Broadband: $134 Billion for the Economy, 2.4 Million Jobs

An analysis commissioned by Connected Nation shows enormous economic, social and environmental benefits with just 7% broadband growth; BBP extended it to calculate state unemployment-rate impact.

Connected Nation, a national nonprofit focused on improving digital inclusion, published a study earlier this year estimating the potential results of extending the ConnectKentucky broadband mapping program nationwide. The report, entitled "The Economic Impact of Stimulating Broadband Nationally," found that if Congress funds legislation empowering every state to implement such programs, the nation would experience an increase in the growth rate of broadband adoption over what would have been expected before the economic meltdown without a broadband-focused program.

Adopting a national policy to stimulate deployment of broadband in underserved areas alone could have dramatic economic impacts. For instance, just a 7-percentage-point increase in broadband adoption could result in:

- $92 billion due to 2.4 million jobs created or saved annually; BBP's state-by-state analysis shows a drop in fall 2008 unemployment rates of 1.45 to 1.85 percentage points, not including labor required to deploy the broadband networks themselves.
- $662 million saved per year in reduced health care costs.
- $6.4 billion per year in mileage savings from unnecessary driving.
- $18 million in carbon credits associated with 3.2 billion fewer pounds of CO_2 emissions per year in the United States.
- $35.2 billion in value from 3.8 billion more hours saved per year from accessing broadband at home.
- $134 billion per year in total direct economic impact of accelerating broadband across the United States.

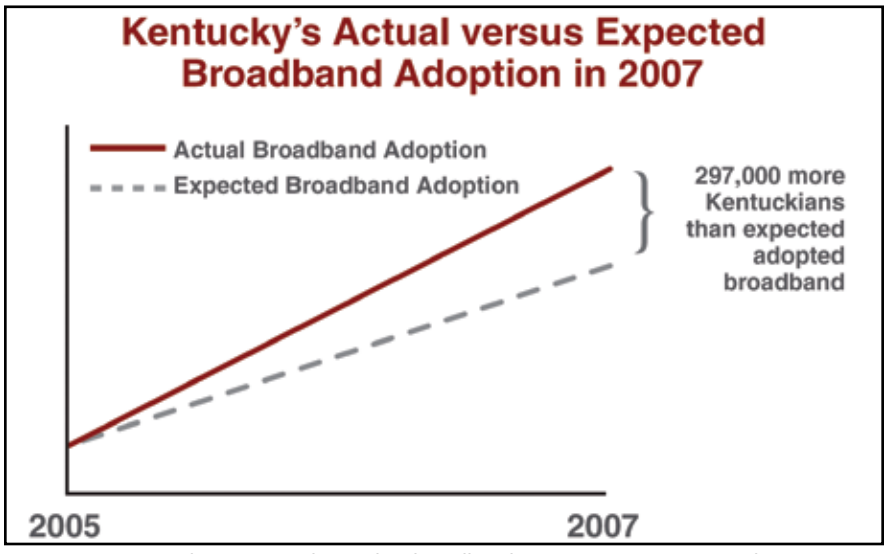
While much of that broadband growth would be fiber-borne, even lower-bandwidth solutions provide significant benefits, the study suggests. In 2007, the US House of Representatives voted unanimously to pass such legislation, and the Senate passed a similar proposal as part of a farm bill renewal. In October, a mapping bill passed both houses of Congress, However, no funding for the program has been allocated.

METHODOLOGY

Using counterfactual analysis ("if *A* had not occurred, then *C* would not have happened but mechanism *B* isn't studied"), the Connected Nation study conservatively quantified the impact of ConnectKentucky as the intervening factor in Kentucky's faster-than-national growth. The study extrapolates this impact to other states, comparing the growth of adoption in Kentucky from 2005-2007 to what would have been expected if ConnectKentucky had not been in place. In those years, Kentucky had 297,000 more broadband subscribers than expected, compared to national growth rates. [1]

Many have recognized that broadband adoption represents an important source of gaining an economic advantage. A recent Brookings Institution study developed a formula for gauging the growth in jobs that can be associated with growth in broadband adoption. [2]

The Connected Nation study uses the Brookings Institution formula along with consumer surveys to estimate the direct economic impacts associated with employment, time saved, direct consumer health care savings and economic and environmental impact of fewer



Expected versus actual growth in broadband users 2005-2007 in Kentucky.

miles being driven due to online activity enabled by broadband.

The savings above were calculated by applying the dynamic equivalents to other states' demographics and by assuming a similar growth rate in broadband adoption. Given the federal government's current search for constructive forms of economic stimulus, Connected Nation asked for:

- Recognition of the critical role of public-private partnerships in broadband expansion.
- Federal enabling of state/local response to broadband deployment and demand aggregation.
- Recognition of the indispensable role nonprofits play in program implementation.
- Work with providers of broadband to create a business case for extension of broadband to unserved areas.

Connected Nation contends that the much larger growth rates for Kentucky household broadband adoption compared with national growth (especially in rural areas), as well as Kentucky's lagging levels of education and income, indicate the 7 percent figure is conservative.

But how does the online activity of an extra 297,000 broadband subscribers in Kentucky translate into a specific economic impact there? The study looks at five economic variables:

- Employment
- Health care cost savings
- Mileage costs saved
- Environmental pollution
- Time saved

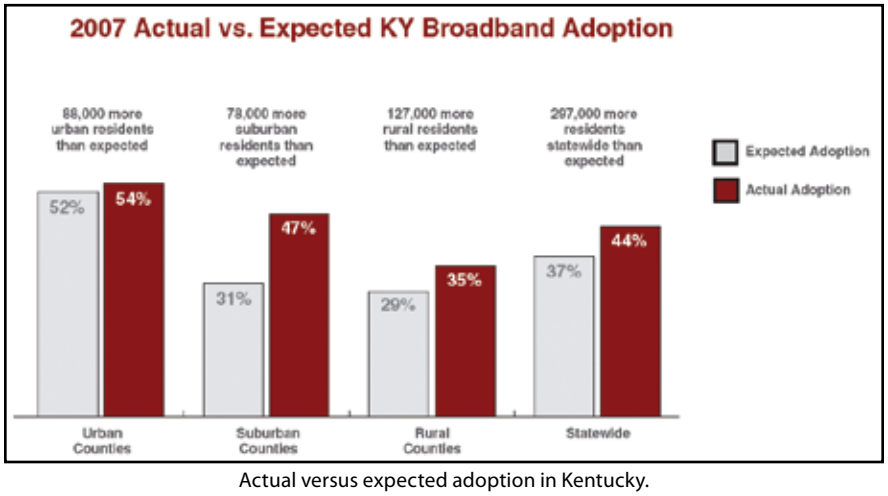
There are additional benefits associated with broadband adoption such as improved education, a more technologically literate workforce and more efficient government services. But they were not quantified in this study.

Employment: There have been several studies of the impact of broadband growth on employment. While they have had varying conclusions, all indicate a positive correlation. The Brookings Institution report concluded that "nonfarm private employment and employment in several industries is positively associated with broadband use. More specifically, for every 1 percentage point increase in broadband penetration in a state, employment is projected to increase by 0.2 to 0.3 percent per year."

Applying it to the data from Kentucky, the 7 percentage point growth in broadband adoption in Kentucky over the expected rate results in an additional 63,000 jobs created or saved in Kentucky between 2005 and 2007. [3]

The average annual economic value of these jobs can be estimated at $1.06 billion in direct wages, using Kentucky's average annual wage of $33,490 in 2006, as reported by the United States Bureau of Labor Statistics (www.bls.gov).

Health care cost savings: According to a small sample in the 2007 ConnectKentucky Residential Technology Assessment, 72 percent of home broadband users who use the Internet for health care purposes report that access to online health information has empowered them to become healthier. [4]



Actual versus expected adoption in Kentucky.

Of the residents who have become healthier, 63 percent report that doing so has saved them money, with an average self-reported savings of $217 per person. To conservatively estimate the impact of the boost in broadband adoption resulting from the ConnectKentucky initiatives, only the actual health care costs savings among broadband subscribers are analyzed – and this analysis is limited to broadband adoption above the expected rate. An estimated 35 percent of all broadband users report saving an average of $217 as a direct result of becoming healthier through obtaining health care information online. This translates into a $9.4 million annual self-reported health care cost savings for the additional 297,000 broadband users above the expected in Kentucky.

This does not account for savings to the state in Medicaid or other indirect health savings.

The ConnectKentucky survey also found that 47 percent of Kentuckians who use broadband to access health care information agree that by doing so, they have prevented potentially unnecessary trips to doctors, hospitals, emergency rooms or other health care professionals. Each patient's visit to a physician, emergency room or other medical facility costs money. Among Kentucky broadband users, 37 percent report that online access to health care information has prevented an average of 4.2 unnecessary trips to receive medical care. This equals more than 462,000 medical visits avoided among the 297,000 additional broadband users as a result of ConnectKentucky efforts.

Mileage costs saved: The ability to conduct transactions online also means that Kentuckians with broadband spend less time in their cars. Instant information and broadband-based access to relevant government services means not having to stand in line at shops and at town hall. In the 2007 ConnectKentucky residential survey, 66 percent of broadband users report driving an average of 102 fewer miles per month because of their online activity. This yields a total annual savings of more than 1.2 billion vehicle miles. Of these savings, approximately 190 million miles per year can be attrib-

uted to larger-than-expected growth in broadband adoption. [5]

Using the United States General Services Administration reimbursement rate for driving of $0.485 per mile, it can be said that the ConnectKentucky initiative has yielded an annual savings of $92.1 million in consumer driving costs.

Environmental pollution: Broadband adoption creates other positive externalities with respect to transportation, such as reduced gasoline consumption and reduced emissions. The estimated cost savings associated with a reduction in miles driven does not account for the significant environmental savings that result from fewer cars on the road. According to the World Resources Institute, the average 2005 fuel fleet economy was 21 miles per gallon. [6]

According to the Center for Environmental Economic Development, 1 gallon of gas equates to 5.159 pounds of carbon. [7]

Given these figures and the savings of 190 million vehicle miles attributed to broadband adoption above expected, it can be estimated that ConnectKentucky efforts generated an annual reduction of 46.7 million pounds of carbon emissions. In addition to the positive environmental impact and using the standard measurements for CO_2 emissions credits, the annual economic impact of 46.7 million pounds of carbon emissions can be estimated at $252,000. [8]

Time Saved: According to the 2007 ConnectKentucky statewide survey, 75 percent of Internet users agree that conducting online transactions has saved them time. Broadband users are significantly more likely than dial-up users to agree that doing things online saves them time. Broadband users report saving nearly 40 percent more time than dial-up users. The average broadband user reports saving 15 hours a month by conducting transactions online. [9]

The time saved by the additional 297,000 individuals accessing broadband in Kentucky above the expected amount translates into approximately 53.4 million hours saved each year. Assuming that one hour saved is equal in value to at least one half hour of wage earned, these saved hours can account for an estimated $429.8 million in value. [10]

The total estimated impact of continuing the ConnectKentucky program in Kentucky alone is $1.59 billion annually.

RURAL EFFECTS

A 2006 GAO report concluded that "when the availability of broadband to households, as well as demographic characteristics, are taken into account, rural households no longer appear less likely than urban households to subscribe to broadband. That is, the difference in the subscribership to broadband among urban and rural households appears to be related to the difference in availability of the service across these areas, and not to a lower disposition of rural households to purchase the service." [11]

Therefore, it appears that with the universal availability of broadband, the current 31 percent rural broadband adoption rate would eventually become much closer to the urban broadband adoption rate of 52 percent.

If the rest of the states in the US were empowered to develop initiatives similar to accelerate broadband, one would expect to see increased adoption in suburban and urban areas, but especially in rural areas, as rural areas are most significantly affected by broadband availability increases. In fact, if every state could accelerate its broadband adoption by 7 percentage points above the expected, as Kentucky did with the ConnectKentucky initiative, one would expect the impact for the United States as a whole to be as shown in the table. **BBP**

REFERENCES AND NOTES

1. If national broadband adoption rates between 2005 and 2007 were applied to Kentucky's 2005 baseline broadband adoption rate (24 percent), then Kentucky's expected statewide adoption would be only 37 percent in 2007. However, Kentucky's broadband adoption percentage is actually 44 percent in 2007, which is 7 percentage points above the expected adoption rate. This additional 7 percentage points translates into approximately 297,000 more individuals accessing broadband in the state of Kentucky than expected. The Kentucky growth data comes from two studies: 2005 University of KY E-Commerce Report – statewide digit dial telephone survey conducted March 2005 (N=1,102 +/- 3% at the 95% level of confidence) and a 2007 ConnectKentucky Residential Technology Assessment – statewide random-digit-dial telephone survey completed September 2007. N = 10,830 +/- 1.7% at the 95% level of confidence. National growth: "Home Broadband Adoption 2007" by John Horrigan and Aaron Smith, Pew Internet and American Life Project, June 2007).
2. Robert W. Crandall, Robert E. Litan, and William Lehr, "The Effects of Broadband Deployment on Output and Employment: A Cross-Sectional Analysis Of U.S. Data," Issues in Economic Policy: The Brookings Institution, No. 6, July 2007.
3. For a two-year time frame, the Crandall et al. paper (pages 9-10) generated .593 as the regression coefficient for a two-year time span from the regression results from the effect of broadband on employment during 2003-2005. Therefore, the study used .593 as the coefficient for the two year effect from 2005-2007. According to the United States Bureau of Labor Statistics, Kentucky's employment was 1.51 million in 2005.
4. Question 15D in the 2007 ConnectKentucky Residential Technology Assessment: "Obtaining health care information online has empowered me to be healthier?" Also, question 16D1: "About how much money would you estimate you have saved by becoming healthier in this way?" And question 16E: "About how many trips to a doctor, hospital or medical center have you saved by finding information online?" n= 191 respondents with broadband service at home who obtain health care information online.
5. Question 15C of the 2007 ConnectKentucky Residential Technology Assessment: "I need to drive less often or fewer miles because of the things I do online" n=243 respondents with broadband service at home.` Question 16C: "About how many miles of driving per month do you save by having Internet service at home?" n=157 respondents with broadband service at home who agree that Internet service at home reduces the amount they need to drive.
6. http://embarq.wri.org/documents/Schipper-VehicEfficiency.pdf.
7. http://ceedweb.org/PDFs/CO2Worksheet.pdf.
8. Using the average cost of carbon emission offsets charged by the 21 major U.S. carbon offset providers, as reported by Carbon Catalog (www.carboncatalog.org) on 1/28/2008.
9. Question 15B of the 2007 ConnectKentucky Residential Technology Assessment: "Doing things online saves me time?" n=243 respondents with broadband service at home, and 113 respondents with dial-up service at home.
10. The estimates regarding the value of time saved is based on the assumption that broadband subscribers can use their extra free time to work more hours, contribute to communities through volunteer time or simply enjoy additional leisure time – which has been shown to enhance productivity while on the clock.
11. General Accounting Office, Broadband Deployment Is Extensive Throughout the United States, but It Is Difficult to Assess the Extent of Deployment Gaps in Rural Areas, May 2006, p. 30.

	Total Annual Economic Impact (millions)	Annual Net Job Growth from the Increase in Broadband (thousands)	Direct Annual Income Growth from the Increase in Broadband (millions)	Average Annual Health Care Costs Saved (millions)	Average Annual Mileage Costs Saved (millions)	Average Annual Hours Saved (millions)	Annual Value of Hours Saved (millions)	Average Annual lbs of CO2 Emissions Cut (millions)	Value of Carbon Offsets (thousands)	Population 2006 (millions)	Non-farm Employment Oct 2008p (millions)	Impact On Unemployment Rate, 1 Yr (percent)
Alabama	$1,692	33	$1,119	$10.2	99	58	$464	50	$271	4.6	2.0	1.7%
Alaska	$317	5	$213	$1.5	14	8	$89	7	$38	0.7	0.3	1.5%
Arizona	$2,499	46	$1,681	$13.7	129	77	$674	66	$354	6.2	2.6	1.8%
Arkansas	$964	21	$635	$6.2	60	35	$262	31	$165	2.8	1.2	1.7%
California	$17,287	262	$11,577	$80.8	768	458	$4,859	389	$2,102	36.5	15.1	1.7%
Colorado	$2,351	40	$1,644	$10.5	102	60	$594	52	$279	4.8	2.4	1.7%
Connecticut	$1,939	30	$1,368	$7.8	76	44	$486	39	$209	3.5	1.7	1.7%
Delaware	$453	8	$325	$1.9	18	11	$107	9	$51	0.9	0.4	1.8%
Florida	$7,532	143	$5,137	$40.1	399	227	$1,955	202	$1,092	18.1	7.9	1.8%
Georgia	$3,908	71	$2,640	$20.7	197	118	$1,049	100	$539	9.4	4.1	1.7%
Hawaii	$578	10	$397	$2.8	28	16	$150	14	$77	1.3	0.6	1.7%
Idaho	$566	11	$378	$3.2	31	18	$154	16	$84	1.5	0.7	1.7%
Illinois	$6,208	106	$4,321	$28.4	274	161	$1,584	139	$749	12.8	6.0	1.8%
Indiana	$2,680	53	$1,860	$14.0	135	79	$670	68	$369	6.3	3.0	1.8%
Iowa	$1,237	26	$867	$6.6	65	37	$299	33	$177	3.0	1.5	1.7%
Kansas	$1,155	23	$798	$6.1	59	35	$292	30	$161	2.8	1.4	1.6%
Kentucky	$1,587	32	$1,062	$9.3	91	53	$425	46	$249	4.2	1.9	1.7%
Louisiana	$1,557	31	$1,030	$9.5	91	54	$426	46	$250	4.3	2.0	1.6%
Maine	$545	11	$372	$2.9	30	17	$140	15	$81	1.3	0.6	1.7%
Maryland	$2,814	44	$1,934	$12.4	121	70	$746	61	$332	5.6	2.7	1.7%
Massachusetts	$3,841	58	$2,765	$14.3	142	81	$919	72	$387	6.4	3.3	1.8%
Michigan	$4,638	76	$3,142	$22.4	217	127	$1,256	110	$594	10.1	4.2	1.8%
Minnesota	$2,791	49	$2,021	$11.4	111	65	$647	56	$305	5.2	2.8	1.8%
Mississippi	$906	19	$570	$6.4	61	37	$267	31	$168	2.9	1.1	1.6%
Missouri	$2,501	49	$1,733	$12.9	126	73	$629	64	$345	5.8	2.8	1.7%
Montana	$337	7	$225	$2.1	21	12	$89	10	$57	0.9	0.5	1.6%
Nebraska	$783	16	$558	$3.9	38	22	$183	19	$103	1.8	1.0	1.7%
Nevada	$1,175	23	$845	$5.5	53	31	$271	27	$145	2.5	1.3	1.8%
New Hampshire	$634	11	$446	$2.9	29	17	$156	15	$79	1.3	0.7	1.7%
New Jersey	$4,637	71	$3,232	$19.3	189	109	$1,196	96	$516	8.7	4.1	1.7%
New Mexico	$694	13	$448	$4.3	41	25	$200	21	$113	2.0	0.9	1.5%
New York	$9,909	148	$6,776	$42.8	421	242	$2,669	213	$1,151	19.3	8.8	1.7%
North Carolina	$3,626	69	$2,466	$19.6	191	111	$949	97	$521	8.9	4.2	1.7%
North Dakota	$264	6	$187	$1.4	14	8	$62	7	$38	0.6	0.4	1.6%
Ohio	$5,166	96	$3,598	$25.4	248	144	$1,294	126	$678	11.5	5.4	1.8%
Oklahoma	$1,270	26	$834	$7.9	76	45	$352	39	$209	3.6	1.6	1.6%
Oregon	$1,653	29	$1,133	$8.2	81	46	$431	41	$221	3.7	1.7	1.7%
Pennsylvania	$5,618	104	$3,905	$27.6	274	156	$1,411	139	$750	12.4	5.8	1.8%
Rhode Island	$518	9	$361	$2.4	24	13	$131	12	$64	1.1	0.5	1.8%
South Carolina	$1,629	33	$1,090	$9.6	93	54	$435	47	$256	4.3	1.9	1.7%
South Dakota	$295	7	$205	$1.7	17	10	$72	8	$46	0.8	0.4	1.6%
Tennessee	$2,451	49	$1,683	$13.4	131	76	$624	66	$358	6.0	2.8	1.8%
Texas	$9,424	173	$6,303	$52.1	486	295	$2,581	246	$1,330	23.5	10.7	1.6%
Utah	$1,066	21	$737	$5.6	50	32	$273	26	$138	2.6	1.3	1.6%
Vermont	$275	5	$192	$1.4	14	8	$68	7	$38	0.6	0.3	1.7%
Virginia	$3,765	63	$2,626	$16.9	166	96	$956	84	$454	7.6	3.8	1.7%
Washington	$3,056	48	$2,075	$14.2	139	80	$828	70	$379	6.4	3.0	1.6%
West Virginia	$616	13	$399	$4.0	41	23	$172	21	$111	1.8	0.8	1.7%
Wisconsin	$2,613	51	$1,864	$12.3	121	70	$616	61	$331	5.6	2.9	1.8%
Wyoming	$216	4	$150	$1.1	11	6	$53	6	$31	0.5	0.3	1.5%
Total	**$134,235**	**2353**	**$91,927**	**$662**	**6,413**	**3750**	**$35,215**	**3248**	**$17,544**	**299**	**137**	**1.7%**

State-by-state economic and employment impact: 2.4 million jobs (new or saved); annual economic impact of $134 billion. Last three columns from BBP.