

Getting Connected: Broadband Services a Key to a Vibrant Rural America

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In Brief...

The Situation:

- Not all broadband services are created equal. Residential services currently available in rural areas are not adequate for businesses that need to compete in a global economy.
- Rural areas will continue to lose population, jobs, and income unless policy changes are made to ensure that rural communities have the same access to business class broadband services as their urban counterparts.
- Helping rural areas achieve telecommunications parity with their urban counterparts is as important as past efforts by the federal government to accelerate the electrification of rural America in the 1930s or to extend the interstate highway system to these areas in the 1950s.
- Low population densities increase the cost of private sector broadband expansion into rural areas. For this reason, rural broadband deployment will require innovative strategies.

Policy Options:

- The *Telecommunications Act of 1996* fails to recognize the importance of creating broadband policies that simultaneously promote sound rural development. As such, broadband services must be delivered in rural America with an eye on the broader economic, workforce, and community development opportunities and challenges existing in rural areas.
- Current policy helps to create and enforce industry “silos” for broadband access. Open access networks represent an important alternative for delivering broadband services to businesses and residents in rural America. A key advantage – it aggregates individual and organizational broadband service to a single network infrastructure.
- Federal, state and local broadband policies must work to create open access networks through public-private partnerships. Furthermore, they must provide loans and grants that will spur the creation of such partnerships and accelerate the deployment of broadband services to rural America.

Global economic trends have fundamentally altered the rural landscape. Manufacturing, a mainstay of rural economies, has steadily declined, and many communities are losing their “best and brightest” as young people leave in search of greater opportunities elsewhere. In this uncertain climate, understanding the possibilities for rural economic and community development has become more important—and more complicated—than ever.

Scholars, policymakers, local leaders, and residents have come to realize that economic development efforts that worked in the past are no longer effective in a global “knowledge economy.” Instead, many analysts now believe that the best hope

for rural areas to participate in the national and global economy lies in the development of small manufacturing and service firms that match local assets with emerging market opportunities.¹

Unfortunately, the telecommunications infrastructure in many rural areas does not allow entrepreneurs and communities to take full advantage of emerging opportunities. Although services such as cable, DSL (digital subscriber lines), and wireless are increasingly available for residential access, schools, businesses, healthcare providers, and local government offices require “business-class” broadband service. In contrast to residential services, these high-end connections provide guaranteed security, greater bandwidth

Table 1: Broadband Network Infrastructure, Access and Services in the Manufacturing and Knowledge Economies

	Manufacturing Economy		Knowledge Economy
	Telephone	Cable TV	Multimedia
Infrastructure	Monopoly control of twisted pair cable to home or business	Monopoly control of coaxial copper cable to the home	Multiple delivery systems; no inherent monopoly control
Access	Monopoly control of the connection to the Telephone Network (PSTN)	Monopoly control of the connection to the head end	Open access network provides multiple vendors access through IP addresses and bandwidth
Services	Monopoly control of dial tone and the ability to make a telephone call	Monopoly control of the TV signal-ability to watch a TV channel	Choices of service vendors for VolP, video, audio, web site hosting

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(from 1.5 – 100 megabytes per second), and synchronous upload and download capability.

Table 1 lays out the requirements for broadband service in a knowledge economy compared to the services needed in a manufacturing economy.

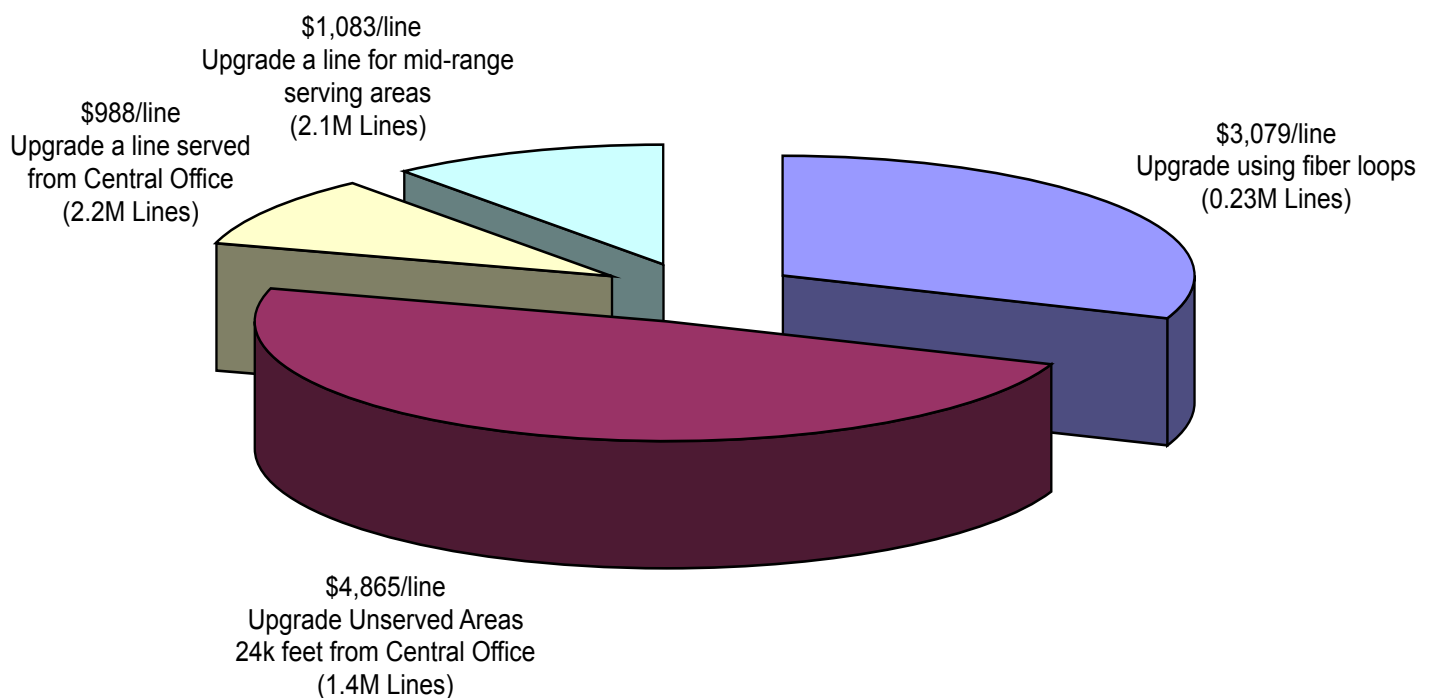
In reality, most telephone or cable companies have no plans to upgrade or expand their ability to deliver business-class broadband services in rural areas. Telecommunications providers argue that the combination of low population densities and high initial investment makes it impossible to recover their costs in a reasonable time frame. In 2006, the National Exchange Carriers Association put the cost of upgrading 5.9 million

rural telephone lines to 8Mbps at \$11.9 billion (see Figure 1).² Under these conditions, there is little financial incentive for private companies to extend high speed Internet to remote locations. If we are serious about the long-term economic and social viability of rural America, we must find ways to effectively and efficiently deliver business-class as well as residential broadband to rural areas.

Open Access Networks: Decoupling Broadband Infrastructure from Service Provision

Open access networks provide an alternative for delivering business-class and residential broadband services to rural communities. The key distinguishing feature of open access networks is that broadband

Figure 1: The Cost to Upgrade 5.9 Million Telephone Lines to a Basic Multimedia Capability Would Be \$11.9 Billion



Source: National Exchange Carrier Association. Trends 2006: Making Progress with Broadband. Whippany, NJ: NECA, 2006. Available at http://www.neca.org/media/trends_brochure_website.pdf

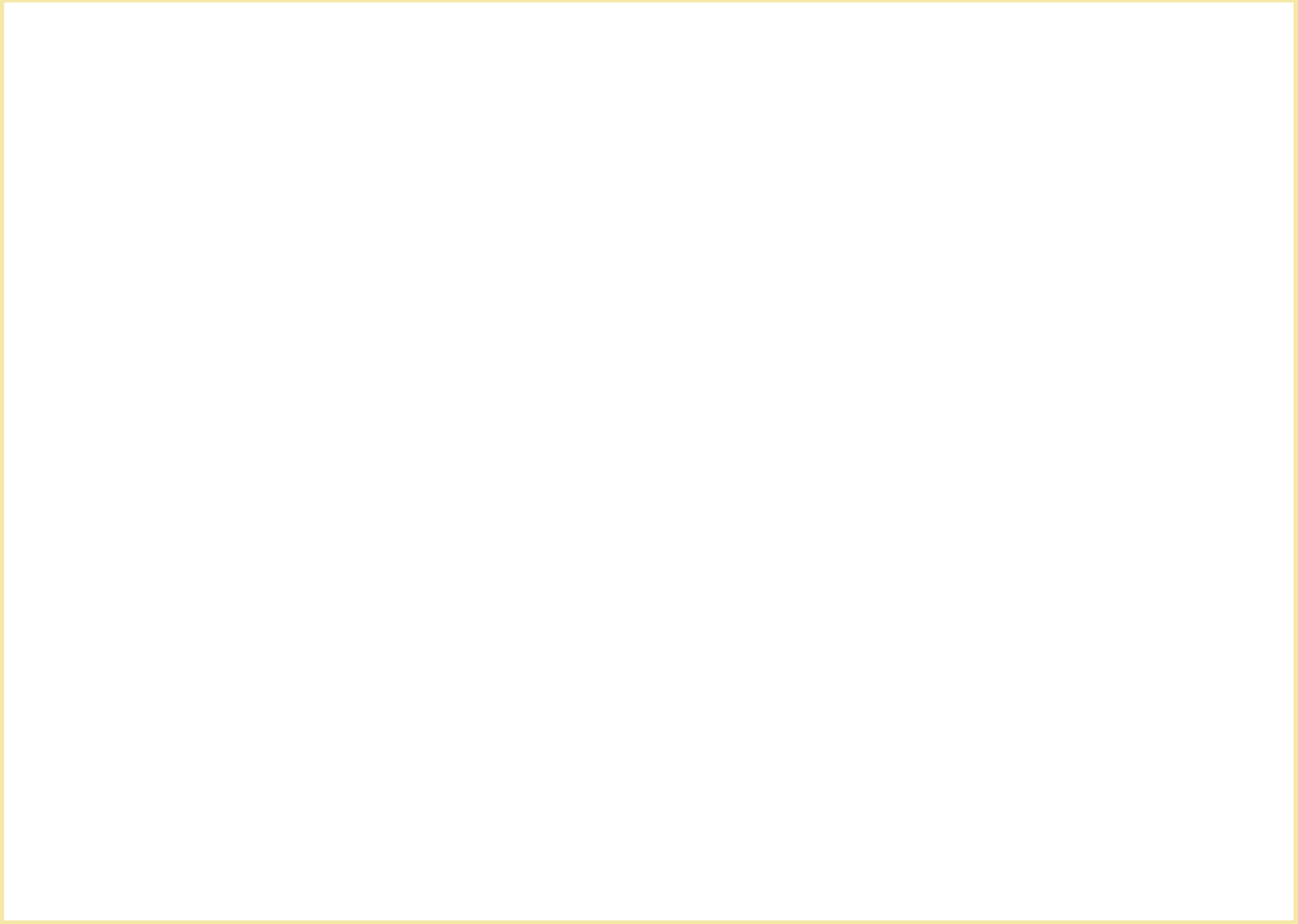
infrastructure is *decoupled* from broadband service provision. In this scenario, the network infrastructure connecting businesses, public buildings, healthcare facilities and residents to the internet is owned and operated independently from entities that provide services, voice, video, data and other services. These providers pay a fee for access to the network infrastructure. Customers connected to the network purchase services from the private service providers.

This approach has the advantage of aggregating individual and organizational broadband service, within and across a community or region, to a single network infrastructure. It also eliminates redundant

infrastructures, thereby reducing the entry cost for any single provider delivering service such as cable or telephone service. The system has the additional advantage of allowing local entrepreneurs to use the network for delivery of business services such as accounting, or data back-up to local organizations.

Figures 2 and 3 provide simplified schematics of the existing and open access network structures. In the existing broadband delivery model, multiple infrastructures are required to deliver numerous services and levels of broadband connectivity. The open access broadband model uses a single infrastructure to deliver voice, video and other

Figure 2: Existing Broadband Structure in Most Rural Areas



services from multiple and competing providers for each type of service, as well as consumer and business-class broadband service.

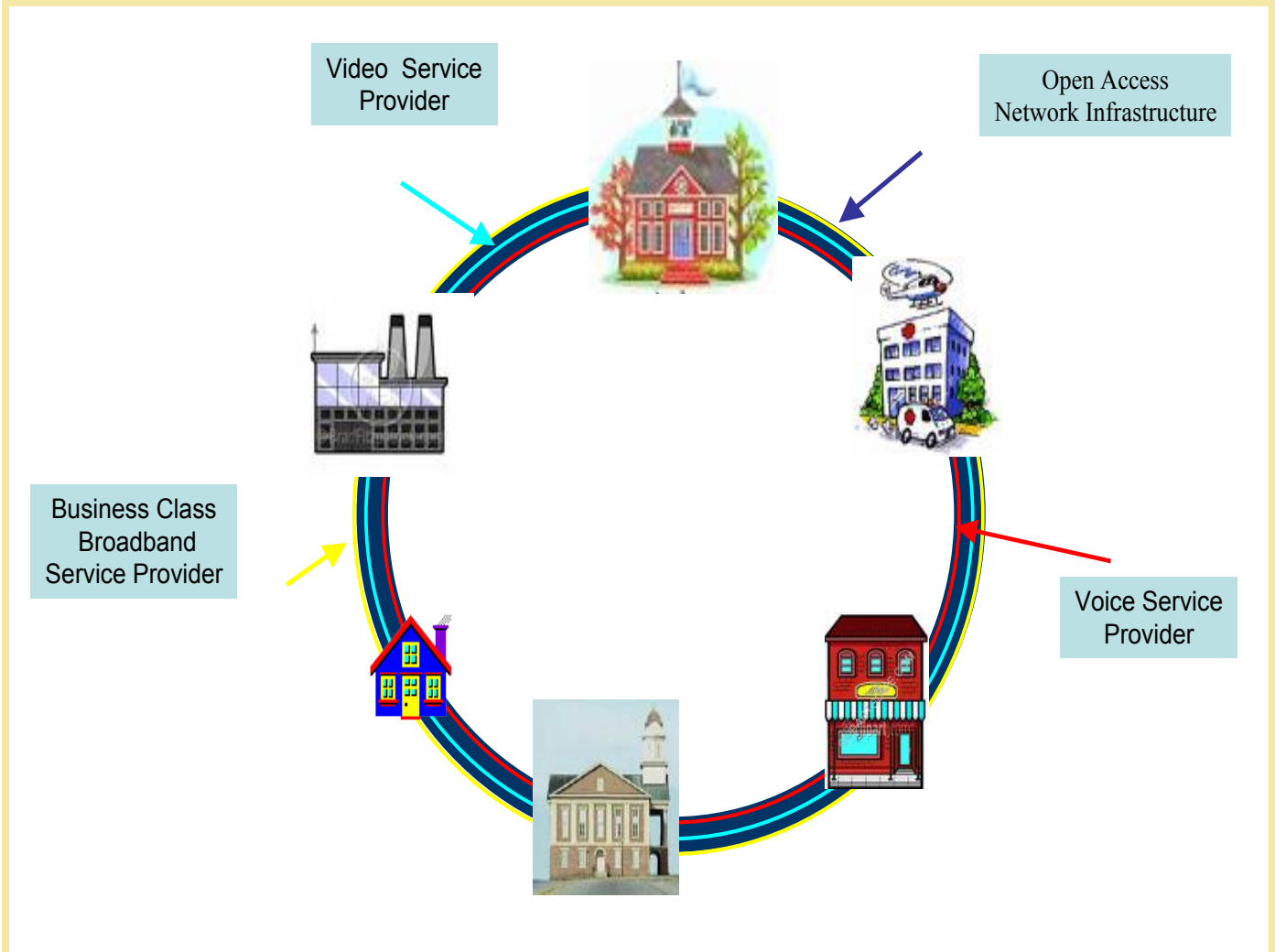
Furthermore, open access networks can be used by local government organizations to provide communication services for police, fire, and ambulance, as well as state and national emergency response services. Similarly, schools and other educational institutions could pay to access and deliver educational services. The fees paid to the network owner/operator would provide both a return on investment and the capital needed to maintain and expand the network infrastructure.

The open access model diverges sharply from what is dominant in the United States today (i.e. private firms holding monopoly control over local network infrastructure, service delivery and access to the network by outside service providers). The AllCoNet network is an example of open access networks in practice (see box on page 6).

Policy Implications

For rural communities today, achieving telecommunications parity with their urban counterparts holds the same importance as RFD (Rural Free Delivery) in the nineteenth century, electrification in the 1930s, and the Interstate

Figure 3: Open Access Broadband Structure



Open Access Networks in Practice

AllCoNet

AllCoNet (allconet.org) is a wireless telecommunications network spanning the mountains of western Maryland. The network infrastructure is owned and operated by Maryland's Allegany County and the County Board of Education. AllCoNet1 was created to provide broadband service to public schools. The Board of Education partnered with the county and municipalities to build the network using water towers, roofs of public buildings, and publicly owned towers to reduce capital investment. AllCoNet1 used unlicensed point-to-multipoint technology for last-mile connectivity, eventually connecting 85 buildings, 4,000 workstations, and 10,000 public sector users.

Prior to AllCoNet, business-class broadband access was available only for firms and organizations able to pay premium prices to the service providers. Area business and political leaders had asked major telecommunication providers for faster, cheaper service. However, they were told distance and terrain made it too expensive to lay fiber-optic cable, especially to a rural county.

The county leaders then asked AllCoNet to upgrade the public network so business-class services could be delivered to the private sector. The network, AllCoNet2, was upgraded and the network was opened to Internet service providers at a low fee to enable delivery of business-class and residential broadband services. The result is a wireless ring supporting over 400 T1 lines (1.5 Mbps upstream and downstream) as well as additional unlicensed multipoint networks for consumer broadband connections.³

Highway System in the 1950s. Communities with poorly developed telecommunications infrastructure will find it increasingly difficult to generate employment opportunities, retain existing businesses, provide healthcare services to residents, and respond to natural or manmade disasters.

Creating a more prosperous rural America will require fundamental changes in telecommunications and rural development policies. Federal telecommunications policies target sector specific investments to make broadband service available to schools, healthcare facilities, libraries, and small communities that lack broadband service. State and local telecommunication

policies typically target the governmental sector as well as those identified above.

National rural development policies have tended to equate rural development with agricultural subsidies that have benefited only a small proportion of the population, with negligible effects on long-term rural community vitality. At local and state levels, rural development policies have largely targeted individual-level and sector-specific investments, particularly in manufacturing and agriculture. In addition, rural development policy has been designed to minimize the differences between places, despite the fact that development often depends on taking advantage of unique local assets.

A place-based, holistic rural development policy is the most viable alternative to the outdated strategies that continue to dominate our thinking. Healthy communities require policies and actions that strengthen the social, economic, political, and environmental dimensions of local life. This means that we must recognize and develop connections between seemingly disparate activities such as broadband provision, economic development, workforce development, homeland security, education, health care, and government.

Unfortunately, the *Telecommunications Act of 1996* makes it difficult to achieve this synergy. For example, in most rural communities and in many low-income urban centers, the two biggest users of business-class broadband services are schools and hospitals— both of which have been given special discounts on telecommunications services through the Universal Service Fund. However, a key prerequisite for securing these discounts is that schools and hospitals are prohibited from sharing any subsidized bandwidth or infrastructure with other community organizations or residents. This limitation prevents the community from aggregating institutional broadband demand with the private sector demand. Moreover, it creates a disparity between the institutions receiving the subsidies and other public and private organizations.

The United States is one of the few countries without a comprehensive policy to promote “broadband”, meaning connections speeds of at least 1.5 Mbps in one direction.⁴ The lack of a comprehensive broadband policy, coupled with dependence on market forces, has prohibited widespread access and adoption of broadband services in rural America. The current model will continue to

leave non-profitable markets underserved, posing problems for broadband deployment in rural areas and the capacity of rural communities to effectively compete in a knowledge-based, global economy.

Achieving affordable business-class broadband service in rural communities will require that the following elements be integrated into all federal, state, and local broadband policies:

- Affordable business-class broadband deployment and access is an important and necessary condition for rural development;
- Strategies that encourage and enable aggregation of business-class broadband across the private (business and industry) and public (government, education, healthcare, homeland security) sectors in rural communities are essential;
- Creation of open access networks through public-private partnerships and provision of grants and loans to support their development is vital;
- Federal and state telecommunications policies must be aligned with rural development policies in order for comprehensive place-based development in rural areas to be realized.

Broadband services will play a key role in building healthy rural communities in the twenty-first century. Without sufficient business-class broadband penetration, maintaining and attracting new businesses and residents to rural areas will be difficult at best. Without a significant change in current telecommunication policy – especially broadband service – less profitable

Overview

An Overview of U.S. Telecommunications Policy

While there have been various state-level policy interventions around telecommunications, the *Telecommunications Act of 1996* was the first federal Act designed to explicitly address Internet deployment. The Act had three goals -- promote competition, extend advanced communication networks, and enhance universal service. Universal service policies were designed to promote access, especially of broadband services, by key entities such as schools, libraries and rural health care facilities.

The Universal Service Fund, which was revised under the *Telecommunications Act of 1996*, includes the “Schools and Libraries” program, commonly referred to as the e-rate program. The e-rate program provides discounts to schools and libraries to obtain affordable telecommunications and Internet access. Eligible schools and libraries receive discounts of 20-90 percent for telephone service, Internet access, and internal connections (such as network connections). The discount amount is based on two factors -- the household income of students in the community and the location of the school or library (an urban or rural area). Those located in rural areas receive slightly higher discounts than those in urban localities.

The *Farm Security and Rural Investment Act of 2002*, the second major federal telecommunications program to be instituted with direct relevance to broadband deployment, includes the “Rural Broadband Access Loan and Loan Guarantee Program” (Pub. L. 101-171). This initiative authorizes \$2 billion in loans to develop broadband infrastructure. However, loan applicants must prepare and submit a solid business plan and demonstrate that they are in strong financial position (so as to minimize the chances of defaulting on their loans). Given these requirements, the Act has had limited impact on underserved rural areas given that few applicants have been able to offer a clear promise of investment return.

markets will continue to be underserved, and rural America will once again be left behind.

About the Authors

All authors are members of the Rural Telecommunications Working Group (RTWG), a multidisciplinary team of researchers and practitioners examining the adoption and impact of digital technologies on rural communities.

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All authors made equal contributions to this research brief. For further information about the subject of this *Rural Realities* report, contact William Shuffstall at: shuffy@psu.edu.

Endnotes

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