

Commissioners' Report on Missouri Broadband Availability

by

Commissioner Robert M. Clayton III
Commissioner Steve Gaw
Missouri Public Service Commission

September 18, 2007

Angie Heffner Robyn, Personal Advisor
Natelle Dietrich, PSC Telecommunications Staff
William Voight, PSC Telecommunications Staff
Dana Parish, Designated Principal Assistant



MISSOURI PUBLIC SERVICE COMMISSION
FROM THE DESK OF
COMMISSIONER ROBERT M. CLAYTON III
COMMISSIONER STEVE GAW

GOVERNOR OFFICE BUILDING • 200 MADISON STREET • SUITE 900
JEFFERSON CITY, MISSOURI 65101
TEL. 573.751.4221
FAX 573.526.7341

ROBERT.CLAYTON@PSC.MO.GOV
STEVE.GAW@PSC.MO.GOV

September 18, 2007

Ms. Colleen Dale, Secretary
Missouri Public Service Commission
P.O. Box 360
Jefferson City, MO 65102

Re: Commissioner's Report on Missouri Broadband Availability

Dear Judge Dale:

Pursuant to §386.130, RSMo. 2000, we tender herewith a Commissioners' Report on Missouri Broadband Availability.

The Report is an analysis and comparison of broadband availability throughout the exchanges of Missouri. The Report confirms that rural Missouri lags behind urban areas in terms of broadband availability and high-speed Internet options. The survey also illustrates the need for enhanced authority for the Commission to gather comprehensive, complete data. Due to technological and regulatory differences among various carriers and our limitations to compel responses, some data cannot be accurately included within the study. Notwithstanding these limitations, these Commissioners have confidence that the Report's suggested trends accurately depict Missouri broadband deployment conditions.

Thank you very much for your assistance.

Very truly yours,



Robert M. Clayton III
Commissioner



Steve Gaw
Commissioner

Cc: Members of the Missouri Public Service Commission

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COMMISSIONERS' REPORT

Executive Summary

This study suggests that statewide wireline broadband deployment has reached 78% in Missouri, while over one in five Missouri households (22% or 1.2 million citizens) continue to lack equitable access to modern telecommunications services at home.

On a state-wide basis, 78% of Missouri households have access to some form of wireline broadband Internet. If the three largest telephone exchange areas of St. Louis, Kansas City and Springfield are removed from the analysis, the percentage of households with wireline broadband access falls to 65%. For exchange areas or communities with less than 25,000 households, wireline broadband deployment falls to 62%, and in exchange areas or communities with less than 15,000 households, wireline broadband deployment drops to 61%. In stark contrast, the level of wireline broadband deployment in the three urban centers is 93%.

The study clearly highlights the fact that urban areas and large cities outpace rural areas in terms of wireline broadband availability. Citizens who live in small towns, who live in the country and certain residents of communities beyond the technical reach of Digital Subscriber Line service (DSL) or cable broadband, lack the same service alternatives and opportunities as those offered in urban areas.

A more in-depth analysis of out-state Missouri suggests that small, rural telecommunications carriers have been more aggressive in offering broadband to customers throughout their service territories than their larger rivals. For example, small, rural telecommunications carriers offer DSL broadband access to 80% of households. These exchange areas have less than 10,000 households. Large telecommunications carriers, including

their local exchange telecommunications competitors, however, have only deployed DSL service to 64% of their exchange service areas, when removing urban centers of St. Louis, Kansas City and Springfield. In exchange areas with less than 25,000 households, large and competitive telecommunications carriers offer broadband access to 60% of households. In exchanges with less than 15,000 households, large and competitive telecommunications carriers offer broadband access to 59% of households.

The Universal Service Fund (USF) may also play a role in calculating broadband deployment. High cost support is available for voice-related telecommunications services in some exchange areas with less than 25,000 households and all but one incumbent local exchange carrier receive some level of support for certain exchange areas in the state (only a few competitive local exchange carriers receive high cost support). In exchange areas where local exchange carriers receive high cost support, DSL broadband is available to 67% of households. In exchange areas where carriers do not receive high cost support, DSL broadband is available to 59% of households, for geographically and demographically comparable areas.

There are 128 exchanges in which no DSL Internet service is available. Among those exchanges, 99 exchange areas are served by large telecommunications carriers while 29 exchange areas are served by small, rural telecommunications carriers. Each of these communities has less than 5,500 households and most have less than 500 households.

Other broadband services are available to compete with telecommunications carriers' DSL service, but it is unclear as to the availability, the quality or the pricing of most of those alternatives. Cable broadband is only available in 267 out of 689 exchange areas, and cable broadband does not reach beyond the borders of towns and cities. Because of incomplete data, it is unclear how many cable broadband connections are present beyond the technical reach of DSL

within the corporate boundaries of a community. Cable broadband is available in 37 exchange areas where there is no DSL service present; however, it is estimated that only 29% of the households within those 37 exchange areas can access the cable broadband service. Wireless service, either through satellite or wireless networks, may prove to be an effective alternative in the future, but it is unclear where the services are available or how the quality or reliability of the service compares to wireline service. Other services like municipal Wi-Fi or Broadband over Power Lines offer great opportunities in the future, but today are either not available or are offered in areas already receiving DSL service.

In conclusion, this survey suggests that 481,800 Missouri families, located primarily in rural areas and small towns, lack the modern tools and conveniences to effectively and meaningfully access the Internet through wireline broadband connections.

Background

No one can dispute that access to the Internet is critically important in today's society. Over the course of its short life, the Internet has revolutionized the way companies do business and the way individuals conduct their personal lives. "Broadband communications are fast becoming the great economic engine of our time," said Commerce Committee Chairman Daniel K. Inouye (D-Hawaii).¹ Consumers use the Internet to collect information on products that they buy and in many cases use electronic commerce to complete their purchases. They conduct research for personal matters, communicate with family and friends far from home, pay their bills and conduct their financial affairs. High school and college students take on-line courses, conduct research, communicate with their classmates and turn in assignments to their professors through the Internet. Professionals complete their continuing education and training obligations

¹ Statement by the United States Senate Committee on Commerce, Science and Transportation, July 19, 2007.

from home, on-line, without incurring costly travel expense. It is used for new forms of recreation in computer gaming and in access to unlimited varieties of media including music, movies and literature. Consumers have the freedom and privacy, in most cases, to use the Internet to its fullest capacity from the safety and convenience of home.

In addition, the Internet is no longer a luxury, but is absolutely essential. Global businesses are connected via virtual private networks and video-conferencing has replaced expensive international travel. Employees may need the option of telecommuting. As broadband connections become more commonplace, employees are able to connect home computers to corporate Internet networks.

Many companies mandate the use of electronic commerce in distributing billing or statement information. Consumers who choose the “old fashioned” paper copies may be subject to additional fees and expenses. On-line banking may be an efficient and inexpensive alternative, but it may carry mandates to eliminate paper statements and notices. Service providers and retailers have mandated use of electronic communication in e-mail rather than from traditional paper correspondence. Airlines charge extra for purchasing airline tickets through an agent or by phone rather than purchasing on-line. The Internet is no longer a novelty and it is no longer a luxury. Access to the Internet is essential today and will become even more critical in the future.

While first generation Internet Service Providers (ISPs) offered dial up Internet access at speeds no greater than 56 kbps,² today's requirements in surfing the web require much greater speeds for even simple tasks like viewing advanced web pages or sending voluminous e-mail. Faster computers and improved technology have made higher processing speeds a possibility.

² In the Matter of Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans (“Deployment of Advanced Telecommunications Capability”) 14 F.C.C.R. 2398, (F.C.C. 1999) at n. 31.

Requirements for even greater speeds accommodate gaming services, work applications, audio and video streaming and other advanced services.

Broadband is the term most often used to describe service that permits use of the Internet at speeds greater than 200 kbps in at least *one* direction. Digital Subscriber Line (DSL) service, usually provided by telecommunications companies through fiber optic cables, copper wires or other connections, has advertised upstream/downstream speeds of approximately 120 kilobits per second to 10 megabits per second. Cable companies provide broadband service through coaxial cable at advertised upstream/downstream speeds ranging from 128 kilobits per second to 8 megabits per second. Fixed and mobile wireless connections can be offered through personal computers, cell phones or personal digital assistants (PDAs) at advertised upstream/downstream speeds of 4 to 54 megabits per second. Some of these services are limited to ranges of 35 to 110 meters from transmission while some services may be available within the entire footprint of a wireless carrier. Lastly, Broadband over Power Lines (BPL) is a fledgling service provided over electrical lines with advertised upstream/downstream speeds ranging from 256 kilobits to 2.7 megabits per second. It is important to remember that while providers typically advertise broadband availability at such speeds, actual experiences are affected by such variables as distance from the transmission source, number of people accessing the service at one time and other factors.

The FCC defines “broadband services” as those services that deliver information at speeds in excess of 200 kbps in at least *one* direction and defines “advanced services” as those services that deliver information at speeds in excess of 200 kbps in *both* directions.³ In its recent broadband notice of proposed rulemaking (NPRM), the FCC sought comment on whether it

³ In the Matter of Development of Nationwide Broadband Data to Evaluate Reasonable and Timely Deployment of Advanced Services to All Americans (“Nationwide Broadband Data”), (WC Docket No. 07-38, released April 16, 2007), at n. 2.

should refine the definitions to expand its understanding of the rapidly evolving broadband marketplace.⁴

Questions have been raised regarding the availability of broadband in the United States and whether certain sectors of the economy lack the modern tools to conduct their business and personal lives in the 21st Century. As Federal Communications Commissioner Michael Copps testified before the United States Congress,

Our biggest infrastructure challenge as a nation is bringing broadband to all of our citizens and we're not doing a very good job. Since we last convened, the OECD ranked the United States 15th in broadband penetration, down from 12th in 2006. But if you don't like that study, there are many others conducted by international organizations, industry associations, think tanks and business analysts that have us at 21st, 11th, 12th, or 24th. By any measure, we're getting too little broadband at too high a price.⁵

The Internet is what connects individuals to markets and links economies around the world. No longer can businesses or consumers expect that goods or services will be exchanged at a local level, but rather, will engage commerce on a global scale through high-speed communications systems. Those who do not have access are left behind at a competitive disadvantage. FCC Commissioner Adelstein argued,

[W]e have failed to keep pace with our global competitors over the past few years. Each year, we slip further down the regular rankings of broadband penetration. For Americans in rural areas, low income consumers, and small businesses, the problem can be even more acute. According to the ITU, the digital opportunity afforded to U.S. citizens is 21st in the world. While some have protested the international broadband penetration rankings, the fact is the U.S. has dropped year-after-year. This downward trend and the lack of broadband value illustrate the sobering point that when it comes to giving our citizens affordable access to state-of-the-art communications, the U.S. has fallen behind its global competitors.

⁴ *Id.*

⁵ Testimony before the United States House of Representatives Committee on Energy and Commerce, July 24, 2007, <<http://www.fcc.gov/ola/testimony.html>>.

There is no doubt about the evidence that citizens of other countries are getting a much greater broadband value in the form of more megabits for less money. This is more than a public relations problem. It is a major productivity problem, and our citizens deserve better.”⁶

As stated by Senator Inouye, “The first step toward securing broadband for all Americans is getting better broadband data.”⁷ The FCC attempted to tackle the issue in 2000 by instituting a formal broadband data program through the use of Form 477.⁸ All facilities-based providers of high-speed connections are required to report twice a year to the FCC information by zip code and transfer speed. Using this data, the FCC has released several reports on broadband availability, including the most recent report dated June 30, 2006,⁹ finding that nationwide, high-speed DSL connections were available to 79% of the households to whom incumbent local exchange carriers (ILECs) could provide local telephone service, and that high-speed cable modem service was available to 93% of the households to whom cable system operators could extend cable TV service. Additionally, the FCC study reported that 99% of all United States zip codes indicate the presence of at least one subscriber who uses a high-speed connection to the Internet.

For Missouri specifically, the study found that 72% of Missouri residential end user premises have access to broadband via telecommunications carriers’ DSL service and 96% of Missouri cable residential end user premises have access to broadband via cable modem, if cable television service is available.¹⁰

⁶ *Id.*

⁷ Statement by the United States Senate Committee on Commerce, Science and Transportation, July 19, 2007.

⁸ Nationwide Broadband Data, *id.* n. 3, at ¶3.

⁹ *High-Speed Services for Internet Access: Status as of June 30, 2006*. Industry Analysis and Technology Division, Wireline Competition Bureau, January 2007.

¹⁰ *Id.* at table 14.

However, questions have been raised as to the accuracy and relevance of the FCC Study because of flaws in the survey methodology. The Government Accountability Office (GAO) reviewed the strengths and weaknesses of the FCC's broadband data collection methodology in a paper released in May 2006.¹¹ The report concluded that it remains very difficult to assess the extent of deployment gaps in rural areas of the United States. The FCC's current methodology includes tracking broadband availability by zip code. This methodology has been criticized by the GAO and the Census Bureau as unrepresentative of geographic regions. The GAO further found that the results were skewed toward metropolitan areas. In fact, the Census Bureau implemented its own statistical entity to compensate for weaknesses associated with geographic issues related to zip codes.¹² Concerns with broadband speed and data collection efforts were also relayed by FCC Commissioners to the United States House of Representatives Committee on Energy and Commerce, July 24, 2007.¹³

The FCC's Missouri-specific numbers are also questionable. For instance, the report found that 72% of residential end user premises have access to DSL, yet, according to its underlying tables, only 879,000¹⁴ residential end user lines were reported. The Staff of the Missouri Public Service Commission (Staff) suggests that with 2.19 million Missouri households, the FCC's figure for end user lines would suggest broadband deployment of a paltry 40%. These statistical inconsistencies suggest a need for further study and analysis.

The United States Congress has moved forward with plans to improve data collection on broadband deployment and availability. The Senate Committee on Commerce, Science, and

¹¹ *Broadband Deployment Is Extensive throughout the United States, but It Is Difficult to Assess the Extent of Deployment Gaps in Rural Areas* ("Deployment Gaps in Rural Areas"). United States Government Accountability Office, GAO-06-426 (May 2006).

¹² See <<http://www.census.gov/geo/ZCTA/zcta.html>>.

¹³ See nn. 5 & 6, *supra*.

¹⁴ This figure represents a combination of end user lines from all broadband sources – DSL, cable, wireless and satellite.

Transportation unanimously approved a bill to improve the quality of federal and state broadband data collection and encourage initiatives that promote broadband deployment. The *Broadband Data Improvement Act* (S. 1492) was introduced by Commerce Committee Chairman Daniel K. Inouye (D-Hawaii) with multiple co-sponsors and it now awaits consideration by the full Senate. This legislation is supported by the National Association of Regulatory Utility Commissioners (NARUC), which encourages further broadband deployment analysis and involvement of state regulatory officials.

Notwithstanding those future efforts by the Congress or other state initiatives, this Report attempts to track the availability of broadband service, defined as 200 kbps and greater in *both* directions, *by household*, throughout telephone exchange areas of Missouri. The Report will discuss the preliminary assumptions made at the start of the study, the scope and plan of acquiring data and will conclude with estimates on state-wide wireline broadband availability as well as by size of community.

Access to high quality, high speed Internet service is absolutely necessary for a 21st Century Missouri economy and an important criterion for a high standard of living and high quality of life for our citizens. The results suggest a need for a collaborative process to address the shortcomings of broadband access and a plan of how best to address the inequitable treatment of certain Missouri citizens.

Preliminary Assumptions

Broadband Definition

For purposes of this Report, broadband is defined as a service that offers transmission speeds in excess of 200 kilobits per second in *both* directions. This definition is consistent with

current FCC definitions for “advanced services” and was identified as an appropriate threshold because 200 kbps was four times faster than dial-up Internet access and was enough speed to permit a user to change web pages as fast as one can turn the pages of a book and transmit full motion video.¹⁵ While it is important to note that the FCC is taking comments on the appropriate speed for future studies,¹⁶ this report will focus on speeds which are in excess of 200 kbps in both directions. This definition of speed can be met by service provided in the form of DSL, cable, BPL and some forms of wireless broadband Internet access. These Commissioners believe 200 kbps in today’s environment is inadequate to meet the communications needs of Missouri consumers. The FCC should reevaluate its minimum transmissions speeds in light of increasing requirements of new technologies and applications.

Scope of Survey

Potential broadband providers were asked to respond to a survey, which sought data on broadband availability and subscribership. The survey asked for separate data relating to business or commercial broadband availability as well as specific data on residential availability, subscribership and usage.¹⁷ The Staff made certain assumptions regarding the number of households or businesses within specific exchange areas and requested responses from the survey participants based on those numbers. The companies were asked to provide the following information on an exchange-by-exchange basis:

1. estimated number of residential customers able to order broadband;

¹⁵ Deployment of Advanced Telecommunications Capability, *id.* n.2 at ¶20.

¹⁶ Commissioners Gaw and Clayton filed comments in response to the FCC’s questions concerning the appropriateness of its definition of broadband. The comments stated that less than ten percent of the providers that responded to the Commissioners’ Missouri-specific survey were unable to offer broadband at transfer speeds greater than 256 kbps. Therefore, the Commissioners encouraged the FCC to set a transfer speed of at least 200 kbps in both directions. Comments of Commissioners Gaw and Clayton. Nationwide Broadband Data, *id.* n.3 (released July 13, 2007).

¹⁷ See Exhibit A (NP version).

2. estimated number of residential customers subscribing to broadband;
3. estimated number of business customers;
4. estimated number of business customers able to order broadband;
5. estimated number of business customers subscribing to broadband;
6. upload/download speeds;
7. price per month for broadband access; and
8. reasons customers may not be subscribing to broadband access.

The questions were designed to evaluate the presence of wireline broadband, by household, when aggregated at the exchange area level.¹⁸ Exchange areas were chosen as the principal block of analysis for several reasons. First, exchange areas are more easily defined geographically and are more familiar to the state regulatory authority. The Commission approves the size and shape of an exchange area and possesses maps which provide a description of the area involved. Further, the telecommunications or cable provider can more easily be identified through its association with an exchange area through Commission records or the community name which identifies the exchange area.¹⁹ Using zip codes may create additional opportunities for inaccuracies in terms of mailing addresses versus physical service location addresses.

While exchange areas were chosen as the means to collect and aggregate the data, it is important to note that broadband data was requested by household within each exchange area in order to identify the availability, or lack thereof, in Missouri. These Commissioners, in

¹⁸ “An ‘Exchange’ or ‘Exchange area’ is a geographical area for the administration of telecommunications services, established and described by the tariff of a telecommunications company providing basic local telecommunications service; §386.020(16), RSMo. 2005. Telephone exchange areas are geographic areas in which customers can typically complete calls without incurring additional fees or long distance charges.

¹⁹ See Exhibit B; see also <<http://www.mtia.org/resources/map02.html>>, Exhibit C, <https://secure.ktis.net/missouricable/franchise_map.html>.

comments to the FCC, have asserted that the only way to truly measure broadband deployment is to determine the actual number of households or customers able to access (or not access) particular types of broadband technology, and to compare the total number of households or customers in the study area.²⁰ There may be merit to aggregating household data on a zip code basis in future studies, which could illustrate interesting trends in certain areas, especially in the case of a larger exchange area with multiple zip codes.

Who Participated in the Study

The survey was sent to fifty-seven (57) telephone companies including all large and small²¹ incumbent local exchange carriers (ILECs)²² and all facilities-based competitive local exchange carriers,²³ including cable companies certificated to offer telecommunications service. Their responses were to be provided by exchange areas.

Surveys were also sent to the Missouri Cable Telecommunications Association to be distributed to cable operators in the state offering cable broadband service. Cable provider data was to be collected on a franchise basis or by an incorporated community basis.

Municipal Internet service offerings were obtained through review of the Commission's December 31, 2006 Report to the General Assembly, *A Study of the Economic Impact of Municipally Owned and/or Operated Cable Television or Telecommunications Systems*,

²⁰ Comments of Commissioners Gaw and Clayton. Nationwide Broadband Data, *id.* n. 16.

²¹ "Small incumbent local exchange carrier" is defined as a local exchange telecommunications company which serves no more than twenty-five thousand subscriber access lines in the state of Missouri. §392.2304, RSMo. 2005.

²² "[A] local exchange telecommunications company [is] authorized to provide basic local telecommunications service in a specific geographic area as of December 31, 1995, or a successor in interest to such a company;" §386.020(22), RSMo. 2005.

²³ "Competitive telecommunications company" is a telecommunications company which has been classified as such by the commission pursuant to section 392.361, RSMo; §386.020(9), RSMo. 2005.

made pursuant to Sections 71.970 and 392.410 RSMo 2002.²⁴ Individual surveys were not sent to municipalities as part of this project because information had been gathered from municipalities within the previous six months.

Electric utilities were contacted to learn whether service known as Broadband over Power Line (BPL) was available anywhere in the state.

Broadband may also be provided by wireless or satellite providers in Missouri, but contact information and jurisdictional issues for these entities made it difficult to solicit survey responses. Wireless broadband service can be offered locally through Wireless Fidelity (Wi-Fi) or over wider areas by Worldwide Interoperability for Microwave Access (WiMax). Another form of wireless service is the type offered by wireless telecommunications carriers over cellular phone networks. Wireless transmissions are affected by such things as weather, terrain and other atmospheric conditions as well as the type of structure of a building.²⁵ While wireless service may prove in the future to be a reliable broadband option, it was not considered the equal of cable broadband, Digital Subscriber Line (DSL) or other wireline-based services because of reliability concerns.²⁶

²⁴ See <<http://psc.mo.gov/teleco/Commission%20Draft%20%20HB1402%202006%20Report.pdf>>.

²⁵ See “Confounded By a Street Lamp,” St. Louis Post-Dispatch (Sept. 5, 2007), <<http://www.stltoday.com/stltoday/news/stories.nsf/editorialcommentary/story/1643150183F767E18625734C0082C6B5?OpenDocument>>.

²⁶ See Consumer & Governmental Affairs Bureau, “What is Broadband,” <<http://www.fcc.gov/cgb/broadband.html>>. Fixed wireless systems transmit an Internet signal from a local tower which is connected to either a satellite or wire system (Tyson, Jeff, “How Wireless Internet Works,” <www22.verizon.com/about/community/learningcenter/articles/displayarticle1/0,1727,1087z1,00.html>). Similar reliability problems that plague wireless phone systems are also present during the exchange of data packets. While mobile wireless systems used by PDAs, cell phones or Internet cards may extend as far as the cell tower coverage area, speeds of such systems decrease over greater distances or in rural areas. Advertised speeds may decrease to 60-80 kpbs outside well-covered urban areas (Verizon Wireless National Access and Enhanced Services Map for Missouri, <<http://www.verizonwireless.com/b2c/CoverageLocatorController?requesttype=newsearch>> and Verizon’s Broadband Access Coverage and Speeds, <<http://b2b.vzw.com/broadband/coveragearea.html>>). There are 20 exchange areas in which wireless Internet services are present with no availability of wireline broadband. Such wireless service may prove to be a cost efficient and reliable system at some point in the future. This Report, however, must focus on the wireline based services which are more effectively measured for reliability.

Further, satellite broadband technology was not considered the equal of wireline-based broadband service because of the reliability concerns, relatively slow upload speeds associated with satellite systems and because of the high price relative to wireline-based services. Any consideration by policy makers to neglect deployment of wireline-based broadband solutions in rural areas of Missouri should take these factors into consideration. Moreover, satellite broadband service may limit or regulate bandwidth for rolling periods of time, or they may even do so permanently. During such periods, customer data transmission speeds are subject to intentional reduction until such time as average speeds or transmitted data decline to predetermined limits, typically set at the time a customer subscribes to the service. Bandwidth regulation may be initiated by service providers for any application, and is particularly applicable in situations involving applications such as web browsing, file transfer, and various streaming applications. Satellite broadband service is typically priced much higher than wired broadband service, with monthly prices as high as \$79.95 for speeds approaching that of typical DSL and cable modem services (price derived from www.attwb.net; August 2007). In addition to the high price of satellite broadband monthly charges relative to DSL or cable modem landline broadband charges, satellite broadband offerings typically require extensive up front equipment investments, which should be expected to act as an entry barrier to rural customers.

This study focuses on wireline service as a known quantity in terms of its quality and general reliability.

Survey Findings and Results

General Statistics

It is estimated that there are approximately 2.19 million households in Missouri reflecting a population of 5.6 to 5.8 million Missourians. Those households are located in 689 telephone exchange areas throughout the state. It is further estimated that 1 million of those households are located in what is considered rural parts of the state²⁷ while the balance of 1.19 million households are located in larger towns or cities.²⁸

Carrier Responses

Complete responses were received from all small incumbent local exchange carriers (ILECs). Complete responses were received from the majority of surveyed Competitive Local Exchange Carriers (CLECs). The large ILECs, AT&T, CenturyTel and Embarq, provided information on broadband availability but would not provide information on broadband subscribership. In fact, AT&T, CenturyTel and Embarq initially were reluctant to respond to the survey without assurances as to the potential use of the data. On May 2, 2007, in order to acquire the data without attempting compulsory discovery methods (issuing subpoenas), additional commitments were made to receive the responses that were provided. Specifically, the following written terms were provided by Staff to carriers in order to obtain responses:

There are no plans to make the actual survey results public. However, it should be expected that certain general conclusions will be drawn from survey responses, and those general conclusions will be made public. The following may serve as examples of general statements likely to be drawn from the survey results.

²⁷ For purposes of this Report, rural was defined as exchanges with less than 25,000 households and includes all Missouri exchanges except those listed in n. 28, *infra*.

²⁸ For purposes of this Report, telephone exchange areas referred to as metropolitan, urban or larger town or city are defined as exchange areas with more than 25,000 households including in total the incorporated communities of O'Fallon, St. Charles, Harvester, Manchester, Joplin, Columbia, St. Joseph, Springfield, Kansas City and St. Louis.

- (a) In communities with less than 5,000 residents, X percent of households have access to some form of landline broadband Internet access.
- (b) In “out-state” Missouri, X percent of households have access to some form of landline broadband Internet access.
- (c) In Missouri’s major metropolitan areas, the average upload/download speed is X megabits (or kilobits) per second.
- (d) In Missouri’s major metropolitan areas, X percent of households have access to X broadband providers.
- (e) The average price consumers in Missouri pay for broadband access is \$X.XX per month.
- (f) In Missouri, X percent of telephone exchange areas have [do not have] access to [any] some form of landline broadband access.

Information obtained from the survey results will be kept confidential. Additionally all information made public will be done so in a manner that avoids the possibility of readers being able to obtain confidential information by “back door” methods. For example, if a “cable TV company” reports a certain quantity of broadband customers in an exchange and the “local telephone company” also reports a certain quantity, a concern immediately arises when publishing the total quantity of customers because each competitor may be expected to simply subtract its own customer quantity in order to determine the quantity of its competitor’s customers. Every effort will be undertaken to minimize the potential for obtaining confidential information by such a back-door manner and all confidential information will be kept confidential.²⁹

There were a few CLECs that did not respond. However, due to their limited presence in the state, their participation was inconsequential to the overall conclusions of the Report.

Telecommunications carriers reported offering service known as Digital Subscriber Line or DSL. DSL service is provisioned by the use of additional equipment required in the carrier’s access network. Typically, Digital Subscriber Line Access Multiplexers (DSLAMs), routers and other data-related equipment must be installed in the central offices, and at Remote Service Terminals, which interface the DSL subscriber’s premises (via the subscriber’s telephone line) to Internet service access. The ability to transport broadband data (high speed data) via copper

²⁹ See Exhibit D.

cable circuits is distance sensitive. Higher speeds are limited to shorter service delivery distances, while lower speeds can be transported farther. Additionally, the copper cable access lines must be conditioned to remove loading coils, bridged taps, loop extenders and other impediments affecting the delivery of DSL service. Generally, it is considered that DSL service can only be offered and delivered to subscribers located no farther than approximately 18,000 feet from a DSLAM. However, certain equipment is available and may be deployed to extend the effective “reach” to subscribers outside the normal zone of service. The density and location of DSLAM-equipped Remote Service Terminals distributed throughout the carrier’s network is directly related to the DSL availability rate in a community.³⁰

The cable broadband providers, excluding those with certificated telecommunications service territories, did not respond in either the requested format or with disaggregated data. The Missouri Cable Telecommunications Association (MCTA) provided a list of all cable companies and their franchise areas with the assertion that if the cable company was providing cable service in such a franchise area, broadband was deployed and available to 100% of its service area. Granular data was requested on the number of households in each franchise and specifics were requested on the prices and speeds offered to broadband subscribers. Despite multiple attempts to obtain this data, MCTA and most cable companies did not provide the level of granularity needed to fully analyze cable broadband availability. Obviously, there are significant differences between franchise territories and telephone exchange areas, making an exact comparison of service availability very difficult without additionally supplied detail. This commission has very

³⁰ Asymmetric Digital Subscriber Line (ADSL) service offers downstream speed from 1.5 to 9 million bit per second, whereas upstream bandwidth ranges from 16 to 640 thousand bits per second. ADSL transmissions work at distances up to 18,000 feet (5,488 meters) over a single copper twisted pair. Symmetrical Digital Subscriber Line (SDSL) is also sometimes referred to as Single-line DSL is a proprietary version of symmetric DSL versions such as HDSL and HDSL2. SDSL technology offers digital bandwidth of up to 2.3 Mbps both ways (symmetrical) over a single twisted-pair copper phone line, over distances up to about 10,000 feet on an "unrepeated" basis. Newton’s Telecom Dictionary (19th ed. 2003); *see also* <<http://www.dslreports.com/faq/7284>>.

little authority over cable television providers and these Commissioners were unable to press for more detailed information. Therefore, some assumptions were made in the cable broadband analysis presented in this Report.

Quality and Reliability of Data³¹

The survey estimates for number of households within individual exchange areas were consistent when compared to 2000 census data. In many telephone exchange areas, AT&T broadband availability data greatly exceeded the Staff-estimated number of households. Upon review of AT&T's methodology, these Commissioners accepted the greater figures of AT&T as being more accurate than the previous estimates. Therefore, for comparison purposes, AT&T's estimate of households (living units) was used to establish AT&T broadband availability.

Business data was not provided on a consistent basis among any of the carriers or technologies making the business data incomplete and unusable. However, some trends may be detectable within the limited data.

Less than one percent of the responders indicate that their Internet service offers transmission speeds of less than 200 kbps in both directions (upload and download). This type of service was not included as being an acceptable example of broadband.

Cable broadband data will require future study and scrutiny. The cable industry supplied aggregated data by identifying the franchise territories served by its members that did not necessarily match up with exchange boundaries. Cable data was not provided with specific reference as to speed, price or reach of the service offering within an exchange area. Since cable providers have different rules relating to carrier of last resort obligations and mandates of

³¹ Survey responses are considered highly confidential, so data is aggregated for purposes of this publicly available report.

universal service,³² the responses of cable broadband providers were used to supplement the findings of telecommunications carriers' DSL offerings. This supplemental data was especially important in areas where DSL was not available.

In the 230 exchange areas in which cable broadband is available, in addition to DSL offerings by telecommunications carriers, it is unclear that cable would affect the overall percentage of wireline broadband availability. Cable service offerings do not extend beyond the borders of a franchise territory as exchange boundaries generally take in rural neighborhoods and communities beyond the city limits. These Commissioners were unable to identify the number of cable connections outside the technical reach of DSL (18,000 feet from the Central Office). When reviewing the 37 exchange areas in which cable is present where no DSL is available, an attempt was made to estimate the number of households in each franchise area. These exchange areas generally have less than 1,000 households and it is estimated that on average, cable providers are able to service approximately 29%³³ of the households within the exchange area.

Because of the lack of specific data, the inability of this Commission to compel more thorough and accurate responses, and because the study areas are significantly different when comparing telecommunications exchange areas with cable franchise territories, cable data can only be used in this limited manner.

There are ten communities served by municipal broadband services in addition to the DSL broadband offerings. Those communities are not included in exchange-by-exchange analyses or in state-wide compilations.³⁴

³² §386.020(6), RSMo 2005.

³³ The Missouri Telecommunications Industry Association telephone exchange map, cable franchise map (*see* n. 19) and the Missouri Highway Department road map were used to determine municipalities associated with franchises. United States Census data was used to determine the population of each municipality. The population was then compared to the estimated number of Missourians in each exchange to determine a ratio of municipality population versus exchange population.

³⁴ *See* n. 24, *supra*.

According to representations by electric utility company representatives, Broadband over Power Lines (BPL) service is not available to the general public anywhere in Missouri. BPL is potentially a service that may become available in the future, but in Missouri, very little progress has been made by electric utilities, municipal electric providers or rural electric cooperatives in offering such service.

Findings

The data is organized by exchange area size using the estimated number of households from the smallest to the largest. Each category includes the number of exchange areas reflected in the statistic. The wireline broadband deployment percentage must reference DSL broadband availability since the cable data is so difficult to use due to differences in service territories and product offerings. However, it is these Commissioners' assertion that because cable providers do not serve outside city limits and do not serve all customers within an exchange area, cable broadband availability would not materially affect the deployment rate. The percentage of DSL broadband deployment should accurately reflect the trends of total wireline broadband availability.

Residential Statistics (689 exchange areas organized by number of households):

Exchange areas with less than 100 households (17 exchanges)

- 78% of households have access to DSL broadband
- 4 exchanges have no access to any wireline broadband

Exchange areas with 100-500 households (269 exchanges)

- 53% of households have access to DSL broadband
- 77 exchanges have no access to DSL broadband
- 61 exchanges have no access to any wireline broadband (77 less 16 exchanges served in part by cable broadband)

Exchange areas with 500-1,000 households (136 exchanges)

- 52% of households have access to DSL broadband
- 30 exchanges have no access to DSL broadband
- 15 exchanges have no access to any wireline broadband (30 less 15 exchanges served in part by cable broadband)

Exchange areas with 1,000-5,000 households (194 exchanges)

- 64% of households have access to DSL broadband
- 16 exchanges have no access to DSL broadband
- 10 exchanges have no access to any wireline broadband (16 less 6 exchanges served in part by cable broadband)

Exchange areas with 5,000-10,000 households (38 exchanges)

- 65% of households have access to DSL broadband
- 1 exchange has no access to any wireline broadband (38 less 37 exchanges served in part by cable broadband)

Exchange areas with 10,000-15,000 households (18 exchanges)

- 60% of households have access to DSL broadband
- All exchanges in this category have access to some wireline broadband.

Exchange areas with 15,000-25,000 households (7 exchanges)

- 72% of households have access to DSL broadband
- All exchanges in this category have access to some wireline broadband.

Exchange areas with 25,000-50,000 households (7 exchanges)

- 78% of households have access to DSL broadband
- All exchanges in this category have access to some wireline broadband.

Exchange areas with greater than 50,000 households (3 Total - City of St. Louis, Kansas City and Springfield)

- 93% of households have access to DSL broadband
- All exchange areas in this category have access to some wireline broadband.

► **TOTAL (state-wide): 78%** of all Missouri households have access to DSL broadband.

► **TOTAL (without St. Louis, Kansas City and Springfield): 65%** of Missouri households have access to DSL broadband.

► **TOTAL (communities with less than 25,000 households): 62%** of Missouri households have access to DSL broadband.

- ▶ **TOTAL (communities with less than 15,000): 61%** of Missouri households have access to DSL broadband.

- ▶ There are **128 exchange areas** in which residential customers have no DSL broadband access. Most of these exchange areas have less than 500 households and all but one exchange areas have less than 5,500 households. Cable providers indicate serving, via franchise agreements, *part* of 37 of these exchange areas, leaving **91 exchange areas** with no wireline broadband access.

Effect of high cost support in broadband access³⁵

Certain carriers receive high cost support from the Universal Service Fund to offer basic local telecommunications service in rural, high cost exchange areas. The funds received are used for the provision, maintenance and upgrade of facilities and services. All but one of Missouri's incumbent local exchange carriers receive some amount of high cost support, but this high cost support cannot necessarily be used in all exchange areas served by the carrier. Generally, exchange areas that receive high cost support can be categorized as being less than 10,000 households although a few exchange areas may be slightly larger. The following chart sets out DSL access by size of exchange area receiving high cost support. It should be noted that high cost support can only be used for voice-related infrastructure and it cannot be used directly on DSLAMS or Broadband-related equipment. The support can be used to upgrade voice-related plant which may indirectly allow a utility to offer broadband service.

³⁵ See <www.usac.org/hc>. The Universal Service Fund is administered by the Universal Service Administrative Company (USAC). See also §386.020(21), RSMo. 2005.

Exchanges Eligible for High-Cost Support

Exchange areas having number of residential households of:	Access to DSL broadband:
100 or less	78%
100 to 500	57%
500 to 1,000	63%
1,000 to 5,000	70%
5,000 to 10,000	61%
Greater than 10,000	85%

► **TOTAL: 67% of Households have access to DSL broadband**

There are carriers that do not receive high cost support in exchange areas for which they would otherwise be eligible. Certain carriers are not eligible to receive support and certain exchange areas are not considered high cost areas. The following chart sets out DSL broadband access by size of exchange area not eligible for high cost support.

Exchange Areas Not Eligible For High-Cost Support

Exchange areas having number of residential households of:	Access to DSL broadband:
500 or less	28%
500 to 1000	33%
1,000 to 5,000	58%
5,000 to 10,000	65%
10,000 to 15,000	58%
15,000 to 25,000	69%
25,000 to 50,000	78%
Greater than 50,000	93%

► **TOTAL (state-wide): 79% have access to DSL broadband**

► **TOTAL (without St. Louis, Kansas City and Springfield): 64% have access to DSL broadband**

- ▶ **TOTAL (communities with less than 25,000 households): 60%** have access to DSL broadband
- ▶ **TOTAL (communities with less than 15,000 households): 58%** have access to DSL broadband

Residential Broadband Subscribership

Since not all providers responded with subscriber data, it is not possible to summarize conclusions of broadband subscribership in Missouri. However, for those companies that did respond, generally only 25% of the households with broadband availability actually subscribe. The carriers who responded with subscribership information can generally be characterized as rural incumbent local exchange carriers. Providers indicated that customers may not be subscribing to broadband service because of technological constraints, geographical constraints, financial constraints or customers do not consider broadband to be necessary.

Residential Transmission Speeds

Most responders offer various broadband tiers, ranging from a minimum of 200 kbps to a maximum of 1.5 megabits per second with some wireline broadband providers offering speeds of 3 mbps or greater. While providers indicated the various upload/download speeds being offered, data was not provided as to the speed available at any given location within the exchange area. Such specific identification would be difficult since transmission speeds are affected by such things as technological constraints, the type of equipment in use or the number of customers that access the broadband facilities at any given time. This survey did not request information or comparisons on advertised transmission speeds with actual transmission performance. Future studies should verify and confirm transmission speed performance.

Residential Pricing

Pricing varied greatly among responders since prices are tied to the various tiers for upload/download transmission speeds. Since providers offer different tier packaging, it is difficult to make comparisons of price. However, as a point of reference, most carriers offer a 256 kbps/512 kbps transmission speed and the price for this service ranged from \$19.95 to \$46.95. These Commissioners were unable to identify any noticeable geographic trends in the variations in price (or service offerings among rural, urban or suburban areas).

Exchanges Where DSL Broadband is Not Available By Type of Carrier

The most significant absence of broadband was found in exchanges where it is completely unavailable to any customer in an exchange. These exchanges are summarized below by size and by the type of carrier serving the exchange. Carriers are separated into categories of small carriers³⁶ and large carriers.³⁷ There are 128 exchange areas with no DSL service available and 91 exchange areas without any wireline broadband service.

Exchange areas with 0-100 households (4)	Large ILEC (1) Small ILEC (3)
Exchange areas with between 100-500 households (77)	Large ILEC (59) Small ILEC (18)
Exchange areas with between 500-1,000 households (30)	Large ILEC (25) Small ILEC (5)
Exchange areas with between 1,000-5,000 households (16)	Large ILEC (13) Small ILEC (3)
Exchange areas with between 5,000-10,000 households (1)	Large ILEC (1)

³⁶ Small Incumbent Local Exchange Carrier is a carrier that meets the definition of §392.230.4, RSMo. 2005. All incumbent local exchange carriers in Missouri, other than those listed in n. 37, *infra*, meet this definition.

³⁷ Large Incumbent Local Exchange Carrier is a carrier that does not meet the definition of a Small Telephone Company as defined in §392.230.4, RSMo. 2005. Large ILECs include AT&T, Embarq and Century Tel.

Exchange areas with between 10,000-15,000 households (0) None

Exchange areas with greater than 15,000 households (0) None

Business Broadband Availability and Subscribership

Responders did not provide sufficient detail to draw any solid conclusions on broadband availability and subscribership for business customers. However, responders did comment that if broadband is available for residential customers in an exchange area, it could be assumed it was also available for business customers. Once again, as stated previously, there are 128 exchange areas in which DSL broadband is not available and 91 exchange areas in which there is no cable or DSL broadband available. Business wireline broadband availability may further be affected by the fact that cable broadband service is generally focused on residential customers rather than business customers, because the bundled cable television product is considered more recreational in nature. It should also be recognized that the data communications needs of business customers are frequently met by subscribership to more expensive and advanced product offerings such as frame relay and various forms of private line services.

Recommendations

This Report suggests that Missouri faces similar broadband deployment challenges as other regions of the country.³⁸ While the urban and suburban areas boast up to 93% broadband availability, many communities, town and villages are without adequate Internet connections for modern day usage. There are 91 exchanges without any form of wireline broadband access which means that many communities are left behind in terms of information access, business opportunities or without access to critical services such as health care or education. Further,

³⁸ See *Deployment Gaps in Rural Areas*, *id.* n. 11.

communities that may have partial wireline broadband coverage cannot be assured that the remainder of their citizens will have access at any time in the near future. With the limitations of DSL at 18,000 feet from the central office of the phone company, many citizens outside of that range must hope for other options. Twenty-two percent of Missouri families or over one million citizens and businesses fall into this category on the wrong side of the digital divide.

Additionally, the urban and suburban areas have many more competitive options when choosing a high-speed Internet connection. Urban areas may have one or more telecommunications providers, one or more cable operators as well as various wireless options. Several larger urban municipalities are attempting to install their own wireless system.³⁹ Most cities have multiple wireless phone providers that may be offering new forms of wireless broadband service to these residents,⁴⁰ yet there are many communities in rural areas and small towns that have a single cell phone provider and no broadband. Some have argued that satellite service will satisfy needs in rural Missouri, but problems in reliability, price and service limitations suggest this type of service is second-class.

The state-wide broadband “market” has achieved 78% broadband deployment in Missouri, but broadband carriers suggest that the market will not attract additional investment or expansion for fear of little or no financial return. Several carriers have offered hints that some communities will soon have a DSLAM permitting part of the community to have broadband access, but those hints lack certain dates of operation. Many have suggested that because of the

³⁹ See n. 25; Logan, Tim, “Network 1 To Set Up Wireless Internet Network In O’Fallon, Mo.,” St. Louis Post-Dispatch (Sept. 15, 2007), <<http://www.stltoday.com/stltoday/business/stories.nsf/story/6A2BEC2FC70DBC8C86257357000E2554?OpenDocument>>.

⁴⁰ Gertzen, Jason and Hayes, David, “Sprint Plans A New Network, But Has Its Skeptics,” Kansas City Star (Sept. 15, 2007), < <http://www.kansascity.com/105/v-print/story/276913.html> >.

market shortcomings in rural areas, government incentives or intervention is necessary for the final push of equal Internet access for all.

Recommendation 1: States play a vital role in collecting data and evaluating the presence or absence of broadband availability and deployment. While the Commission's role in telecommunications is evolving, it is well-equipped to acquire and compile the necessary data for policy makers in highlighting the broadband and communications needs of Missouri.

The Commission, or a comparable state agency, must be specifically empowered to collect data on broadband deployment from all broadband carriers so that a comprehensive and complete report may be generated for policy makers. Further, that power must include the ability for maintaining proprietary records and keeping certain information confidential.

Recommendation 2: The FCC has declined to intervene in the broadband service market and has allowed market forces to dictate priorities in investment and service. The businesses and residents without access to high-speed connections may never be served by the market. If the market fails these customers, who have chosen as their right to reside in rural areas and small towns, it may be appropriate for state or federal action to assure equity in broadband Internet access.

Policy makers must make broadband access a priority and send the right messages to regulators, telecommunications providers and the market. Political will may be what is required for the final push for communications equity. These messages might include tax incentives, regulatory incentives, statutory mandates and state or federal appropriations. States such as North Carolina (through its tobacco settlement), Oregon (through low-cost financing), Washington (through a public-private partnership), Kentucky (through public-private

partnerships, funded partially through tax dollars) and other states (through a state high-cost universal support fund) have found creative mechanisms to make broadband a priority.

Recommendation 3: Some have argued that absent federal support from the high-cost Universal Service Fund, additional private investment in broadband services will not occur.⁴¹ These arguments have been made in spite of the exponential growth of the current high-cost fund and the controversy over the support methodologies. This study suggests that telecommunications carriers receiving high-cost support have been more aggressive at broadband deployment and some have argued it is due to cash infusions from the USF.

High-cost support may be an option to advance the investment in broadband deployment, however, any funding methodology must carefully consider the barriers for each area and for each carrier. Some carriers have suggested the primary barrier is the initial capital investment in DSLAMs or installing fiber optic equipment to the remote terminal. Some other carriers have suggested that data transport costs from the central office to the ISP and from the ISP to the Internet backbone are the primary barriers to entry. Still other carriers have suggested that the greatest barrier to broadband deployment is the disappointing subscribership in certain areas due to lack of interest or need, lower than average incomes or other economic reasons.

Policy makers must creatively and comprehensively evaluate the reasons causing broadband deployment to stall and craft any potential funding mechanism to solve each of the unique circumstances. The current high-cost fund methodologies are no longer financially viable and, in some circumstances, have little regard for actual costs incurred by certain carriers.

⁴¹ See Federal-State Joint Board on Universal Service, Statement on Long Term, Comprehensive High-Cost Universal Service Reform, WC Docket, CC Docket No. 05-337, CC Docket No. 96-45, <www.fcc.gov>; Statement of Commissioner Michael J. Copps, (Sept. 6, 2007), *id.*

In Conclusion

State and federal leaders in both the executive and legislative branches must make broadband equity a priority when evaluating communications system availability. Elected and appointed officials must find the appropriate manner in which rural customers can compete professionally and enjoy life similarly as their urban friends. It has been suggested that the United States continues to fall behind other nations in access to advanced communications systems. A great portion of the actual people falling behind are those in rural areas of the country who already face great difficulties in being competitive in a global market. It is from the perspective of those without communications access that we should judge America's competitive position in the world. If that perspective is considered, these Commissioners believe that significant and prompt action is absolutely necessary.

Respectfully submitted,



Robert M. Clayton III
Commissioner



Steve Gaw
Commissioner

Dated at Jefferson City, Missouri,
on this 18th day of September, 2007.