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# ECONOMIC IMPACT OF WIRELESS BROADBAND IN RURAL AMERICA

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## EXECUTIVE SUMMARY



The Voice of Rural and Regional Carriers

Telecom Advisory Services, LLC



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**The Voice of Rural and Regional Carriers**

This document is an Executive Summary of a full report that can be downloaded from [www.teleadv.com](http://www.teleadv.com) or <http://rca-usa.org>.

“Within the next five years, we’ll make it possible for businesses to deploy the next generation of high-speed wireless coverage to 98 percent of all Americans. This isn’t about faster Internet or fewer dropped calls. It’s about connecting every part of America to the digital age. It’s about a rural community in Iowa or Alabama where farmers and small business owners will be able to sell their products all over the world (...) This is our generation’s Sputnik moment. Two years ago, I said that we needed to reach a level of research and development we haven’t seen since the height of the Space Race. And in a few weeks, I will be sending a budget to Congress that helps us meet that goal. We’ll invest in biomedical research, information technology, and especially clean energy technology – an investment that will strengthen our security, protect our planet, and create countless new jobs for our people.”

— **PRESIDENT BARACK OBAMA,  
STATE OF THE UNION ADDRESS, JANUARY 25, 2011**

“The President said we will need to out-innovate, out-build, out-compete and out-educate other countries, and I couldn’t agree more. I’m glad the President focused on the need to invest in our infrastructure and encourage exports to create jobs. These investments are critical to American competitiveness and issues my Committee is hard at work on.”

— **SENATOR JAY ROCKEFELLER (D-WV), CHAIRMAN OF THE SENATE  
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,  
JANUARY 25, 2011**

“Innovation is a great American trait, a defining characteristic that can be seen in our entrepreneurial spirit and our ground-breaking industries and advancements. Fostering innovation is a laudable national goal that knows no party boundaries. As we pursue the policies of the future, we must follow the path defined by the desires of the American people.”

— **CONGRESSMAN FRED UPTON (R-MI),  
CHAIRMAN OF THE HOUSE ENERGY AND COMMERCE COMMITTEE,  
JANUARY 25, 2011**

"If we are to accomplish the President's goal of deploying next generation, high-speed wireless coverage to 98 percent of all Americans within five years, this administration must: (1) require interoperability throughout the 700 MHz spectrum band that will help to unleash next generation services; (2) mandate data roaming providing consumers and public safety with seamless coverage to next generation networks and service no matter where they work or live; and (3) undertake success-based, forward-looking Universal Service reform. This study focuses on two of these three policy objectives – the need for interoperability and data roaming – and how these two policy objectives can help the President achieve his goal of high-speed wireless coverage to 98 percent of all Americans within five years."

**—STEVEN K. BERRY, PRESIDENT AND CEO OF RCA,  
JANUARY 28, 2011**



This study, utilizing federal and state level statistics and relying on econometric analysis, estimates the economic impact that full deployment of rural wireless broadband would have on rural America. It is based on the premise that requiring interoperability among all carriers operating in the 700 MHz band and data roaming, the fundamental building blocks for rural and regional broadband deployment, will enable investment and, consequently, rapid deployment of wireless broadband infrastructure in unserved and underserved geographies. **This investment will result in the creation and/or retention of 117,000 jobs in the nineteen states that have the lowest broadband availability and penetration in the United States.**<sup>1</sup> Jobs will be primarily concentrated in the wholesale trade, health and financial services sectors. **Of the total 117,000 jobs, approximately 38,500 will be new jobs created as a result of the economic boost provided by wireless broadband in rural areas. The remaining 78,500 jobs will be saved as a result of the combination of economic growth and increased capabilities resulting from the ability to gain access to broadband services.**

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<sup>1</sup> For purposes of the analysis, states with less than 90 % of households served by 4 megabytes per second broadband service (standard of service defined by the FCC) were selected. Based on the statistics gathered by the Federal Communications Commission, the list comprises West Virginia, Arkansas, Mississippi, Alaska, South Dakota, Montana, North Dakota, Kentucky, New Mexico, Missouri, Wyoming, Oklahoma, Louisiana, North Carolina, Alabama, Kansas, Virginia, Tennessee, and Maine. This approach has the advantage of considering only those geographies that are facing major infrastructure access shortfalls, as opposed to a demand (penetration) problem.

Rural America comprises the largest portion of unserved and underserved broadband population. Of the 7,035,613 housing units identified as either unserved (cannot access broadband service) or underserved by the National Broadband Plan,<sup>2</sup> a plurality is located in what the Census Bureau classifies as rural counties. This is no surprise since the broadband deployment plans of national carriers do not prioritize rural fixed or mobile broadband capital investment.<sup>3</sup> In these territories, lower customer density and/or populations that are depressed socio-economically do not result in attractive economics of network deployment.

Given this systematic lack of investment in providing rural areas with broadband services, the Federal Communications Commission in its 2010 National Broadband Plan identified the deployment of broadband technology in unserved and underserved communities as a national priority. In particular, the National Broadband Plan emphasized that wireless broadband, specifically the service offered within the 700 MHz frequency band, was among the most viable technologies for addressing these gaps.<sup>4</sup> In addition, one of the basic objectives of the Broadband Technology Opportunity Program (BTOP) and Broadband Initiatives Program (BIP) is to stimulate deployment of broadband facilities in unserved or underserved communities. In light of these priorities, the current assumption is that the desired coverage goals will result from a combination of the investment of the private sector, primarily rural carriers, and government stimulus, such as the BTOP and the USDA Broadband Loan programs.

However, two obstacles challenge this goal. First, while rural carriers have acquired 700 MHz spectrum to deliver broadband services in their footprint, they face interoperability and data roaming challenges with service providers operating in other bands. This situation has the potential to significantly arrest the deployment of wireless infrastructure in areas currently unserved by broadband. The FCC has not completed action on these issues which have been pending before the Commission since 2009 and 2005, respectively. This is will not help to support the shared goal of the President, Congress and the FCC to spur broadband deployment throughout the U.S.

Second, a large portion of the public funds that are dedicated to broadband deployment as part of the BTOP and BIP programs are being assigned to fiber optics infrastructure, which is more suited economically and technically to providing service in urban and suburban environments. Furthermore, a portion of the BTOP spending has focused on middle mile infrastructure as opposed to *last mile* access enablement. A similar problem of fund misallocation was identified in a 2005 audit by the USDA's Inspector General of the RUS (Rural Utility Service) Broadband Loan Program, determining that nearly 12 percent of total loans went to suburban communities located near large cities (USDA, Office of Inspector General, Southwest Region

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2 Source: FCC (2010). National Broadband Plan estimated housing units without service of 4 Mbps download speed in <http://www.broadband.gov/maps/availability.htm>.

3 See Atkinson and Schultz (2009). *Broadband in America: where it is and where it is going*. New York: Columbia Institute for Tele-Information

4 See Federal Communications Commission (2010).

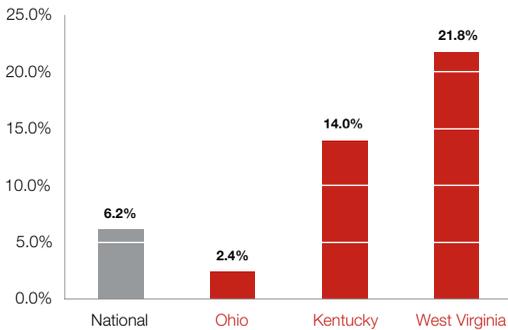
2005).<sup>5</sup> Under these conditions, it is fair to assume that, if public funds do not flow to rural wireless projects and rural wireless providers are not supported by the right interoperability framework, the deployment of wireless broadband in rural America will be delayed.

The objective of this study is to evaluate the employment and income opportunity costs that result from not mandating data roaming nor requiring interoperability in the 700 MHz band for wireless carriers serving rural America. The study focuses on three specific states with different characteristics (Kentucky and West Virginia, with high rural population and Ohio, which exhibits larger urban and suburban concentrations) and estimates, by means of econometric analysis, the economic impact that broadband has had in the past years. With this evidence in hand, the study projects the potential economic impact of wireless broadband deployment in the unserved and underserved areas of the three States, and then extrapolates the results for the nineteen states with less than 90% coverage of broadband service of at least 4 Mbytes.

The study shows how the broadband supply gap represents a critical issue for states with a considerable rural economy. While at the national level, unserved or underserved broadband households represent 6.1% of all households, this metric increases dramatically in rural geographies, for example reaching 14.0% in Kentucky, and 21.8% in West Virginia. Obviously, the

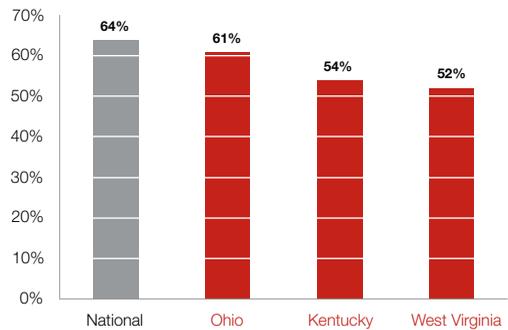
**FIGURE 1**

Percent of Households Unserved or Underserved by Broadband Service (2010)



Source: Federal Communications Commission. National Broadband Plan

Broadband Internet Adoption (Households) (2009)



Source: Economics and Statistics Administration and national Telecommunications and Information Administration (2010). Exploring the digital nation: home broadband internet adoption in the United States.

<sup>5</sup> A follow-up audit found that this situation was not remedied, noting that between 2005 and 2008, broadband loans were extended to 148 communities within 30 m of cities with populations greater than 200,000 - including Chicago and Las Vegas (USDA. 2009. *Audit report: Rural utilities service broadband grant and loan programs. Audit Report 09601-8-TE.* <http://www.usda.gov/oig/webdocs/09601-8-TE.pdf>.)

supply gap, which measures service coverage, does not equate to penetration, which measures adoption of broadband. However, the rural lag still exists: while national broadband penetration has reached 64% of households, in Kentucky it is 54% and in West Virginia it is 52%<sup>6</sup> (see *Figure 1*).

It is expected that, even under universal coverage conditions, a portion of the non-adopting households would not be subscribing to broadband service simply due to demand issues such as affordability and educational factors.<sup>7</sup> Nevertheless, unless these communities are given the opportunity to connect to the Internet, they will remain permanently marginalized and the economic penalty would be significant. Below we review our results for Kentucky, Ohio and West Virginia in turn, and extend the analysis to the 19 states that rank lowest in broadband availability and penetration.

### THE BROADBAND OPPORTUNITY IN KENTUCKY

According to the latest FCC statistics,<sup>8</sup> there are 1,221,000 broadband lines in Kentucky. The growth of broadband lines has increased at an average rate of 57% over the past ten years, reaching a penetration of 20% of the population, or 54% of households. On the supply side, broadband service (at download speeds higher than 4 megabytes per second, which is the standard defined by the FCC for universal broadband service) is currently available to 86% of households, leaving 14% (266,000) either unserved or underserved.<sup>9</sup>

Broadband availability has had an important and statistically significant impact on job creation and the increase of median income in Kentucky. Our estimations, based on econometric analyses of data between 2004 and 2007, show that the lack of broadband service availability has an impact on job creation and income in both metropolitan and rural counties (see *Table 1*).

**TABLE 1.**  
**Kentucky: Impact of a 1% Point Increase in Broadband Availability on Employment and Median Income**

	Impact on Median Income	Impact on Employment
Metropolitan Counties	0.0968*	0.0303
Rural Counties Adjacent to Metro Counties	0.0704*	
Rural Counties Isolated from Metro Counties	0.0800*	-0.1953*

\* Significant at the 1 % level

Source: Data compiled from Connect Kentucky databases, and ESRI Business Analyst Sourcebook for County demographics; analysis by the authors

6 Economics and Statistics Administration and National Telecommunications and Information Administration (2010).

*Exploring the digital nation: home broadband internet adoption in the United States*. Washington, D.C., November.

7 Source: Horrigan (2009). *Home broadband adoption 2009*. Pew Internet and American Life Project.

8 Source: FCC's report "Internet Access Services: Status as of June 30, 2009." (2010)

9 Source: National Broadband Plan (2010).

In particular, broadband penetration has been found to be statistically significant on the growth in employment in the financial services and insurance, wholesale trade, and health sectors of Kentucky, even within rural counties (see *Table 2*).

**TABLE 2.**  
**Kentucky: Impact of a 1% Increase in Broadband Penetration on Industrial Sector Employment**

Industry Sector	All Counties	Rural Counties
Financial Services and Insurance	0.678 (**)	0.517 (***)
Wholesale trade	0.846 (*)	0.836 (*)*
Health Services	0.126 (*)	0.122 (**)

(\*) Significant at 1% level

(\*\*) Significant at 5% level

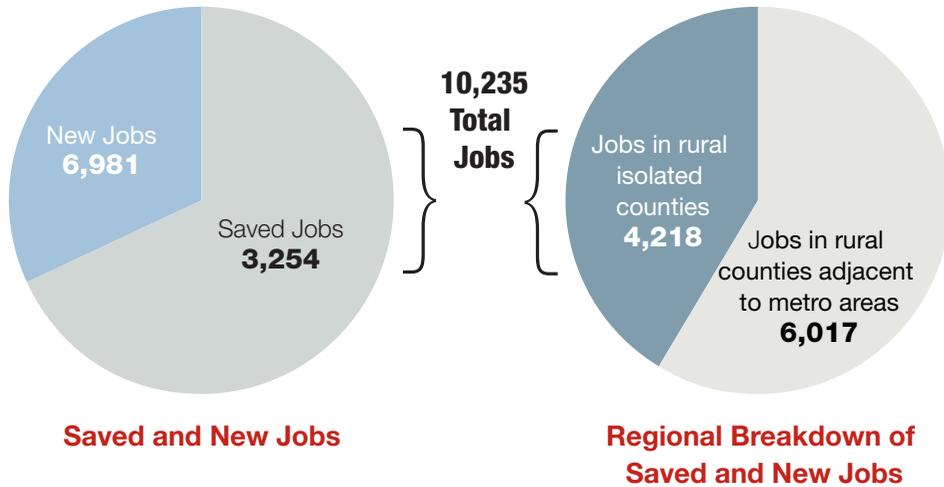
(\*\*\*) Significant at 10% level

Source: Data compiled from US Census Bureau, Connect Kentucky databases, and ESRI Business Analyst Sourcebook for County demographics; analysis by the authors

Based on the historical (2004-9) effect of broadband on Kentucky's county employment and median income, the impact of broadband availability on future economic growth and employment was estimated. Thus, if broadband availability were to increase to 100 % through deployment of 700 MHz wireless technology, this would result in 10,235 jobs created or saved resulting from business expansion enabled by broadband between 2011 and 2014.<sup>10</sup> Of these jobs, 3,254 will be new jobs resulting from new economic activities triggered by wireless broadband deployment in rural counties. Conversely, 6,981 jobs will be saved as a result of the combined impact of economic growth and enhanced capabilities that will be provided to those workers as a result of wireless broadband (see *Figure 2*).

<sup>10</sup> It is important to recognize that the number of jobs saved/created is limited by the natural unemployment rate, and therefore we cannot expect to realize the projected level of jobs if people are already employed. However, as of now, the unemployment rate in Kentucky is at 10%, well above the natural rate of 4-5%.

**FIGURE 2.**  
**Kentucky: Employment Impact of Full Broadband Availability**



Source: Data compiled from Kentucky Occupational Outlook to 2018, US Department of Labor: Local Labor Unemployment Statistics, Connect Kentucky databases; analysis by the authors

The largest portion of jobs created or saved would be concentrated in the rural counties adjacent to metropolitan areas (6,017 jobs), although a significant portion would also be created or saved in rural isolated counties (4,218). Increasing broadband availability to 100% would also cause the median income of each county to grow on average by 2.1% (\$ 914) of Kentucky’s median income, which is \$43,765.

**THE BROADBAND OPPORTUNITY IN OHIO**

Based on the FCC latest reported statistics,<sup>11</sup> there are 4,107,000 broadband lines in Ohio. The growth of broadband lines has increased at an average rate of 34% over the past ten years, reaching a penetration of 30% of the population, or 61% of households. On the supply side, broadband service at download speeds higher than 4 megabytes per second is currently available to 98% of households, leaving 2% (123,456) either unserved or underserved.<sup>12</sup>

If broadband availability were to increase to 100 % through deployment of 700 MHz wireless technology, this would result in 5,744 jobs created or saved resulting from business expansion between 2011 and 2014.<sup>13</sup> Of this amount, it is estimated that 860 will be new jobs resulting

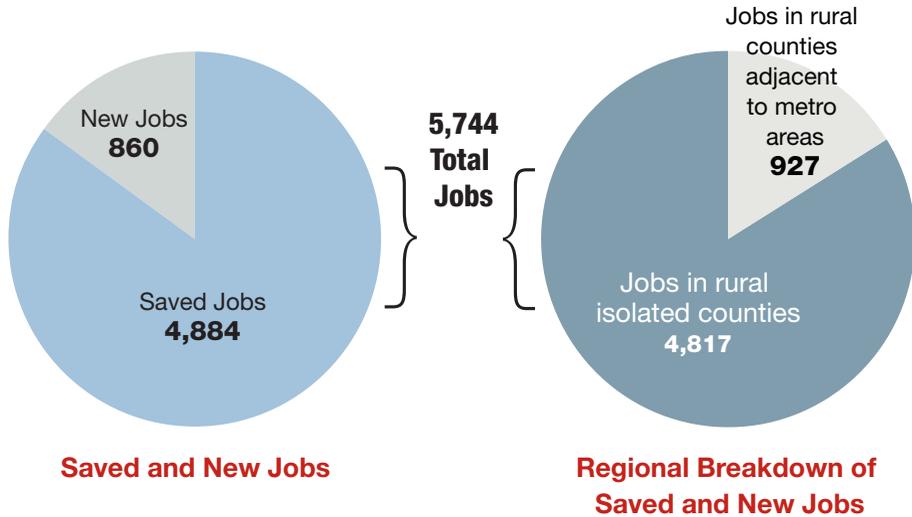
11 Source: FCC’s report “Internet Access Services: Status as of June 30, 2009.” (2010)

12 Source: National Broadband Plan (2010).

13 Because data for the panel regression was only available for Kentucky, projections for Ohio relied on the econometric estimates from the former. It is considered, however, that these estimates are relatively reliable due to the rich set of controls and the inclusion of county fixed effects. Therefore, the projections assume that, given the set of controls (such as income, population density, etc.), rural counties in Ohio respond to broadband in a way that is similar to rural counties in Kentucky. The same assumption applies for metro counties in Ohio and West Virginia.

from new economic activities triggered by wireless broadband deployment in rural counties and 4,884 jobs will be saved as a result of the combined impact of economic growth and enhanced capabilities that will be provided to those workers as a result of wireless broadband (see Figure 3).

**FIGURE 3.**  
Ohio: Employment Impact of Full Broadband Availability



Source: Data compiled from 2018 Ohio Job Outlook – Employment Projections, US Department of Labor: Local Labor Unemployment Statistics; analysis by the authors

The largest number of jobs would be created in rural isolated areas (4,817), which raise the likelihood of retention of population in these environments. As above, the number of jobs saved/created is limited by the natural unemployment rate. Increasing broadband availability to 100% would also cause the median income of each county to increase by \$428 on average which represents 0.8% increase in Ohio’s median income of \$52,047. Again, the study estimates that there is an opportunity cost of not deploying 700 MHz service in Ohio and achieving 100% broadband availability.

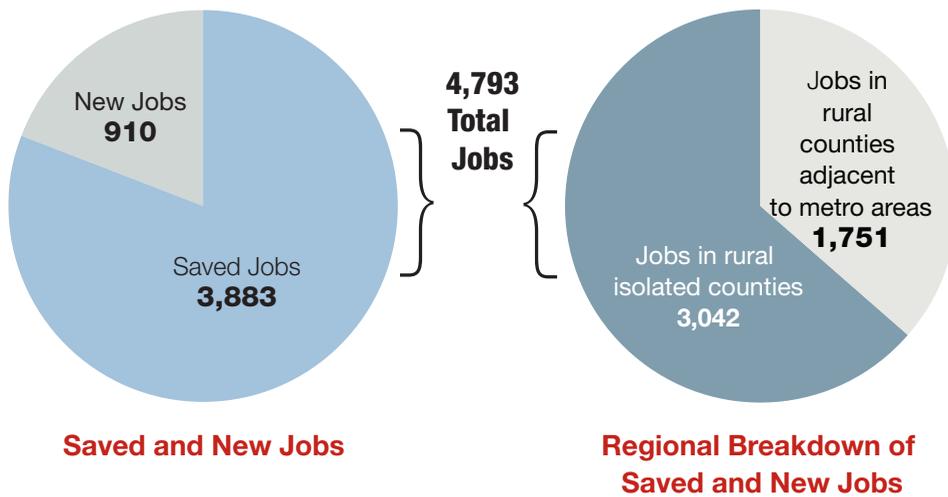
**THE BROADBAND OPPORTUNITY IN WEST VIRGINIA**

According to the FCC,<sup>14</sup> there are 518,000 broadband lines in West Virginia. The growth of broadband lines has increased at an average rate of 55% over the past ten years, reaching a penetration of 24% of the population, or 52% of households. Fixed broadband service (at speeds higher than 4 Mbps) is currently available to 78% of households, leaving 194,789 households unserved or underserved.

<sup>14</sup> Source: FCC’s report “Internet Access Services: Status as of June 30, 2009.” (2010)

Based on the historical effect of broadband on West Virginia's county employment and income, the impact of broadband availability on future economic growth and employment was estimated. Thus, if broadband availability were to increase to 100% through deployment of 700 MHz wireless technology, this would result in 4,793 jobs created or saved from business expansion between 2011 and 2014. Of the total jobs, 910 will be new jobs resulting from new economic activities triggered by wireless broadband deployment in rural counties. Conversely, 3,883 jobs will be saved as a result of the combined impact of economic growth and enhanced capabilities that will be provided to those workers as a result of wireless broadband. The largest portion of jobs created or saved will be in rural isolated environments (3,042) (see Figure 4).

**FIGURE 4.**  
**West Virginia: Employment Impact of Full Broadband Availability**



Source: Data compiled from West Virginia Occupational Projections Statewide 2008-2018, US Department of Labor: Local Labor Unemployment Statistics; analysis by the authors

Increasing broadband availability to 100% would also cause the median income of each county to increase by \$1,264 on average. This represents 3.43% increase in West Virginia's median income, which is \$36,804. In sum, the study also concludes that there is a significant opportunity cost of not deploying 700 MHz service in West Virginia and achieving 100% broadband availability.

**ESTIMATING THE IMPACT ON RURAL AMERICA**

In addition, the study estimated the economic impact of making broadband fully available in the nineteen states with 4 megabytes per second broadband access below 90%. According to these estimates, by relying on wireless broadband and therefore, providing 100% of coverage,

116,862 jobs can be created or saved between 2011 and 2014, while on average, the median income per county in those states could be increased by \$1,201. (see Table 3).

**TABLE 3.**  
**Employment Impact of Full Broadband Availability in 19 States**

State	Percent of Unserved or Underserved Households	Population Penetration	Jobs Created/Saved	New Jobs	Saved Jobs
Alabama	12.0%	19%	7,587	2,585	5,002
Alaska	20.7%	23%	1,845	507	1,338
Arkansas	25.2%	18%	8,960	3,733	5,227
Kansas	11.6%	23%	3,056	1,114	1,942
Kentucky	14.0%	20%	10,235	3,254	6,981
Louisiana	12.8%	20%	6,237	1,771	4,466
Maine	10.0%	25%	1,537	242	1,295
Mississippi	23.0%	15%	13,077	3,430	9,647
Missouri	13.6%	21%	10,016	1,964	8,052
Montana	17.3%	22%	2,280	742	1,538
N. Carolina	12.3%	23%	13,288	5,540	7,748
N. Dakota	16.5%	24%	660	206	454
N. Mexico	15.1%	19%	3,771	1,226	2,545
Oklahoma	13.1%	20%	5,855	1,815	4,040
S. Dakota	18.7%	22%	1,314	539	775
Tennessee	10.1%	20%	11,192	4,188	7,004
Virginia	11.2%	24%	10,163	4,141	6,022
W. Virginia	21.8%	24%	4,793	910	3,883
Wyoming	13.5%	22%	996	502	494
<b>Total</b>	<b>14.1%</b>	<b>21%</b>	<b>116,862</b>	<b>38,409</b>	<b>78,453</b>

Source: Data compiled from US Department of Labor: Local Labor Unemployment Statistics; analysis by the authors Federal Communications Commission, Economics and Statistics Administration and National Telecommunications and Information Administration

The employment generation number comprises both new jobs to be created as a result of the deployment of wireless broadband in rural areas, and jobs in those regions that can be preserved as a result of both economic growth and the added capabilities that workers would develop as a result of gaining access to broadband. Considering the total employment impact of 116,862 jobs, it is estimated that new jobs would amount to 38,409, while 78,453 jobs would be preserved.<sup>15</sup>

<sup>15</sup> Estimates are provided to the last digit to provide traceability to economic calculations.

In conclusion, the opportunity cost of not allowing rural carriers to roam or interoperate with national carriers at the 700 MHz band is significant. Service deployment in this band is the only choice for unserved and underserved households to gain access to broadband at the service speed stipulated in the National Broadband Plan. If these policy changes were to be enacted, accessibility to service would have a significant economic impact. In the three states analyzed in this study, filling up the supply gap (14% in Kentucky, 2.5% in Ohio, and 22% in West Virginia) could result in 20,772 jobs created or saved resulting from business expansion between 2011 and 2014, and an increase in median income, ranging from \$914 in Kentucky to \$428 in Ohio, and \$ 1,264 in West Virginia. In addition, by making broadband fully available in the nineteen states with lowest broadband coverage, 116,862 jobs could be created or saved between 2011 and 2014, of which 38,409 are new jobs.

**TABLE 4.**  
**Impact of Full Broadband Availability**

	Kentucky	Ohio	W. Virginia	19 States*
Unemployment (October 2010)	10.0 %	9.9 %	9.3 %	8.39 %
Jobs created or preserved by broadband (2011-4)	10,235	5,744	4,793	116,862
New Jobs	3,254	860	910	38,409
Preserved Jobs	6,981	4,884	3,883	78,453
Median income (2010)	\$ 43,765	\$ 52,047	\$ 36,804	\$47,055
Increase in median income	\$ 914	\$ 428	\$ 1,264	\$1,201

(\*) Comprises West Virginia, Arkansas, Mississippi, Alaska, South Dakota, Montana, North Dakota, Kentucky, New Mexico, Missouri, Wyoming, Oklahoma, Louisiana, North Carolina, Alabama, Kansas, Virginia, Tennessee and Maine.

Source: Data compiled from US Census Bureau, Connect Kentucky, Connect Ohio databases, and ESRI Business Analyst Sourcebook for County demographics; analysis by the authors







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