E-CONNECTIVITY IN RURAL AMERICA:
PUBLIC RESEARCH UNIVERSITIES
ADVANCING DIGITAL INCLUSION

A concept paper by the Association of Public and Land-grant Universities
THE CHALLENGE IN BRINGING BROADBAND ACCESS TO RURAL AMERICA

“In today’s information-driven global economy, e-connectivity is not simply an amenity - it has become essential. E-connectivity, or electronic connectivity, is more than just connecting households, schools, and healthcare centers to each other as well as the rest of the world through high-speed internet. It is also a tool that enables increased productivity for farms, factories, forests, mining, and small businesses. E-connectivity is fundamental for economic development, innovation, advancements in technology, workforce readiness, and an improved quality of life. Reliable and affordable high-speed internet connectivity will transform rural America as a key catalyst for prosperity.”
— Report to the President of the United States by the Task Force on Agriculture and Rural Prosperity, October 2017

Rural residents and businesses need access to high-speed internet service. The challenges of long distances and low population and business density make access to high-speed internet and digital services even more important in the nation’s rural areas than in areas in which the doctor, the grocery store, the school, the theater, or a helpful neighbor are a short walk or drive away. Some observers have called digital services deficiencies in rural areas compared to urban areas a “rural penalty.”1 The penalty limits the ability of rural residents to effectively use information, eroding productivity, competitiveness, and quality of life.

But these same challenges of distance and density make it difficult for the private sector to offer high-speed internet services in rural areas using the same technologies and business models that they use in more densely populated places. Current technologies exhibit economies of scale and business models respond to those scale demands.

This reality has long been recognized. The Telecommunications Act of 1996 required the FCC to “encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans....”2 Thus, the FCC published its first broadband progress report in 1999, and the most recent report was issued in February 2018.3 The gaps revealed by these reports and others led to substantial investments in rural broadband. For example, the American Recovery and Reinvestment Act of 2009 included $7.2 billion for broadband grant and loan programs, with $2.5 billion administered by the U.S. Department of Agriculture to be focused in rural areas;4 the Rural Utility Service of USDA has invested 4.5 billion in grants and loans since 2001;5 and Congress has also funded other programs subsidizing broadband services such as e-rate, which requires providers

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3 https://www.fcc.gov/reports-research/reports/broadband-progress-reports
to serve libraries and schools, and the Rural Health Care Fund, which provides subsidies for telecommunications services for rural hospitals.

These investments have made a difference. According to the FCC, 69 percent of the population in rural areas has access to fixed terrestrial broadband at the benchmark speeds of 25 Mbps/3 Mbps in 2016, up from 46 percent in 2012. Mobile LTE with speed of 5 Mbps/1 Mbps reaches 98 percent of rural households, up from 63 percent in 2012.

Yet the gap between rural and urban access remains. Virtually all (98%) of households in urban areas have access to fixed broadband, a difference of 29 percent. While there is a slim gap between urban and rural areas in the deployment of mobile LTE with speeds of 5 Mbps/1 Mbps, deployment of mobile LTE with a median speed of 10 Mbps/3 Mbps is still much lower in rural (70 percent) than in urban (91 percent) areas. In rural counties with either isolated, sparsely settled geography or high-poverty/high-minority regions, this gap is even greater according to Rural America at a Glance 2017. The population on tribal lands has only 65 percent of the population with access to terrestrial broadband at the benchmark speed. Particularly in situations where poverty has already become too much a part of the local economy, the additional hindrance imposed by inferior e-connectivity further limits the opportunities for residents to experience a higher quality of life, tap appropriate education and workforce training opportunities, leverage technological innovations, and develop viable economic opportunities.

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How can the nation’s public research universities advance the important work of helping regions and individuals in need of connectivity? How can universities help them reach their individual and collective potential through vital network connectivity, content, and digital literacy? In May 2018, USDA’s National Institute of Food and Agriculture’s Rural Regional Development Centers (RRDCs), convened a stakeholder meeting around e-Connectivity in rural America. The meeting participants defined a framework describing a spectrum of assistance universities can provide to help build capacity for effective e-connectivity.

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11 FCC 2018, p. 22
12 The RRDCs, supported by the National Institute of Food and Agriculture (NIFA), provide rural communities access to the research and educational outreach capacity of public universities. For more information about RRDS, see http://rrdc.info/index.html.
This spectrum of technical assistance and community development opportunities span six key areas:13

- **Awareness of Relevance**—Universities and their partners can help to raise awareness in communities about the benefits of broadband and encourage community leaders to consider taking steps to advance access. This involves educating the community about the potential opportunities as well as convening key stakeholders, gathering multi-generational input, and assessing community readiness.

- **Access and Availability**—How might stakeholders in areas currently lacking broadband infrastructure work together to change that? Universities can work with community partners to help a community gain or increase access to broadband by facilitating strategic planning, conducting feasibility studies, hosting stakeholder input meetings, and providing technical assistance for writing grant proposals. Affordability is a key concern among lower income populations that may have the most to gain from e-connectivity.

- **Adoption**—Providing broadband infrastructure is not sufficient to encourage adoption. Universities and their partners can help people, businesses, and governments within areas that recently acquired broadband infrastructure understand and take the steps required to access the infrastructure and the services it provides. People might need to be convinced of the value of the resources required—both the time invested to learn how to use it and the financial requirements. The costs and benefits must be clearly outlined and communities must consider how to help those with limited financial resources connect in ways that will have a meaningful impact on their lives.

- **Utilization**—Once people have access to broadband and have decided it makes sense to use it, how do they acquire the skills needed to find and use the information, applications, and opportunities to improve their business, their decision making, their productivity, and their quality of life? Universities can work with partners to provide multi-layered digital literacy training with consideration for the needs of various audiences that may need assistance. This training will be most effective by building community-level partnerships among entities that can provide the direct assistance with training needs. Additionally, training on cyber security issues is essential to protect these new users from potential harm.

- **Content**—Universities provide content that makes broadband access valuable for rural residents, farmers, businesses, and communities, including online degree programs, outreach/extension training for small businesses, and data-driven decision support for public officials.

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• **Research and Technology Development for Alternative Broadband Provision Models**—Universities research alternative business models and technologies for providing broadband access that reduce the cost of access especially for rural areas. APLU member universities are already working on a variety of alternative broadband access models. Additionally, research that informs policy decisions, clarifies barriers to adoption and utilization, and explores linkages between access and quality of life issues such as health outcomes and education are vital to closing the digital divide.

**UNIVERSITIES EXPANDING E-CONNECTIVITY: AN ECONOMIC AND COMMUNITY DEVELOPMENT OPPORTUNITY**

Public research universities have long been engaged in rural communities, contributing to the economic welfare, well being, and quality of life of communities across the nation. Land-grant institutions, through their Cooperative Extension programs, work directly with rural populations on wide ranging topics including broadband access and e-connectivity. More broadly, university units supporting community engagement, public service, and outreach allow institutions to maximize benefits to rural communities through a variety of programs and services including engagement with K-12 schools, improving public health, advancing food security, and providing environmental and agricultural technical assistance. Rural communities also benefit from university efforts to build economic resilience by advancing the technological and entrepreneurial ecosystems of their states and communities.

Included in all these areas of work are efforts to expand broadband access, uptake, and valuable content in rural areas, develop new business models for broadband, and develop and test technologies that reduce the per-user cost of broadband in sparsely populated areas. Universities have already contributed to the development and adoption of the Internet, and now they are working to ensure that Americans reap the rewards of technology that can connect them to opportunities for learning, business, and improved quality of life.

The examples highlighted here are only a fraction of what universities can and should do to assist rural communities in gaining access to and benefiting from e-connectivity in ways that residents, institutions, and businesses in urban areas take for granted. Each of these efforts is realizing important impacts. However, each addresses only one or two parts of the broader set of barriers to broadband access and utilization. There is a considerable opportunity for universities and their partners to strategically address not just one but all six of the opportunities described above. These collective efforts will not only expand e-connectivity and access but also ensure such access yields societal and economic advancement for rural America.
UNIVERSITIES LEADING BROADBAND ACCESS AND USAGE IN RURAL AREAS

Universities already play several roles with the objective of improving access, usage, and benefits from broadband in rural areas. Just a few examples include the following:

- **Cornell University** has conducted research on how rural broadband adoption affects economic outcomes in rural areas; they have also explored the economic feasibility of alternative business models for rural broadband provision.

- **Massachusetts Institute of Technology** incubated Altaeros Energies when two of its founders were MIT students who received a Small Business Innovation Research (SBIR) award. Altaeros provides airborne telecommunications platforms that can make rural mobile broadband much more cost effective than tower-deployed technologies.

- **The National 4-H Council**, a community of more than 100 public universities across the nation, is partnering with Microsoft and local governments in six states on the 4-H Tech Changemakers project. Part of the Microsoft Rural Airband Initiative, the Tech Changemakers teams took part in leadership training and conducted community outreach to identify a community issue and developed a plan to help address the issue with digital skills and resources.

- **Northern Illinois University** is leveraging federal, state, and private sector grants to build NIUNet, a network of 2,200 miles of fiber optics that will connect 9 counties across Northern Illinois and provide broadband access to over 600 community anchor institutions. They are also facilitating and delivering an array of health, education, research, and economic development application over the NIUNet.

- **The Ohio State University’s 100 Gbps Network & Innovation Center** has been instrumental in ensuring Ohio leads the nation in broadband internet speeds. They are also leading the Ohio Middle Mile Consortium to develop a comprehensive statewide plan to expand broadband infrastructure throughout the state. With Connecting Rural Ohio, they are helping underserved communities achieve broadband internet connectivity through wireless technologies.

- **Oklahoma State University’s Division of Agricultural Sciences and Natural Resources** partners with select public libraries to enhance broadband access to residents in some of the state’s more rural areas. They are working with eleven libraries and are adding new libraries each year. Each library receives multiple hotspot devices with unlimited data for a full year. These devices can be lent to patrons to provide broadband access. A similar program, funded by the Tocker Foundation, is managed by the **University of Texas at Austin’s Technology and Information Policy Institute**.

- **University of New Hampshire**, as part of its rural broadband initiative, has developed a rural broadband strategic plan for New Hampshire.

- **The University of Wisconsin-Madison’s Center for Community & Economic Development** has launched a “Connected Aging Community” project. Funded by Bader Philanthropies, the project pairs elderly residents with youth to improve intergenerational social infrastructure, help older adults adopt technology, and ensure independent living by elderly residents.

- **Washington State University Extension** is working within the state of Washington to increase e-connectivity awareness, access and use through Broadband Action Teams (BAT). BATs include representation for education, business, libraries, healthcare, public safety, tribes, economic development, community members as well as local, state and federal government staff who meet regularly to address local or regional broadband needs. The BAT model has received high interest across the country and is replicable and customizable.
APLU WORKS WITH MEMBERS ACROSS NORTH AMERICA

The Association of Public and Land-grant Universities (APLU), North America’s oldest higher education association convening the presidents, provosts, senior research officers and other decision makers across 241 public research universities, university systems and partner organizations across the U.S., Canada, and Mexico, proposes an initiative to expand e-connectivity in rural America by addressing challenges in awareness, access, adoption, utilization, content, and research. APLU’s Office of Economic Development and Community Engagement will lead this project in collaboration with APLU’s Office of Food, Agriculture, and Natural Resources and key internal and external stakeholders.

NEXT STEPS:

• Engage universities across the United States in addressing the 6 opportunities for expanding the promise of e-connectivity in rural America;

• Develop engagement strategies, business models, training, content, and technologies that will enable and maximize the benefits of improved connectivity to rural areas.

• Share successful strategies with local, state, and national policy makers, universities, and their stakeholders.

• Develop a plan for expanding the pilot across rural America.

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