 Mbps to just over 25 Mbps.⁴⁰ 5G networks promise to at least quadruple those speeds. T-Mobile's 5G Home Internet product offers an illustrative example. It delivers speeds of up to 100/23 Mbps, is priced at \$50/month, and does not come with data caps, positioning it very favorably vis-à-vis wireline competitors.⁴¹

The rapid shift to remote everything – work, learning, etc. – precipitated by COVID-19 highlighted the importance of robust upload speeds as well as download speeds. Fortunately, upload speeds have been growing in tandem with download speeds. Indeed, average upload speeds on wireline networks has more than doubled since 2018, rising from 32.8 Mbps to 73.9 Mbps.⁴² Similarly sizeable gains in upload speeds are being made in the mobile arena as well, driven in large part by the increased availability of 5G. Upload speeds on 4G networks averaged around 8 Mbps; on 5G networks, they can exceed 20 Mbps.⁴³

By and large, consumers across the country are satisfied with their broadband connections. A survey conducted in May 2021 found that “86% of respondents rate[d] their Internet [service] as excellent or good,” while “84% of respondents [were] satisfied with their download speed.”⁴⁴ As discussed in more detail below, this clear consumer embrace of broadband connections with higher download speeds than upload speeds contradict assertions by some about the need for symmetrical speeds (*i.e.*, connections where

³⁸ See Tyler Cooper, *US State with the Worst and Best Internet Coverage 2018*, July 23, 2018, BroadbandNow, <https://broadbandnow.com/report/us-states-internet-coverage-speed-2018/>.

³⁹ See Tyler Cooper and Julia Tanberk, *Best and Worst States for Internet Coverage, Prices and Speeds 2021*, Sept. 20, 2021, BroadbandNow, <https://broadbandnow.com/research/best-states-with-internet-coverage-and-speed>.

⁴⁰ See, *e.g.*, Babu Jackson and Sabine Neschke, *Difference Between 3G-4G-5G*, May 4, 2021, Bipartisan Policy Center, <https://bipartisanpolicy.org/blog/cellular-data-and-digital-divide/> (“Difference Between”); Liane Cassavoy, *How Fast is 4G LTE Wireless Service?*, Feb. 11, 2021, Lifewire, <https://www.lifewire.com/how-fast-is-4g-wireless-service-577566>.

⁴¹ T-Mobile Home Internet, FAQ, <https://www.t-mobile.com/isp/faq>.

⁴² See, *e.g.*, Frank Catalano, *Washington State Ranks in Top 10 in Annual Speedtest U.S. Broadband Performance Report*, Dec. 12, 2018, GeekWire, <https://www.geekwire.com/2018/washington-state-ranks-top-10-annual-speedtest-u-s-broadband-performance-report/> (reporting 2018 data released by Ookla); *United States' Mobile and Fixed Broadband Internet Speeds – Sept. 2021*, Ookla, <https://www.speedtest.net/global-index/United-states>.

⁴³ See, *e.g.*, *Difference Between*.

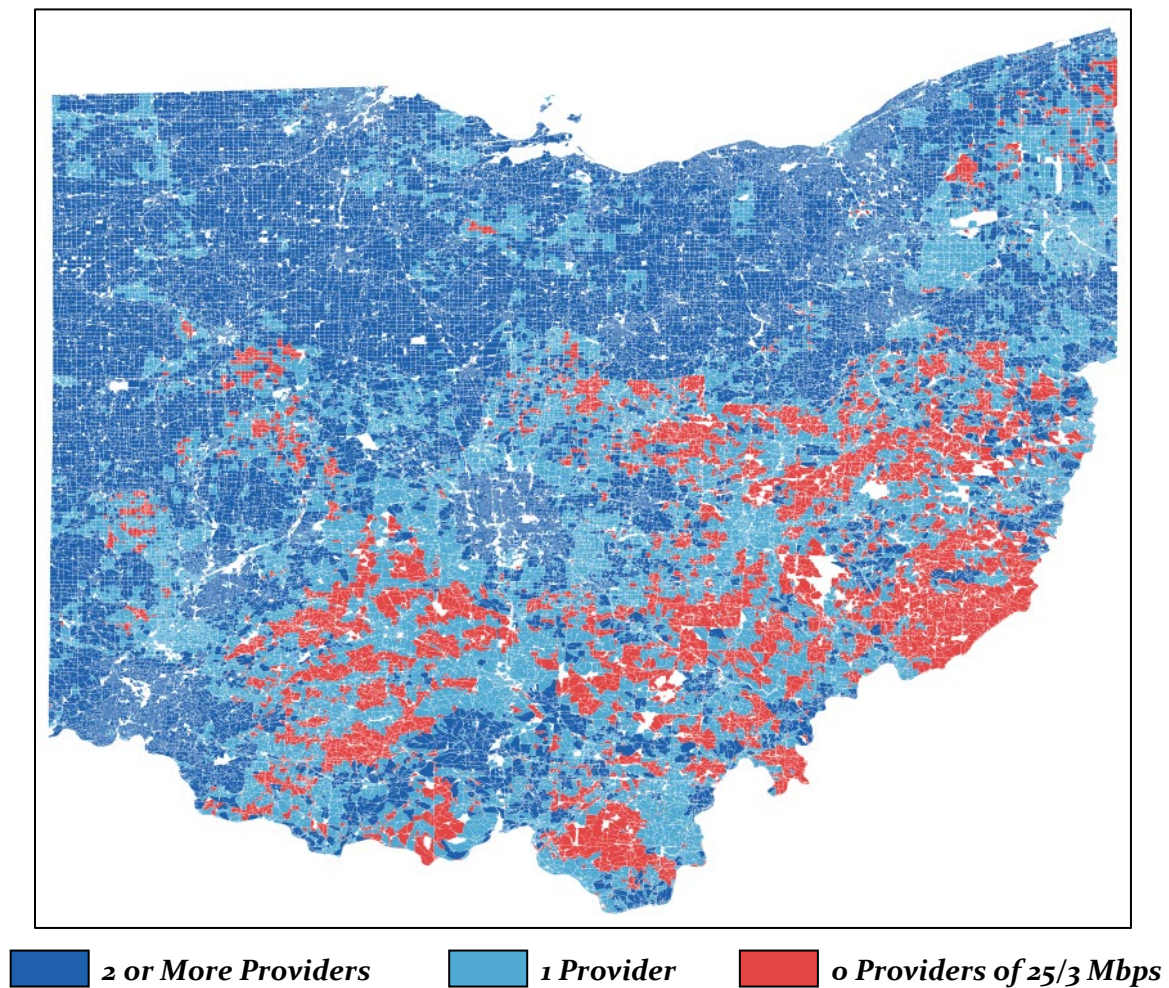
⁴⁴ Carl Weinschenk, *Report Finds Strong Broadband Satisfaction, Willingness to Support Broadband Buildouts*, May 17, 2021, Telecompetitor, <https://www.telecompetitor.com/report-finds-strong-broadband-satisfaction-willingness-to-support-broadband-build-outs/>.

download and upload speeds are the same). Such high levels of customer satisfaction ultimately appear closely linked to consistent growth of both upload and download speeds, which allows consumers to accomplish what they wish online.

3.1.3 Open Issues

As previously noted, the state has estimated that approximately 300,000 households across Ohio lack access to a wireline broadband connection of at least 25/3 Mbps. **Figure 2**, below, depicts this digital divide, with the areas shaded in red highlighting where these households are located.

Figure 2 – Household Availability of 25/3 Mbps Connections (2020)⁴⁵



⁴⁵ ACLP analysis of FCC Form 477 Data (on file). Only areas with one or more residential households are shown on the map. The color coding indicates the number of ISPs providing residential 25/3 Mbps connectivity.

When all platforms are included in the analysis of broadband availability, however, the digital divide in Ohio – and across the country – is less dire. Even so, Ohio is rightly committed to facilitating further deployment of broadband networks to areas that currently lack it.

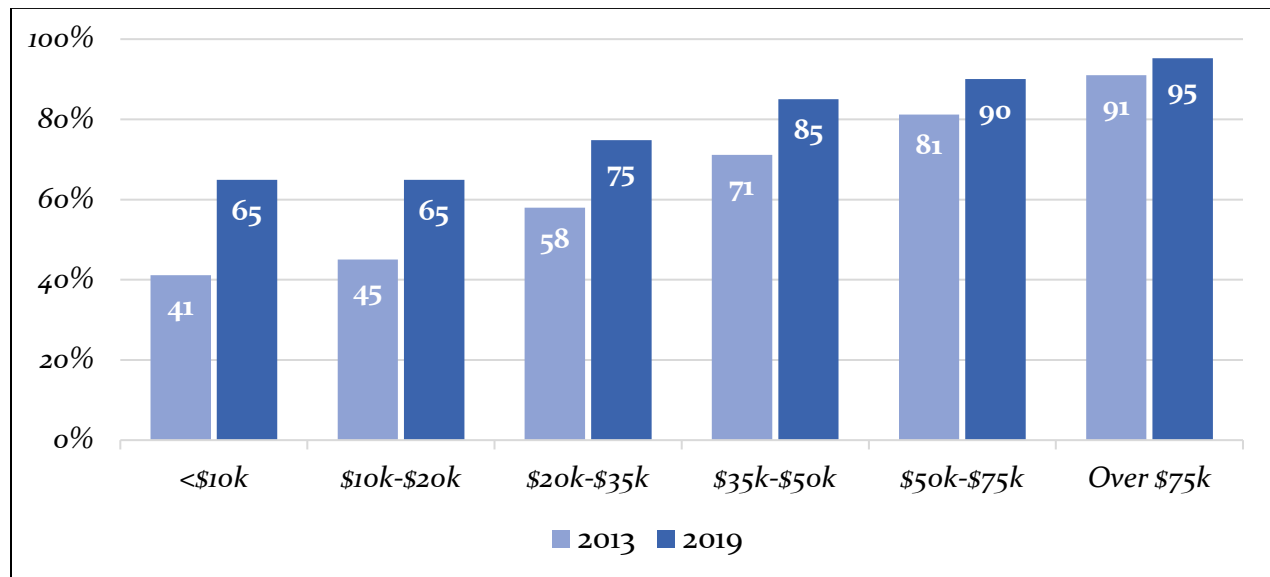
3.2 Demand-Side Issues

Broadband connectivity encompasses more than just supply-side issues like the availability of a high-speed internet connection. Equally as important is the willingness of consumers to subscribe to broadband and their ability to put those connections to meaningful uses. This section analyzes broadband adoption in Ohio.

3.2.1 Adoption

Broadband adoption in Ohio is robust. As of 2019, Census data indicate that about 85% of Ohioans had adopted broadband, up from 71% in 2013.⁴⁶ Adoption rates appear to lag most among lower-income households. As detailed in **Figure 3**, broadband adoption generally increases as income increases, a trend that is evident across the country.⁴⁷

Figure 3 – Broadband Adoption by Household Income Category – Ohio⁴⁸



⁴⁶ ACLP Analysis of ACS Data (on file).

⁴⁷ See, e.g., *Internet/Broadband Fact Sheet*, April 7, 2021, Pew Research Center, <https://www.pewresearch.org/internet/fact-sheet/internet-broadband/?menuItem=48odace1-fd73-4fo3-ad88-cae66e1f4217>.

⁴⁸ ACLP Analysis of ACS Data (on file).

3.2.2 Addressing the Digital Divide

Addressing pockets of under-adoption of broadband services tends to be more difficult than bringing broadband to unserved areas. Non-adoption certainly exists in areas where broadband is unavailable – a person cannot adopt a service that is not available to them – but, in most instances, households without broadband are in places where a connection is readily available. Consequently, effective interventions typically entail efforts to incentivize or provide aid directly to non-adopters to subscribe.

Given the relationship between income and broadband adoption, the cost of a subscription and computing device are usually major hurdles for those who remain offline, as is a perception that broadband might not be relevant or useful.⁴⁹ Taken together, this creates a mindset among many that broadband at almost any price is unaffordable.⁵⁰ The most impactful responses in these situations tend to revolve around making available low-cost plans to low-income households and supplementing those offerings with digital literacy training for those who want and need it (see section 4 for additional discussion).⁵¹

3.3 The Role of Non-Traditional Providers

In some instances, non-traditional providers of broadband – namely a city or county government, or an electric utility – have been positioned as a means of addressing broadband connectivity challenges. Specifically, electric cooperatives have sought to deploy broadband in mostly unserved parts of the state, reasoning that their existing electric infrastructure and fiber assets provide a natural foundation for deploying commercial broadband services to customers. Private electric utilities are also examining whether and how to enter the broadband space. Government-owned broadband networks (GONs), on the other hand, have been deployed almost entirely in parts of Ohio where broadband is already available. In both cases, the small-scale nature of these deployments and their uneven track-record does not augur well for leveraging non-traditional broadband providers to solve pressing connectivity issues, except perhaps in areas where all other options for expanding broadband access have been exhausted (see section 4, below, for additional discussion).

The track record of these providers is examined below.

⁴⁹ See, e.g., Andrew Perrin, *Mobile Technology and Home Broadband 2021*, at p. 9-10, Pew Research Center (June 2021), https://www.pewresearch.org/internet/wp-content/uploads/sites/9/2021/06/PI_2021.06.03_Mobile-Broadband_FINAL.pdf.

⁵⁰ *Id.*

⁵¹ See, e.g., John B. Horrigan, *Reaching the Unconnected: Benefits for Kids and Schoolwork Drive Broadband Subscriptions, But Digital Skills Training Opens Doors to Household Internet Use for Jobs and Learning*, Technology Policy Institute (Aug. 2019), https://techpolicyinstitute.org/wp-content/uploads/2019/08/Horrigan_Reaching-the-Unconnected.pdf.

3.3.1 Electric Cooperatives

Ohio is home to 25 rural electric cooperatives (RECs) that, together, serve approximately 380,000 residential and business customers across the state.⁵² To date, it appears that at least three cooperatives have taken steps towards making broadband available to their customers. Specifically, two cooperatives – Consolidated REC and Buckeye REC – have announced plans to build FTTH networks, with Consolidated having already built out a network to some 8,000 customers.⁵³ The third cooperative – Butler REC – is working with Cincinnati Bell to facilitate deployment of the private ISP’s fiber network to 2,000 households.⁵⁴

RECs will likely continue to play a targeted role in bringing broadband to unserved areas in the short term. A consortium of cooperatives received nearly \$200,000 via the FCC’s Rural Digital Opportunities Fund (RDOF) to bring service to approximately 1,336 unserved locations in the state.⁵⁵ In addition, the legislature, via HB2, amended state law to allow cooperatives to offer broadband services over existing easements, a change that could encourage additional REC broadband initiatives.⁵⁶ As previously noted, the state also requires RECs to make their ROW available to ISPs on a nondiscriminatory basis.

Over the long term, cooperatives’ role in the broadband space might grow since RECs are eligible for grant funding from a variety of federal and state sources (*e.g.*, the state’s grant program, ARPA, and IJJA’s BEAD program). To assure a level playing field going forward, Ohio might explore additional changes to the regulatory framework impacting the ability of RECs to offer broadband (for further discussion, see section 4). Some of these changes might also apply to other electric utilities – *e.g.*, investor-owned utilities (IOUs) and municipal utilities – exploring entrance into the broadband market.

3.3.2 GONs

Like RECs, GONs have played a limited role in bolstering broadband connectivity in Ohio. Of Ohio’s more than 1,000 local governments, only a handful of cities and counties have pursued a GON.⁵⁷ Some of these projects have been praised as models that might be

⁵² Ohio’s Electric Cooperatives, <https://www.ohioec.org/ohios-cooperatives>.

⁵³ See, *e.g.*, Consolidated, Fiber, <https://consolidated.crowdfiber.com/>; *Co-Op Spotlight: Buckeye Rural Electric Cooperative*, May 3, 2021, Ohio’s Electric Cooperatives, <https://www.ohiocoopliving.com/co-op-spotlight-buckeye-rural-electric-cooperative>.

⁵⁴ Cincinnati Bell, Butler REC Partnership – FAQ, <https://www.cincinnati-bell.com/special-pages/brec>.

⁵⁵ FCC, RDOF – Assignment Winning Bidders, https://auctiondata.fcc.gov/public/projects/auction904/reports/winning_bidders (“RDOF Winners”).

⁵⁶ See section 2, above.

⁵⁷ Ohio.gov, Local Government, <https://ohio.gov/wps/portal/gov/site/government/topic-hubs/local-government/>.

replicated elsewhere in the state and across the country. However, a closer look reveals weaknesses that might give other cities in Ohio and elsewhere pause before following a similar path.

- *Dublin's Dublin.*⁵⁸ Dublin is a fiber transport service that the city markets to business customers. Specifically, it is a “no-cost lateral connection to a high speed, ultra-low latency fiber optic network.”⁵⁹ Where available, Dublin allows businesses to connect directly to a data center; businesses can then choose from a range of data services, including broadband access.⁶⁰ The city pursued this project to retain and attract businesses. Whether or not Dublin has succeeded in its mission remains to be seen, as no data has been presented evidencing a causal relationship between the network’s presence and economic development gains.
- *FairlawnGig.*⁶¹ This FTTH network serves the entire city of Fairlawn and parts of the surrounding joint economic development district. Often described as a “huge success,”⁶² the GON in Fairlawn has yet to find its financial footing. Indeed, since the project’s launch in 2016, the GON has yet to achieve profitability. Instead, the Fairlawn Gig network has operated at a significant loss each year of its existence. Operating losses totaled \$207,317 in 2016;⁶³ \$1,127,549 in 2017;⁶⁴ \$861,482 in 2018;⁶⁵ \$806,416 in 2019;⁶⁶ and \$980,853 in 2020.⁶⁷ Because of these losses, the city has had to prop the system up with annual transfers from its general fund.⁶⁸ The poor

⁵⁸ See Dublin, Dublin Transport, <https://www.econdev.dublinohiousa.gov/dublink-broadband>.

⁵⁹ Dublin, What is Dublin Transport, <https://dublinohiousa.gov/dev/dev/wp-content/uploads/2015/12/Dublink-Transport.pdf>.

⁶⁰ Dublin, OH, Dublin, <https://www.econdev.dublinohiousa.gov/dublink-broadband>.

⁶¹ Fairlawn Gig, <https://www.fairlawngig.net>.

⁶² *Transcript: Community Broadband Bits Episode 463*, Aug. 18, 2021, Community Networks, <https://muninetworks.org/content/transcript-community-broadband-bits-episode-463> (quoting Fairlawn’s Director of Public Service). See also James K. Wilcox, *How Municipal Broadband Helped an Ohio Town Cope During the Pandemic*, Aug. 31, 2021, Consumer Reports, <https://www.consumerreports.org/municipal-broadband/municipal-broadband-helped-ohio-town-cope-during-pandemic-a3845246875/>.

⁶³ *Regular Audit for the Year Ended December 31, 2016*, at p. 3, City of Fairlawn, OH, https://ohioauditor.gov/auditsearch/Reports/2017/City_of_Fairlawn_16-Summit.pdf.

⁶⁴ *Regular Audit for the Year Ended December 31, 2017*, at p. 3, City of Fairlawn, OH, https://ohioauditor.gov/auditsearch/Reports/2018/City_of_Fairlawn_2017_Summit.pdf.

⁶⁵ *Regular Audit for the Year Ended December 31, 2018*, at p. 3, City of Fairlawn, OH, https://ohioauditor.gov/auditsearch/Reports/2019/City_of_Fairlawn_18-Summit.pdf.

⁶⁶ *Regular Audit for the Year Ended December 31, 2019*, at p. 3, City of Fairlawn, OH, https://ohioauditor.gov/auditsearch/Reports/2020/City_of_Fairlawn_19-Summit.pdf (“2019 Audit”).

⁶⁷ *Regular Audit for the Year Ended December 31, 2020*, at p. 5, City of Fairlawn, OH, https://ohioauditor.gov/auditsearch/Reports/2021/City_of_Fairlawn_20_Summit_FINAL.pdf.

⁶⁸ See, e.g., *2019 Audit* at p. 44 (showing a \$180,000 transfer from the General Fund to the Broadband Fund).

financial performance of this GON is typically omitted from profiles and other less-than-objective analyses of FairlawnGig.⁶⁹

- *Hudson Velocity*.⁷⁰ Hudson began exploring a citywide FTTH GON in 2015.⁷¹ Since then, the city has scaled back its efforts, focusing first on a phased build-out to assess the system's viability. The GON's financials were poor initially, with expenses far exceeding revenues.⁷² Beginning in 2019, however, the GON began operating in the black.⁷³ Even so, the network remains small, with around 400 business and residential customers⁷⁴ in a city with a population of 22,200 and over 2,000 business establishments.⁷⁵ In addition, the GON's rate of subscriber and revenue growth appears to have slowed and is well below projections included in the system's business plan, which is being used to benchmark Velocity's "success," raising questions about its long-term viability and whether it makes sense to continue expanding this network.⁷⁶
- *Medina County Fiber Network*.⁷⁷ This countywide fiber network began serving business customers in 2013.⁷⁸ The county estimated that the network would be "self-sustaining by 2018."⁷⁹ By 2020, that was still not the case – the network continued to

⁶⁹ See, e.g., Corian Zacher, *The Ohio Case Study*, Next Century Cities (July 2021), <https://nextcenturycities.org/wp-content/uploads/TheOhioCaseStudy-by-Corian-Zacher.-NCC-Release-on-08.05.21.pdf>.

⁷⁰ Hudson's Velocity network serves both residential and business customers. See Hudson Velocity, FAQ, <https://www.hudsonvelocity.com/faqs/>.

⁷¹ See, e.g., Jim Mackinnon, *Hudson, Ohio, to Wire Entire City with High-Speed Fiber*, July 23, 2015, Akron Beacon Journal, <https://www.govtech.com/dc/articles/hudson-ohio-to-wire-entire-city-with-high-speed-fiber.html>.

⁷² See *Velocity Broadband Enterprise Business Plan*, at p. 3 (Feb. 2019), <https://hudson.legistar.com/View.ashx?M=F&ID=7231240&GUID=66B6F4FA-6FD3-4936-A367-803CoE5AB158>.

⁷³ See, e.g., Hudson Velocity, FAQ, <https://www.hudsonvelocity.com/faqs/>. For 2020: <https://www.hudson.oh.us/ArchiveCenter/ViewFile/Item/2308>

⁷⁴ See *July 2021 Financial Report*, at p. 7, Hudson, OH (Aug. 2021), <https://www.hudson.oh.us/ArchiveCenter/ViewFile/Item/2379>.

⁷⁵ Census Quick Facts, Hudson, OH, <https://www.census.gov/quickfacts/fact/table/hudsoncityohio/PST045219>.

⁷⁶ See, e.g., *January 2021 Financial Report*, at p. 7, Hudson, OH (Feb. 2021), <https://www.hudson.oh.us/ArchiveCenter/ViewFile/Item/2338>.

⁷⁷ Medina County Fiber Network, <https://www.medinacountyfibernet.com/>.

⁷⁸ Medina County Fiber Network, FAQ, <https://www.medinacountyfibernet.com/the-network/frequently-asked-questions/>.

⁷⁹ *Id.*

operate at a loss despite expanding into the provision of last-mile via a partnership with a private ISP.⁸⁰

Given the ongoing financial and operational uncertainty surrounding many of these projects, the role of GONs in addressing Ohio's broadband connectivity challenges appears limited (for further discussion, see section 4).

3.4 Takeaways

The preceding analysis supports the following takeaways regarding broadband connectivity in Ohio.

First, broadband availability is generally robust across the state. Most Ohioans can choose from multiple on-ramps to the internet – cable, fiber, 4G, 5G, fixed wireless, etc. The continued expansion of broadband networks is due to consistent investment in the underlying infrastructure by ISPs, which in turn stems directly from the supportive and largely deregulatory framework for advanced communications services maintained by the state. Addressing the small pockets of unserved areas in the state will require significant collaboration between state and local government on the one hand and ISPs on the other. A framework for establishing productive public-private partnerships is articulated in section 4.

Second, overall broadband adoption levels in Ohio are also robust and have climbed across the board over the last few years. However, there are areas in the state where adoption lags significantly behind the state average. Many of these areas are in cities where broadband is readily available. As discussed in section 4, closing adoption gaps is complex and resource intensive. Accordingly, additional resources are needed to help bring as many Ohioans online as possible. Fortunately, much of the federal funding available for broadband can be used to address such demand-side issues.

Third, the role of non-traditional providers in addressing Ohio's broadband connectivity issues appears to be niche in nature. Electric cooperatives are well positioned to help bring broadband to unserved parts of their service territories, while the expensive and complex nature of building, maintain, operating, and upgrading GONs renders them appropriate only in those areas where all other service options have been exhausted.

4. LOOKING AHEAD

Over the next few years, Ohio, like many states, will confront connectivity-related challenges on numerous fronts, including: (1) how to maximize the impact of state and federal infrastructure investments; (2) bringing broadband to unserved areas; (3) bolstering

⁸⁰ See Bob Finnan, *Fiber Network Not Yet Turning a Profit*, Feb. 15, 2020, Medina Gazette, <https://medina-gazette.com/news/202313/fiber-network-not-yet-turning-a-profit/>.

adoption where broadband is already available; and (4) maintaining a level playing field among a range of traditional and non-traditional broadband providers seeking to address these issues. The following offers principles and recommendations that might guide these efforts in Ohio and elsewhere.

4.1 A Framework for Prioritizing Investment in Infrastructure Modernization

With billions in federal stimulus and infrastructure funding expected to flow into Ohio over the next few years, the state and many of its political subdivisions will have numerous opportunities to invest in a range of projects, including those related to broadband expansion. Even though the federal allocations are significant, there is still a need to prioritize and precisely target these investments.

As these funds begin to fill state and local coffers, there is growing evidence that policymakers face a range of competing priorities, from repairing financial damage done by the pandemic to shoring up long-overlooked basic infrastructure like water and wastewater systems.⁸¹ Indeed, Ohio’s public infrastructure – its bridges, dams, waterways, roadways, and the like – received a grade of C- by the American Society of Civil Engineers (ASCE) in its 2021 Infrastructure Report Card.⁸² In its analysis, ASCE determined that “Ohio’s infrastructure is mediocre and exhibits significant deterioration. Condition and capacity are areas of serious concern with strong risk of failure.”⁸³

As state and local policymakers consider how to invest ARPA and IIJA funds, each entity would be best served undertaking a holistic assessment of infrastructure needs and areas where other investments are long overdue. Such an examination would likely identify a laundry-list of needs ahead of broadband infrastructure that require immediate attention, like bolstering broadband adoption rates; improving public health in the aftermath of the pandemic; allocating more money to public schools; and enhancing the financial standing of chronically underfunded public pensions. If and when officials elect to spend public funds on broadband, they should apply the principles articulated in the next few sections.

4.2 Serving the Unserved – Strategically Targeting Funding

A torrent of broadband funding is poised to flood Ohio over the next few years. The FCC’s RDOF will route \$17 million to the state, while the state itself has committed at least \$250

⁸¹ See, e.g., *City Fiscal Conditions 2021*, National League of Cities (Oct. 2021), <https://www.nlc.org/wp-content/uploads/2021/10/2021-City-Fiscal-Conditions-Report-2021.pdf>.

⁸² ASCE, Ohio Report Card, <https://infrastructurereportcard.org/state-item/ohio/>.

⁸³ *Report Card for Ohio’s Infrastructure – 2021*, at p. 3, Ohio Section of the ASCE (July 2021), https://infrastructurereportcard.org/wp-content/uploads/2021/07/FullReport-OH_2021_smaller.pdf.

million for its broadband grant program.⁸⁴ As previously noted, state policymakers are considering whether and how to invest \$5.68 billion in ARPA funds to address broadband connectivity issues, while officials in dozens of counties and cities across the state are doing the same with nearly as much in direct ARPA allocations.⁸⁵ Ohio will also receive at least \$100 million via the recently enacted IIJA for broadband.

Wisely spent, these funds can help to finally close the state's digital divide and bring broadband to every part of the state. Elements of a strategy for efficiently and effectively investing these resources in broadband might include:

- *Focus on unserved areas* – the parameters of Ohio's new grant program should guide all spending on broadband regardless of the source. Such will ensure that funds go to unserved areas first and foremost and avoid any temptation of directing resources to subsidize ISPs in served areas. Fortunately, Ohio's decision to prioritize unserved areas via its grant program aligns with criteria included in the IIJA, which, among other things, requires state broadband offices to allocate grants stemming from this pot of money to projects in unserved areas before focusing elsewhere.⁸⁶
- *Assure accountability* – those doling out grants and those receiving subsidies should be held to account for the funding they receive. Policymaker accountability should revolve around the use of data to guide where investments are made to ensure that funds go to where they are needed most. In addition, the challenge process included in the state's new grant program should become an aspect of every state-led broadband allocation.⁸⁷ Such will help to prevent wasteful spending on overbuilding networks in served areas. Funding recipient accountability should include regular reporting of progress towards promised deployments – how much money has been spent, how many new customers have been served to date, when the project might be completed, etc. The IIJA includes a range of such provisions and will likely influence how Ohio operationalizes these measures in its grant program.
- *Adhere to a tech neutral approach* – given the proven ability of both wireline and wireless broadband platforms to deliver reliable service to users regardless of geography, Ohio should avoid focusing on a particular technology or speed benchmark (e.g., symmetrical gigabit speeds delivered via fiber) and instead steer funding to ISPs of all ilk. The Ohio grant program and the rules guiding both ARPA and IIJA expenditures already encompass such an approach, so it is reasonable to extend this to all broadband spending in the state.

⁸⁴ RDOF Winners; section 3, *supra*.

⁸⁵ Section 3, *supra*.

⁸⁶ IIJA § 60102(h)(1)(A) *et seq.*

⁸⁷ ORC §§ 122.4030-4037.

4.3 Serving the Unserved – Prioritizing Partnerships with Expert ISPs

Substantial new funding will likely entice a range of established and new ISPs to apply for support from the state. To maximize the impact of its investments, Ohio should seek to partner primarily or exclusively with experienced ISPs – *i.e.*, service providers that have a proven track-record of building out to unserved areas; of maintaining and improving those networks over time; and of securing those systems. Smaller, less established ISPs simply do not possess such expertise.

This same dynamic should also apply to non-traditional providers seeking to deploy new broadband network infrastructure. As previously discussed, the most impactful role of these entities, which include municipalities and electric utilities, is as a last resort in truly unserved areas.

The benefits of public-private partnerships (PPPs) that involve established entities are myriad and include:

- *Less risk.* A primary benefit of using a PPP to enhance broadband connectivity is that it greatly reduces a city or state’s risk exposure. Whereas building a GON to address connectivity needs entails significant risk – in the form of debt, deploying a successful business model, keeping up with long-term operating expenses, having to compete with nimbler private ISPs, etc. – a PPP allows a city to offload much of that risk to the private partner. Experienced private partners have significant experience shouldering and managing such risks.
- *Optimized investment.* Cities and states that leverage public resources to seed PPPs are better able to ensure that those scarce dollars are put to their best uses. Oftentimes, PPPs require significantly less capital to achieve connectivity goals than investing in a GON or similar government-led project. PPPs are thus much more efficient, allowing a city to use funds for other, more pressing needs (*e.g.*, modernizing public infrastructure, improving schools, bolstering public safety, shoring up pension funds, etc.).
- *More quickly achieve connectivity goals.* Impactful PPPs target specific areas and deploy resources to support network expansion or the deployment of demand-side programs. Such precision in the deployment of resources helps to achieve connectivity goals more quickly. In contrast, building a new network from scratch or deploying a GON takes many years, and there is no guarantee of success given the rocky history of such networks.
- *Position government as convener.* The optimal role for public entities at both the city and state level is as a convener of stakeholders. Bringing parties together enhances planning and strategy development and ensures that whatever solutions are ultimately deployed have buy-in from all involved. The converse –

when a city seeks to go it alone or attempts to force ISPs to engage in certain activities – is rarely productive.

4.4 Closing the Adoption Gap

For most Ohioans, a broadband connection is readily available. For those who choose not to adopt despite such ready access, the state should invest considerably more in programming aimed at helping to convince them to come online.

Addressing such demand-side issues is arguably the most important broadband issue facing the state. It is also the least understood broadband-related issue because, among other things, it lacks a single “solution.” Serving unserved households is relatively straightforward by comparison and generally follows a consistent template of (1) finding the needed level of public investment to make service in an area “economic” and (2) using that funding as a means of forging PPPs with expert private firms to extend networks into those areas. Addressing adoption-related issues is significantly more complex because the barriers impeding more robust adoption tend to differ slightly from user group to user group. For some, the cost of a connection and/or computing device might be the sole barrier. However, others might not perceive broadband as useful, thereby making it seem expensive at almost any price. Still others view broadband as dangerous, causing them to remain offline to preserve their privacy.

Fortunately, numerous best practices have emerged over the last decade that can guide these efforts across Ohio.

If the cost of a connection and/or a computing device is a major barrier to adopting broadband, then the state, along with partners in the public, private, and nonprofit sectors, should do more to promote the availability of the federal Affordable Connectivity Program (ACP). The ACP makes available monthly subsidies of up to \$30 and resources to offset device costs to qualifying low-income households.⁸⁸ As of December 2021, some 481,000 Ohioans had availed themselves of the Emergency Broadband Benefit program, the ACP’s predecessor.⁸⁹ With thousands more eligible, resources should be invested in helping enroll even more people in this program.

In addition, Ohio – and other states – should consider supplementing the federal ACP award with additional funds stemming from ARPA, IIJA, the state’s general revenues, or some combination of the three. Both ARPA and IIJA allow states to use available broadband funds for such demand-side activities. Public officials should also work with ISPs to promote the availability of low-cost plans – like Comcast’s Internet Essentials, Charter’s

⁸⁸ Federal Communications Commission, Affordable Connectivity Program, <https://www.fcc.gov/acp>.

⁸⁹ USAC, Emergency Broadband Benefit Program Enrollments and Claims Tracker (as of Dec. 31, 2021), <https://www.usac.org/about/emergency-broadband-benefit-program/emergency-broadband-benefit-program-enrollments-and-claims-tracker/>.

Spectrum Internet Assist, and AT&T's Access. These programs have helped bring millions of Americans online over the last few years.⁹⁰

For those who see broadband as irrelevant, unnecessary, or potentially dangerous, the state should invest in outreach programs tailored to respond to non-adopters' various concerns about using the internet. Such targeted interventions have proven to work when they are deployed at the hyper-local level and reflect the specific needs and concerns of under-adopting groups (e.g., senior citizens).⁹¹ These programs should be paired with digital literacy training to equip new users with the skills and confidence needed to fully harness the power of broadband. Some \$2.75 billion in funding expressly earmarked for these kinds of activities is included in the IJA, providing Ohio and every other state with a robust new source of funds to pursue these critical activities.⁹²

Such a multifaceted focus on demand-side issues could help to bolster adoption and meaningful uses of broadband in Ohio's larger cities, where broadband is available, but where pockets of under-adoption exist. The following case studies examine these issues in some of Ohio's largest cities.

4.4.1 *Cleveland Case Study*

Broadband adoption rates in Cleveland have plateaued at around 70% for the last few years. In 2019, broadband adoption across the entire city was 69.3%, similar to the 70% rate in 2017 and not much higher than the 67.7% rate in 2016.⁹³ On the supply side, broadband has been universally available in Cleveland since at least 2015, when FCC data showed that 99.8% of households could access a connection of at least 25/3 Mbps.⁹⁴ That figure rose to 100% of households in 2018 and has remained there ever since.⁹⁵

What is the best way to address this gap between robust availability and adoption?

Some have sought to blame ISPs for failing to deliver more competitive offerings, a claim that defies the data. Competitive choice in Cleveland has risen steadily over the last few years, with nearly 70% of households currently able to select from at least two wireline

⁹⁰ See, e.g., *Internet Essentials Progress Report*, Comcast (March 2021), https://update.comcast.com/wp-content/uploads/sites/33/dlm_uploads/2021/03/IE-ProgressReport_FINAL.pdf.

⁹¹ See, e.g., Charles M. Davidson, Michael J. Santorelli & Thomas Kamber, *Toward an Inclusive Measure of Broadband Adoption*, 6 *International Journal of Communication* 2555-2575 (2012), <http://comms.nyls.edu/ACLP/Davidson-Santorelli-Kamber-Toward-an-Inclusive-Measure-of-Broadband-Adoption-IJOC-2012.pdf>.

⁹² IJA § 60301 *et seq.*

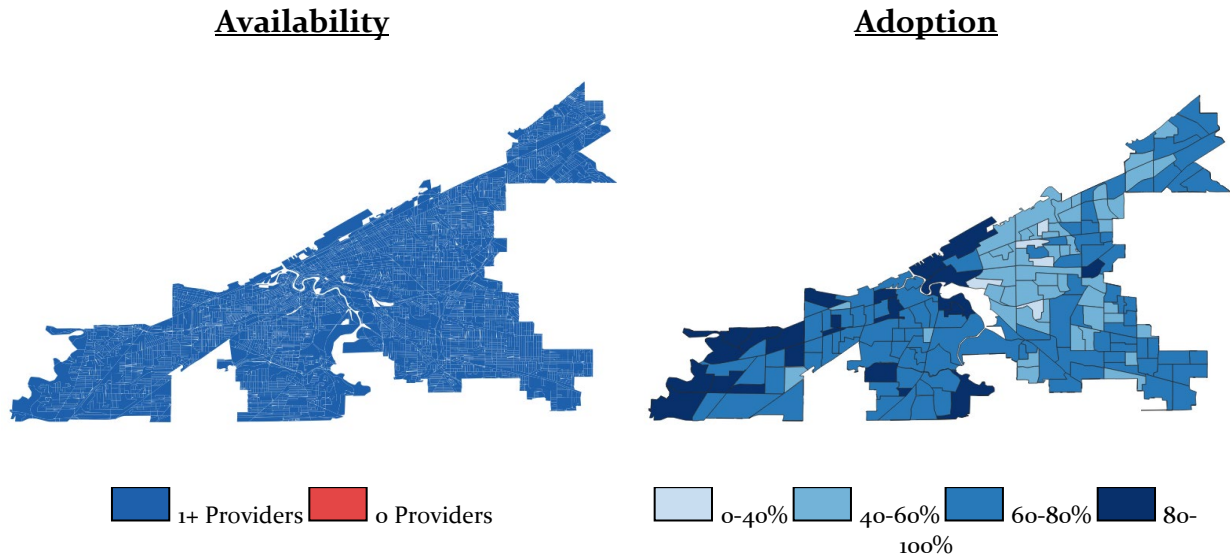
⁹³ ACLP Analysis of ACS Data (on file).

⁹⁴ ACLP Analysis of FCC Form 477 Data (on file).

⁹⁵ *Id.*

providers of 25/3 Mbps service; that figure is up from less than 4% in 2015.⁹⁶ In addition, as noted above, the availability of multiple providers of mobile broadband service – via 4G and 5G networks – further increases the number of choices available to Clevelanders. Ultimately, though, focusing just on the number of broadband providers in Cleveland – or in any city – makes little sense when broadband abounds and when people are actively choosing not to adopt. **Figure 4** illustrates this dynamic.

Figure 4 – Household Broadband Availability and Adoption in Cleveland⁹⁷



A better approach might be to focus on addressing barriers to broadband adoption. At the top of many non-adopters’ list is likely the affordability of a connection and a computing device. As noted above, there are several options for offsetting the cost of a broadband connection and access device – including the ACP and via a low-cost package from an ISP. Additional funding for demand-side activities – *e.g.*, topping up the federal ACP – could be steered to Cleveland and other cities in Ohio by the state via its grant program, the size of which is poised to grow exponentially due to the arrival of ARPA and IIJA funds. Supplementing these offerings with on-the-ground digital literacy development programs

⁹⁶ ACLP Analysis of FCC Form 477 Data (on file).

⁹⁷ ACLP Analysis of FCC Form 477 and ACS Data (on file).

In the availability map: broadband is defined as service at or above the FCC’s 25/3 Mbps threshold; Census blocks with both zero residential providers and zero households are omitted; color coding indicates the number of ISPs providing residential 25/3 Mbps connectivity.

In the adoption map, color coding indicates the proportion of households that have a broadband subscription.

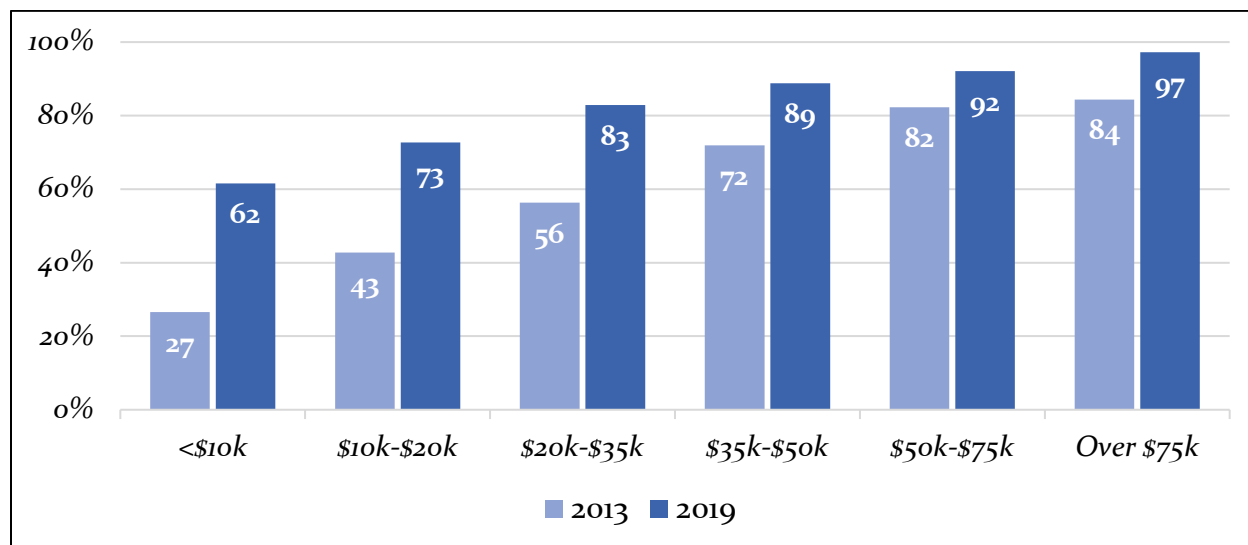
has proven to help close digital divides in cities like Cleveland and could be worthy of continued expansion in the city and beyond.⁹⁸

4.4.2 Cincinnati Case Study

Similar dynamics are evident in Cincinnati, where every household in the city has had access to a broadband connection for the last several years.⁹⁹ Competition has also improved markedly: about 90% of households can choose from two or more wireline broadband options, up from 58% in 2015.¹⁰⁰ With multiple options for 4G mobile broadband available to every person in the city, and with additional 5G options quickly coming to market, households across Cincinnati can choose from several different options for accessing the internet.

As in Cleveland and other large cities in the state, broadband adoption rates in certain communities continue to lag in Cincinnati. Overall, broadband adoption in Cincinnati was 86% in 2019, mirroring the state average of 85%.¹⁰¹ Adoption rates tend to lag most among lower-income households (see Figure 5).

Figure 5 – Broadband Adoption by Household Income Category – Cincinnati¹⁰²



⁹⁸ See, e.g., Lara Fishbane and Adie Tomer, *How Cleveland is Bridging Both Digital and Racial Divides*, March 9, 2020, Brookings – The Avenue blog, <https://www.brookings.edu/blog/the-avenue/2020/03/04/how-cleveland-is-bridging-both-digital-and-racial-divides/>.

⁹⁹ ACLP Analysis of FCC Form 477 (on file).

¹⁰⁰ ACLP Analysis of FCC Form 477 (on file).

¹⁰¹ ACLP Analysis of ACS Data (on file).

¹⁰² ACLP Analysis of ACS Data (on file).

The pandemic greatly exposed these gaps in broadband adoption, particularly in low-income households with school-age children. To address these divides, local service providers like Charter and Cincinnati Bell provided students, their families, and educators with discounted broadband options and access to low-cost computing devices.¹⁰³ Since then, these and other ISPs have continued to work locally to bring more residents online. For example, Cincinnati Bell partnered with the Greater Cincinnati Foundation and several other groups to provide free broadband access to every public-school student in the city for the 2020-2021 school year.¹⁰⁴ More recently, the federal ACP has become available, helping to greatly offset the monthly subscription price for thousands of families in the city.

Unlike in Cleveland, Cincinnati appears to lack a cohesive strategy for bolstering digital literacy skills. Instead, efforts to make available adoption-oriented programming targeted at different user groups – *e.g.*, students; working-age adults; seniors – have been mostly ad hoc in nature. This highlights an opportunity for local officials, ISPs, community groups, and other stakeholders to marry up resources and expertise in an effort to deploy a comprehensive digital literacy framework. Coupled with the ACP subsidy and related low-income programs maintained by Charter and Cincinnati Bell, a holistic and partnership-oriented approach could help shrink the city’s digital divide more rapidly, bringing additional households online and connecting them to the transformative power of broadband.

4.4.3 *Columbus Case Study*

Broadband connectivity in the state capital is robust. Every household in the city has had access to a wireline broadband connection for several years; as of 2019, 97% of households could choose from at least two wireline broadband connections.¹⁰⁵ Columbus was also among the first markets in the state to receive 5G service, providing residents with additional choices for accessing the internet.¹⁰⁶

¹⁰³ See, *e.g.*, Governor DeWine, Lt. Governor Husted Praise Internet Providers for Commitment to “Keep Americans Connected” Pledge, March 13, 2020, Office of the Governor of Ohio, <https://governor.ohio.gov/wps/portal/gov/governor/media/news-and-media/dewine-husted-praise-internet-providers-for-commitment-to-keep-americans-connected-pledge>.

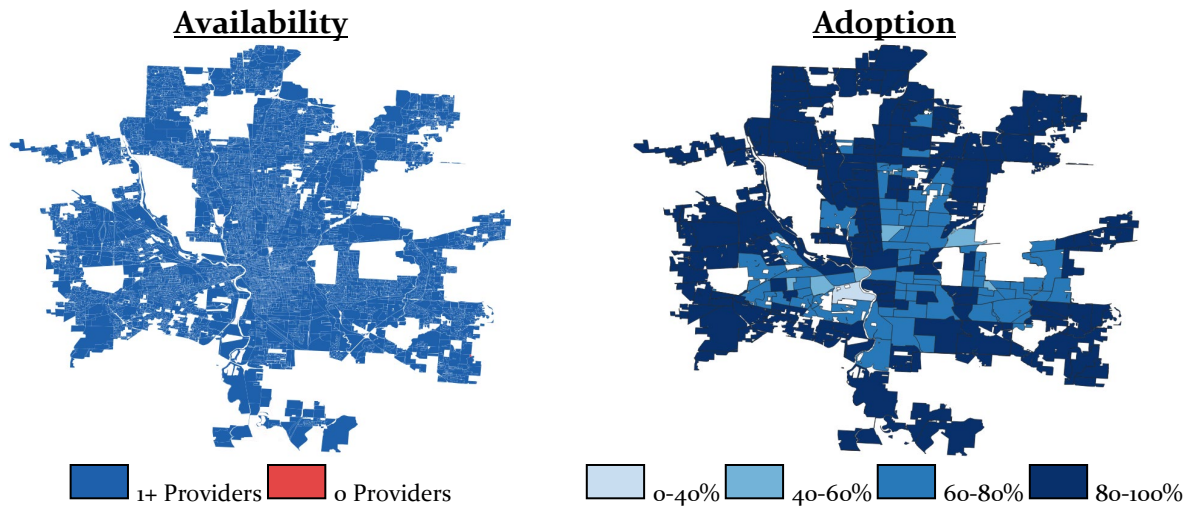
¹⁰⁴ See Greater Cincinnati Foundation, *Fifth Third Foundation, Accelerate Great Schools, Donors Close Digital Divide for Cincinnati Public Schools Students*, Aug. 25, 2020, Greater Cincinnati Foundation, <https://www.gcfndn.org/news/greater-cincinnati-foundation-fifth-third-foundation-accelerate-great-schools-donors-close-digital-divide-for-cincinnati-public-schools-students/>.

¹⁰⁵ ACLP Analysis of FCC Form 477 (on file).

¹⁰⁶ See, *e.g.*, Chris White, *Verizon Launching 5G Service in Columbus Monday*, Dec. 23, 2019, ABC6.com, <https://abc6onyourside.com/news/local/verizon-launching-5g-service-in-columbus-monday>.

Broadband adoption is also healthy across the city: overall adoption rose to 90% in 2019, outpacing the state average of 85%.¹⁰⁷ However, under-adoption is evident among lower-income households and in well-defined pockets across the city (see **Figure 6**).

Figure 6 – Household Broadband Availability and Adoption in Columbus¹⁰⁸



As in Cleveland and Cincinnati, the conditions evident in Columbus – universally available broadband; robust competitive choice; well-defined pockets of under-adoption – lend themselves to impactful interventions on the demand-side. Responses to date, however, have focused mostly on the supply-side. For example, a June 2020 assessment prepared for the city recommended a range of supply-side interventions, many of which are GON-like in nature, even though the report concluded that the digital divide in Columbus was “not the result of a gap in infrastructure.”¹⁰⁹

Nevertheless, the city has pursued a strategy of attempting to remedy clear demand-side issues via supply-side interventions. Specifically, Columbus launched a pilot program that leveraged city-owned fiber to deliver low-cost internet access – 50 Mbps for \$15/month – to

¹⁰⁷ ACLP Analysis of ACS Data (on file).

¹⁰⁸ ACLP analysis of FCC Form 477 and ACS Data (on file).

In the availability map: broadband is defined as service at or above the 25/3 Mbps threshold; Census blocks with both zero residential providers and zero households are omitted; color coding indicates the number of ISPs providing residential 25/3 Mbps connectivity.

In the adoption map, color coding indicates the proportion of households that have a broadband subscription.

¹⁰⁹ *Broadband Access in City of Columbus, Ohio – Assessment and Strategies for Addressing the Broadband Gap*, at p. 6, The Columbus Foundation (June 2020), <https://columbusfoundation.org/umbraco-media/6661/broadband-access-in-city-of-columbus-2020-06-30.pdf>.

several hundred households.¹¹⁰ Last-mile connectivity is delivered wirelessly.¹¹¹ Even though cable ISP Charter, for example, offers a similarly cost-effective option for qualifying households, and even though the federal ACP has dramatically reduced service costs from all ISPs, some think the Columbus pilots “represent exciting opportunities to introduce new, scalable, low-cost options into the market.”¹¹² Whether these experiments are viable over the long-term, particularly in the face of competition from wireline and wireless ISPs, remains to be seen.

With discussions ongoing about how to spend federal stimulus funds, and whether and how those funds should be used for broadband, local stakeholders might be best served collaborating on a plan to address the city’s demand-side issues. There is evidence that steps have already been taken in this direction, in particular meetings among local policymakers and ISPs to identify how best to maximize available ACP funding to help close the local digital divide.¹¹³ Focusing on these issues and channeling any available funding to address affordability concerns and bolster digital literacy skills could help to significantly improve digital equity and finally close the digital divide in Columbus.

4.4.4 Dayton Case Study

Like in many of Ohio’s larger cities, broadband is universally available in Dayton, and competitive choice is increasing – the percentage of households able to choose from at least two wireline providers of broadband has increased from less than 3% in 2015 to about 66% in 2020.¹¹⁴ Overall broadband adoption was 80% in 2019.¹¹⁵ Differences in adoption rates by income group are significant: nearly 90% of households with annual incomes over \$75,000 had adopted broadband in 2019, compared to about 70% of households with incomes below \$35,000 (see **Figure 7**).¹¹⁶ In a city where annual median income is approximately \$32,540 and the poverty rate is over 30%, the affordability of broadband looms largest as a barrier to adoption.¹¹⁷

¹¹⁰ See, e.g., *Franklin County Digital Equity Coalition Framework*, at p. 8, March 2021, <https://www.columbuslibrary.org/sites/default/files/uploads/docs/Franklin%20County%20Digital%20Equity%20Framework.pdf> (“*Franklin County Digital Equity Framework*”).

¹¹¹ See, e.g., Maren Machles, *Franklin County, Ohio Aims to Address Digital Equity in Urban Areas*, April 22, 2021, MuniNetworks.org, <https://muninetworks.org/content/franklin-county-ohio-aims-address-digital-equity-urban-areas>.

¹¹² *Franklin County Digital Equity Framework* at p. 8.

¹¹³ See, e.g., Hayleigh Colombo, ‘*Cautious Optimism*’ in Columbus About Influx of Federal Money to Tackle Digital Divide, May 7, 2021, NBC4.com, <https://www.nbc4.com/news/columbus-business-first/cautious-optimism-in-columbus-about-influx-of-federal-money-to-tackle-digital-divide/>.

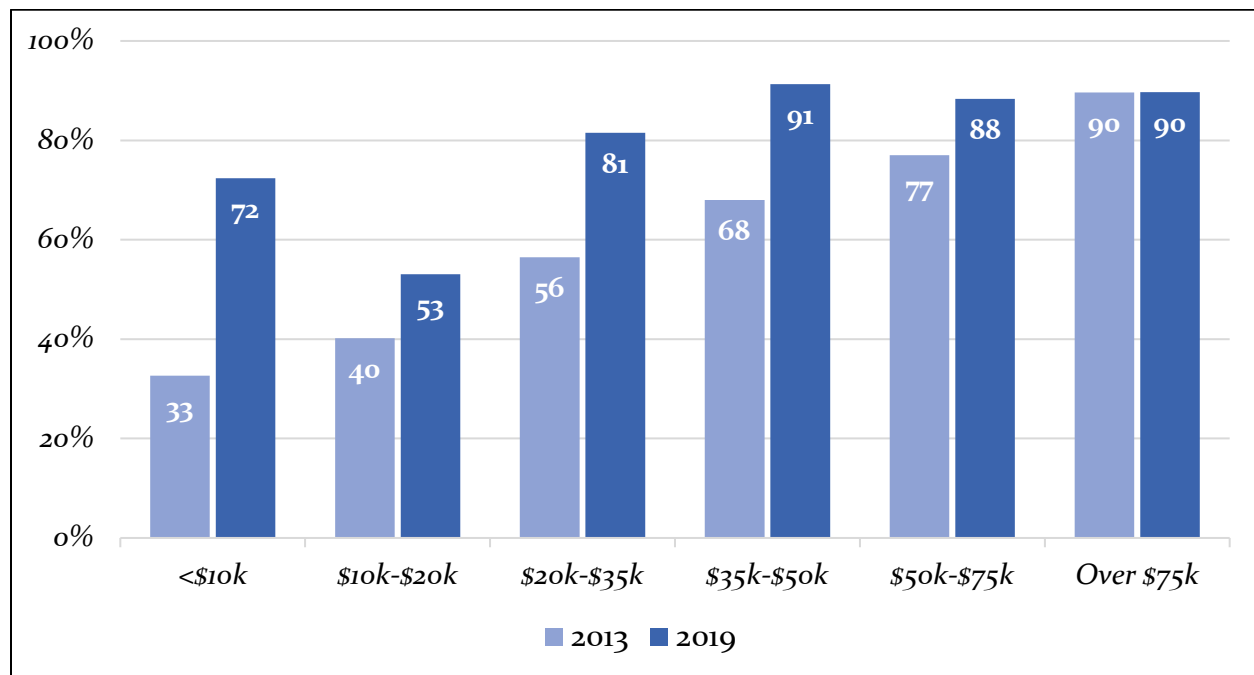
¹¹⁴ ACLP Analysis of FCC Form 477 (on file).

¹¹⁵ ACLP Analysis of ACS Data (on file).

¹¹⁶ ACLP Analysis of ACS Data (on file).

¹¹⁷ US Census Quick Facts, Dayton city, OH, <https://www.census.gov/quickfacts/daytoncityohio>.

Figure 7 – Broadband Adoption by Household Income Category – Dayton



A variety of efforts on both the supply-side and demand-side are underway in Dayton to address these connectivity issues.

On the supply-side, Dayton invested \$2 million in federal CARES Act funds to provide free Wi-Fi service and distribute hundreds of laptops in five public housing communities.¹¹⁸ This aligns with a broader strategy aimed at leveraging public assets to support new networks that can compete with incumbent ISPs in an effort to drive down “high” prices.¹¹⁹ Unfortunately, the track record of such GON-like initiatives in Dayton is poor. About 15 years ago, Dayton “provided free Internet access downtown and unsuccessfully tried to expand coverage to the entire city,” resulting in a failed municipal Wi-Fi network.¹²⁰ Moreover, the ability of public Wi-Fi to serve as a long-term connectivity solution is unproven, especially in a city where numerous other broadband options are available and when a significant monthly subsidy is available via the ACP.

On the demand-side, Montgomery County, of which Dayton is the seat, has identified myriad digital literacy gaps and attempted to marshal local resources to assist in closing

¹¹⁸ See, e.g., Bonnie Meibers, *Ohio Communities Use Relief Funds to Install Public Wi-Fi*, Oct. 16, 2020, Dayton Daily News, <https://www.governing.com/community/ohio-communities-use-relief-funds-to-install-public-wi-fi.html>.

¹¹⁹ See, e.g., *Digital Equity*, Montgomery County, <https://nextcenturycities.org/wp-content/uploads/BCC-Final-Presentation-.pdf> (“Montgomery County Digital Equity”).

¹²⁰ Cornelius Frolik, *Dayton, Ohio, to Take Another Run at Public Internet*, Aug. 31, 2020, Dayton Daily News, <https://www.govtech.com/network/dayton-ohio-to-take-another-run-at-public-internet.html>.

them.¹²¹ Many of the entities providing digital literacy services are located in Dayton and offer free programs, mostly in libraries.¹²² Recently, the Dayton library system partnered with Charter to raise awareness of the importance of broadband and to provide free broadband access for several months; thereafter, participants could enroll in Spectrum Internet Assist to continue forward with low-cost broadband service.¹²³

Given the considerable demand-side challenges in Dayton, the city, like Cleveland, might benefit most from a coordinated effort among all local stakeholders to develop and implement a comprehensive initiative to close the digital divide. Such a campaign focused on targeting non-adopters was proposed in 2017; it does not appear that Dayton moved forward with it.¹²⁴ With federal funding available for use in support of these kinds of demand-side initiatives, now might be the time for Dayton to focus all available resources on this set of issues.

4.5 Maintaining a Level Playing Field

With a sizable infusion of funding available to support broadband deployment to unserved areas and a growing array of ISPs capable of offering service – traditional providers like cable, telecom, mobile, and fixed wireless; emerging providers like low-earth-orbiting satellite firms; and non-traditional providers like GONs and electric utilities – every state, including Ohio, must ensure that these myriad entities compete on similar terms and conditions. Failure to address the inherent advantages of certain providers could undermine the incentives of all ISPs to invest and compete for customers.

What kinds of advantages could tilt the playing field? The inherent advantages of both GONs and electric utilities are illustrative. Foremost among these is the ability to cross-subsidize broadband networks by tapping guaranteed revenue streams from captive customer bases. A local government can do this by propping up a struggling GON with infusions from a general fund, which is comprised of tax receipts from residents and businesses. This is a common occurrence with GONs, as illustrated by the continued subsidization by Fairlawn of its network (see section 3, above).¹²⁵ A utility can do this by allocating some fiber-related costs to its electric business (*e.g.*, for smart grid purposes),

¹²¹ *Montgomery County Digital Equity*.

¹²² *Id.*

¹²³ See, *e.g.*, Gwen Owen, *Dayton Metro Library Bridges the Digital Divide with GET CONNECTED Program*, Dec. 14, 2020, Dayton Metro Library, <http://www.daytonmetrolibrary.org/news/3871-getconnected-announced>.

¹²⁴ *Community Technology Action Plan, City of Dayton, Ohio*, at p. 48, Connected Nation (July 2017), <https://connectednation.org/wp-content/uploads/sites/15/2018/04/city-of-dayton.pdf>.

¹²⁵ For additional examples, see, *e.g.*, Charles M. Davidson & Michael J. Santorelli, *Understanding the Debate over Government-Owned Broadband Networks: Context, Lessons Learned, and a Way Forward for Policy Makers*, ACLP at New York Law School (June 2014), <http://comms.nyls.edu/ACLP/ACLP-Government-Owned-Broadband-Networks-FINAL-June-2014.pdf>.

which can be recouped in rates charged to captive electric customers.¹²⁶ Local governments and electric utilities also oftentimes own ROW and other assets that are critical to broadband deployment. When they decide to build a network, a local government or utility can grant itself free, priority access to those assets while charging other ISPs fees and putting their permit applications through the standard review process.

In recognition of these kinds of advantages, state legislatures across the country, including in Ohio, are beginning to adjust legal and regulatory frameworks to assure a level playing field among all ISPs. As noted above, Ohio has begun doing this in the context of electric cooperatives, requiring those entities to provide ISPs with nondiscriminatory access to their ROW. Additional adjustments that have been made in other states and that might be explored in Ohio and elsewhere include:

- Explicit bans of cross-subsidization by utilities offering broadband service.¹²⁷
- Focusing utility broadband efforts on unserved areas.¹²⁸
- Requiring local governments and utilities to develop feasibility studies and financial plans for their broadband projects to ensure that they are sustainable and won't require subsidies to keep afloat.¹²⁹
- Regular audits and financial reporting to enhance accountability, protect against cross-subsidization, and guard against corruption.¹³⁰

A level playing field also requires a technology neutral approach to broadband connectivity. This concept revolves around an all-of-the-above mindset vis-à-vis bringing broadband to unserved and underserved areas. Some argue that all new broadband networks should be fiber. Such a perspective artificially narrows the solutions available to broadband challenges. Fixed wireless, for example, has played and will continue to play a key role in plugging availability gaps and enhancing competitive choice in Ohio and other states across the country.¹³¹ As previously discussed, 5G mobile broadband is quickly emerging as a competitor of wireline networks. Emerging satellite services could very well deliver

¹²⁶ See, e.g., George S. Ford, *Electricity Rates and the Funding of Municipal Broadband Networks: An Empirical Analysis*, 102 Energy Economics (Oct. 2021), <https://www.sciencedirect.com/science/article/pii/S0140988321003613?dgcid=author>.

¹²⁷ See, e.g., AR Code § 23-18-806; GA Code § 46-3-200.2; KY Rev. Stat § 278.2201.

¹²⁸ See, e.g., MN Stat. § 429.021; VA Stat. § 56-585.1:9.

¹²⁹ See, e.g., MS Code § 77-17-5.8; WV Stat. § 24-2-1P(f); FL. Stat. § 350.81(2)(c).

¹³⁰ See, e.g., IN Code § 32-30-16-17(c); MS Code Ann. § 77-17-15; SC Code § 33-49-150(b).

¹³¹ See, e.g., Joan Engebretson, *RDOF Will Put Gigabit Fixed Wireless to the Test*, Dec. 18, 2020, Telecompetitor, <https://www.telecompetitor.com/rdof-will-put-gigabit-fixed-wireless-to-the-test/>.

service on par with wireline networks in the not-too-distant future.¹³² And cable, the most popular wireline service in the country, continues to increase download and upload speeds to reflect actual customer demand and usage patterns.

Policy should thus be supportive of *all* platforms capable of delivering broadband speeds.

¹³² See, e.g., Michael Kan, *Starlink: Here are the Download Speeds You Can Expect Across North America*, May 5, 2021, PCMag, <https://www.pcmag.com/news/starlink-here-are-the-download-speeds-you-can-expect-across-north-america>.