

DATE: April 4, 2018
TO: Interested Parties
FROM: Michael Cnossen, Fiscal Analyst
RE: Broadband Internet

Introduction

As the internet has expanded its presence into the center of our working and personal lives, it is increasingly viewed as a necessity rather than a luxury. Despite steady progress in the availability and speed of internet service networks, there are calls for faster and more reliable broadband internet, particularly to underserved rural areas.

The disparity between urban and rural internet capabilities has been called the digital divide, and many argue it threatens the strength of Michigan's rural businesses, schools, farms, and healthcare. In response to these concerns, both public and private solutions are being sought to overcome the costly challenges of achieving universal access to advanced broadband internet.

Recent efforts in Michigan to expand access have included leveraging private investment through federal grants, small business loan support, financing awards from the Michigan Strategic Fund (MSF), municipal-provided broadband services, a partnership between the Michigan Public Service Commission and the non-profit Connect Michigan, and other local efforts. While some disagreement exists over what reasonable and timely deployment of broadband services entails, all agree a significant gap exists between Michigan's current status and the goals set forth in Governor Snyder's 21st Century Infrastructure Commission Report, which aim to make Michigan a top-five state for broadband access.

This memo provides background on broadband internet technology; federal, state, and local initiatives; and Michigan's status and outlook as they relate to investing in broadband deployment.

Broadband Internet Technology

Broadband internet has become a catch-all term to refer to most forms of internet delivery. It includes Digital Subscriber Line (DSL), cable, and fiber optic, collectively called fixed services, along with satellite and mobile LTE networks. It does not include dial-up service.

Several metrics are used to measure internet service quality with megabits per second (Mbps) the most widely used for marketing and service benchmarking. In 2015, the Federal Communications Commission (FCC) set the standard of 25 Mbps download speed and 3 Mbps upload speed (25Mbps/3Mbps) as the benchmark speed to be achieved under its statutory guidance to "encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans."¹

Although mobile LTE networks fail to reach the 25Mbps/3Mbps standard, the FCC has deemed mobile broadband to be as essential as fixed services in providing indispensable tools for daily life. As such, the FCC includes mobile broadband in its definition of advanced telecommunications and thereby

¹ 2016 Broadband Progress Report. Federal Communications Commission. January 2016

covers mobile broadband under its statutory mandate. However, the FCC excludes satellite services because its current maximum speeds fall far short of the benchmark speed.

Demand and Challenges for Broadband Access

Advanced internet services (25Mbps/3Mbps and faster) are more readily available in urban and more densely populated areas due to economies of scale and the lower marginal costs of adding new customers. Because these advantages are not present for rural customers, the quality and availability of advanced internet service lags far behind.

Lack of advanced internet services can result in lower social, cultural, and economic engagement among rural residents. Rural businesses, schools, and governments may have a competitive disadvantage compared to their more urban counterparts. Some suggest the disparity may even limit the ability of rural communities to attract and retain residents.

Advanced rural broadband could lead to benefits such as advances in maintaining infrastructure systems and enhanced technological tools for farmers and agricultural businesses participating in local and global commodity markets. These capabilities, and potential future ones, would come from the extensive connecting of the physical and digital worlds and the emerging technologies that result. This ever-increasing connectivity is referred to as the *Internet of Things*.

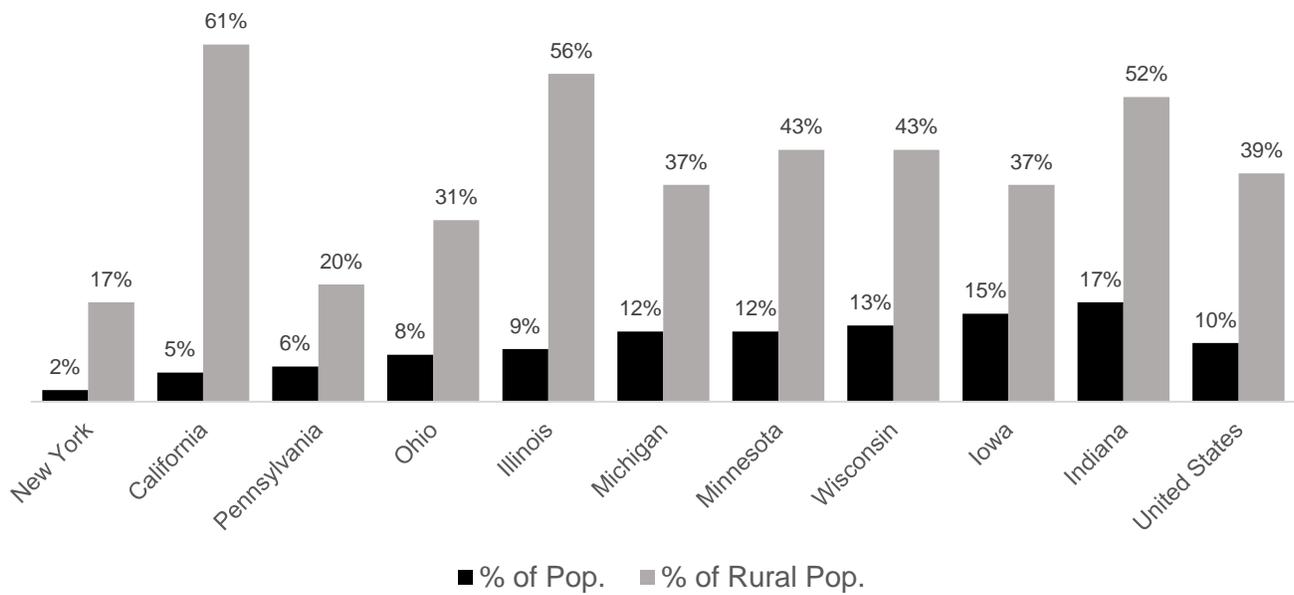
Despite there being demand for advanced broadband among rural residents, the high cost of connecting broadband infrastructure, or backhaul, greatly hinders private internet service providers' (ISPs) ability to deliver affordable access. ISPs in rural areas have reported that 80% of their costs go towards acquiring backhaul. To help address this challenge, the FCC is directed by statute to, when determined necessary, accelerate the deployment of advanced telecommunications capability "by removing barriers to infrastructure investment and by promoting competition in the telecommunications field."² To facilitate this, the FCC has worked to remove infrastructure barriers through the Connect America Fund (CAF) which it has used to subsidize the costs of providing service to rural areas for several of the largest telecommunications companies. Despite this assistance, service in rural areas often continues to be limited to only 10Mbps/1Mbps and less, or remains unavailable.

Broadband in Michigan

Roughly half of all U.S. states have a state broadband office. Michigan is among those that do not. However, various offices within state government, local governments, non-profit, and education organizations have been involved with improving broadband services beyond private market offerings. Their combined efforts have contributed to greater broadband access in Michigan. According to data from the State of Michigan's Open Government Initiative, only 1% of Michigan residents do not have access to broadband internet as of 2015. However, this percentage includes service speeds of 10Mbps/1Mbps and slower that do not meet the FCC's recommended benchmark. When the 25Mbps/3Mbps speed is used for the definition of access, 12% of all Michigan residents and 37% of rural residents are without access (See [Figure 1](#)). [Figure 2](#) shows the geographic distribution of 25Mbps/3Mbps access in Michigan.

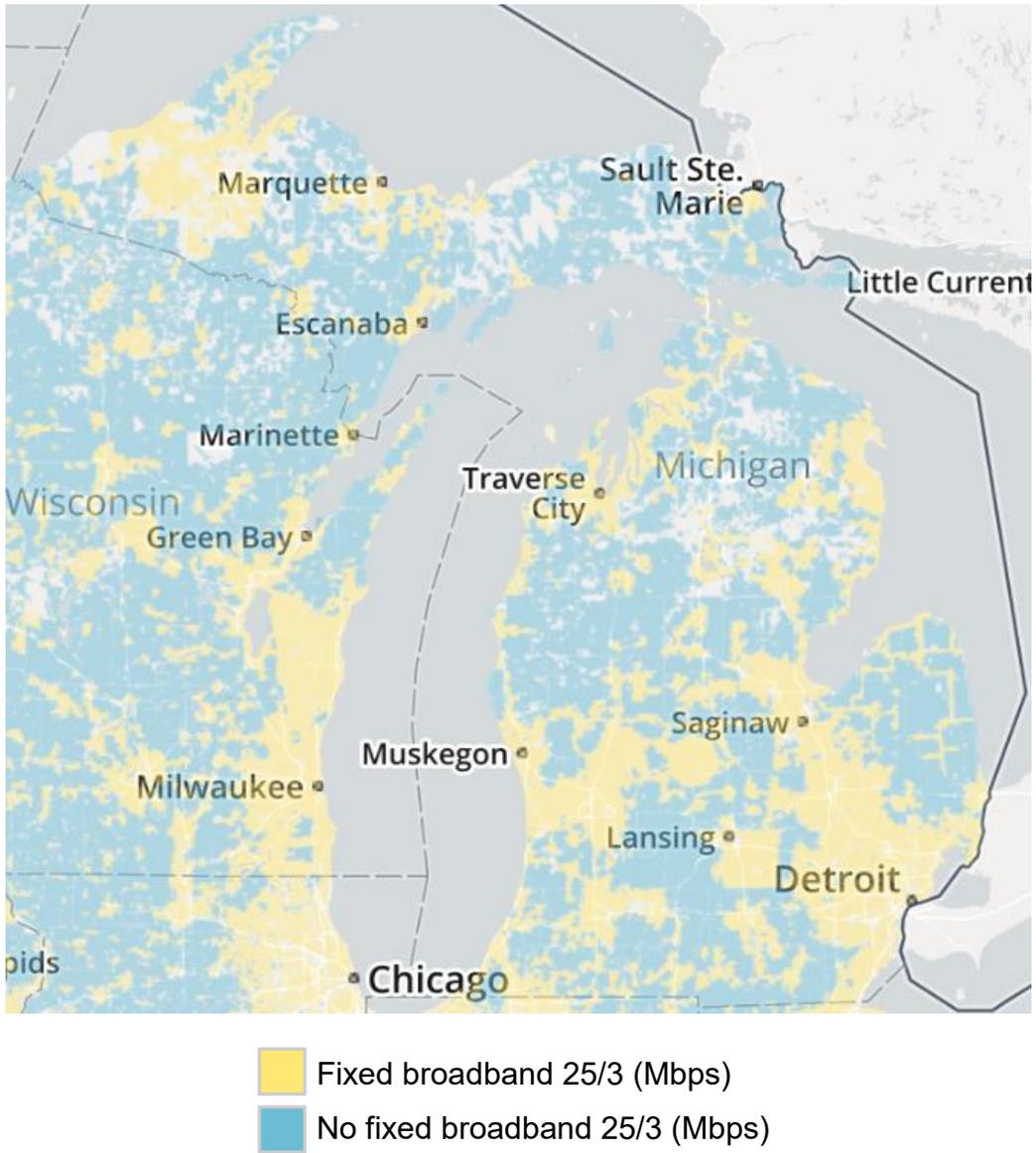
² 2016 Broadband Progress Report. Federal Communications Commission. January 2016

Figure 1. State Populations without Access to 25Mbps/3Mbps Fixed Broadband



Source: Federal Communications Commission, 2016 Broadband Progress Report

Figure 2. Distribution of 25Mbps/3Mbps Fixed Broadband Access in Michigan



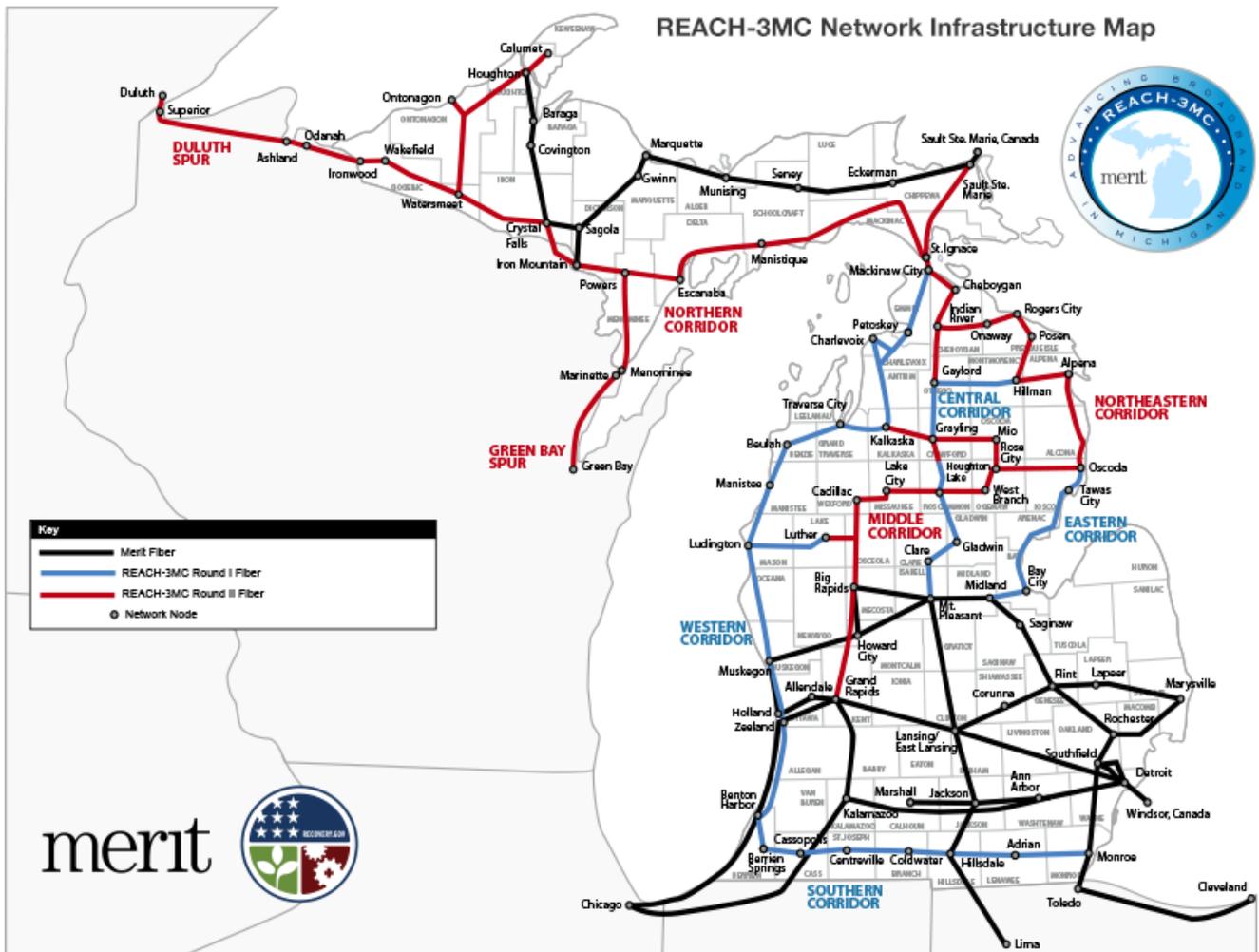
Source: Federal Communications Commission, 2016 Broadband Progress Report

In 2002, Governor Engler and the Legislature approved the creation of the Michigan Broadband Development Authority (MBDA) with Public Act 49 of 2002. MBDA was created within the Department of Treasury to assist broadband expansion by financing broadband infrastructure. MBDA received \$50.0 million from the Michigan State Housing Development Authority to issue loans to incentivize private investment in broadband expansion. After nearly four years in operation, MBDA was disbanded after failing to recover \$14.5 million in loans.

The State of Michigan has contributed state funds towards the expansion of broadband. The Michigan Strategic Fund (MSF) has committed approximately \$8.4 million GF/GP to three projects over the last several years. The largest award loaned \$6.5 million in 2017 to Northern Michigan University to build and operate a broadband network to bring high-speed broadband service to every city and township in the Upper Peninsula by 2019. The network will be funded through low user fees and will include educational and professional services. The other two projects, totaling approximately \$1.9 million, provided loans to two private ISPs, Vergennes Broadband and ACD.net, to help extend their network infrastructure to underserved areas.

The Merit Network, which services the technology needs of Michigan's public universities, undertook the largest statewide investment in extending broadband infrastructure from 2010 to 2014. The project, known as the Rural, Education, Anchor, Community and Healthcare-Michigan Middle Mile Collaborative (REACH-3MC), was funded through a combination of \$128.0 million in federal grants from the National Telecommunications and Information Administration (NTIA) and \$30.0 million in private investments. The project constructed nearly 2,300 miles of high speed, 1 gigabit-per second (Gbps), or faster, fiber cable throughout the lower and upper peninsulas connecting Michigan's public universities with advanced internet capabilities (See [Figure 3](#)). The project also provided crucial open "middle mile" backhaul infrastructure to many rural areas. Middle mile lines act as main arteries or highways for broadband connection allowing private ISPs to provide affordable end-user connections by building "last mile" branching lines to rural communities.

Figure 3. Merit Network’s REACH-3MC “Middle Mile” High-speed Fiber Network



Source: web.merit.edu/meritformichigan/

Private entities, other than ISPs, have also invested in rural broadband in Michigan. Microsoft Corporation has partnered with Packerland Broadband, an Upper Peninsula-based ISP, to extend broadband service to more than 80,000 people across the Upper Peninsula and northeastern Wisconsin. The project is part of Microsoft's nationwide Rural Airband Initiative which aims to provide rural internet service using TV White Spaces spectrum. TV white space is unused spectrum in UHF television bands and is able to transmit signals over a considerable distance and through hilly terrain. The use of TV white space has been proposed as a much less expensive approach to providing rural broadband service than connecting homes by cable. However, internet service provided via TV white space often does not reach the 25Mbps/3Mbps benchmark.

Local governments also have organized to provide high-speed internet infrastructure to serve as broadband providers themselves and/or open their networks to allow ISPs to compete. The City of Holland and Village of Sebawaing have begun offering their residents high-speed fiber internet at competitive service fees. Sebawaing's network provides retail-only service which means the municipality is the only provider, and the network is not open to private third-party ISPs at a wholesale rate. Holland, on the other hand, provides an open network which also includes the municipality as a provider.

Other examples include Laketown Township, which has one of the lowest broadband access rates in the state, placing an \$8.7 million millage on a special election ballot in an effort to secure funds for a township-owned high-speed network. The millage failed with a 6% vote margin. In contrast, the residents of Lyndon Township did approve a \$7.0 million millage for its own network in August 2017 with a 32% vote margin. Other local governments reportedly have been considering various options for funding municipal-owned networks.

Other States' Broadband Funding

Nationally, state government funding for broadband efforts vary significantly. According to Strategic Networks Group, a private research and consulting firm, 13 states provide consistent annual broadband funding in their budgets with an average annual appropriation of \$668,000. The primary category of spending was planning and support followed by infrastructure.

On a larger scale, both New York and California have funded large broadband infrastructure projects that far exceed anything else undertaken nationally. In 2017, California approved a plan to spend \$66.0 million annually through 2022, for a total of \$330.0 million, on broadband infrastructure to provide advanced broadband to no fewer than 98% of California households. Funding is provided by California's 10-year old broadband program, the California Advanced Services Fund, which collects surcharges from end-user rate revenues collected by telecommunications carriers.

In 2017, New York launched a \$500.0 million initiative, Broadband for All, with the goal of providing every New York resident high-speed internet by 2018. The program is funded from a portion of the more than \$8.0 billion the state received from bank settlement agreements. In addition, New York leveraged an average of 26% in private investment from these funds and received \$170.0 million in grants from the FCC's CAF.

Michigan's Broadband and Spending Outlook

In December 2016, Governor Snyder's 21st Century Infrastructure Commission presented a detailed report which included more than 100 recommendations for improving Michigan's infrastructure over the coming decades. Among the goals outlined in the report was Michigan achieving top-five status among states for broadband access and adoption. This goal envisions all residents and businesses having 25Mbps/3Mbps fixed broadband access by 2020 and 100 Mbps download speed by 2024, as well as all geographic areas having access to 10 Mbps mobile broadband speeds by 2020 and 25 Mbps speeds by 2024.

To accomplish this, Governor Snyder released Executive Order (EO) No. 2018-2 on January 29, 2018, to create the Michigan Consortium of Advanced Networks (MCAN) as recommended by the 21st Century Infrastructure report. MCAN will be an advisory body consisting of non-paid, appointed expert members from the public and private sectors and various other stakeholders from state government and local communities. The EO charges MCAN to develop a strategic vision and roadmap to achieving universal broadband access by August 2018. The roadmap is expected to recommend the use of public-private partnerships along with other creative recommendations like investing in emerging technologies, workforce development, and adaptive state regulations and policies.

Funding for MCAN has not been appropriated. However, in a FY 2017-18 Supplemental Request (2018-3) included as part of the FY 2018-19 Executive Budget Recommendation, the Governor recommended \$20.0 million for advanced broadband expansion with \$13.6 million from the General Fund and \$6.4 million from the Michigan Infrastructure Fund. From these funds, approximately \$500,000 would directly support MCAN's activities while the remaining amount would be used to create competitive matching grants to implement the recommendations eventually developed in MCAN's roadmap.

Comparing the costs seen from the experiences of California and New York in providing universal broadband, a much higher level of investment in Michigan would appear necessary over the coming years to achieve its similarly defined goals. The creation of MCAN, an expert advisory panel to coordinate investments, could lead to significant cost savings towards achieving the Governor's goals by identifying barriers to private and local investments.

A well-developed statewide strategy could also assist in securing federal funds from the FCC, FTIA, or other agencies. In January 2018, the FCC's Chairman, Ajit Pai, proposed an additional \$500.0 million to CAF to incentivize continued broadband infrastructure advancement. A CAF reverse auction is scheduled to commence in July 2018 to determine how these funds will be distributed. Additionally, it is expected that additional federal funds will be made available for broadband infrastructure in the Trump Administration's final infrastructure plan.

Conclusion

As discussed in this memo, rural areas have inherent characteristics that have limited technological advancement, thereby creating a digital divide with their more urban counterparts. As the internet has changed many of the basic tools and methods required to successfully operate and compete in a highly connected world, the digital divide has become an increasing concern. What was once regarded by most as a private convenience suitably provided by the market, is now often viewed as a utility that requires public assistance to meet every citizen's needs.

The FCC, which has been investing in and facilitating broadband infrastructure expansion for years, is also responsible for interpreting the part of Federal statute that calls for the incentivized deployment of broadband to be "reasonable and timely." Now that states are beginning to plan and support the deployment of broadband, the task of interpreting "reasonable and timely" deployment will be implicit in the funding and policy decisions they make. Though steady advancements in broadband service and coverage are being made by ISPs, the divide between rural and urban areas will likely persist for the foreseeable future. The \$8.4 million GF/GP investments from the MSF suggests there is potential for public-private broadband partnerships in Michigan. Considering the scope of the vision of 21st Century Infrastructure report and the continuously accelerating rate of technological improvement, broadband internet investment may be a recurring question for the State of Michigan over the coming years.