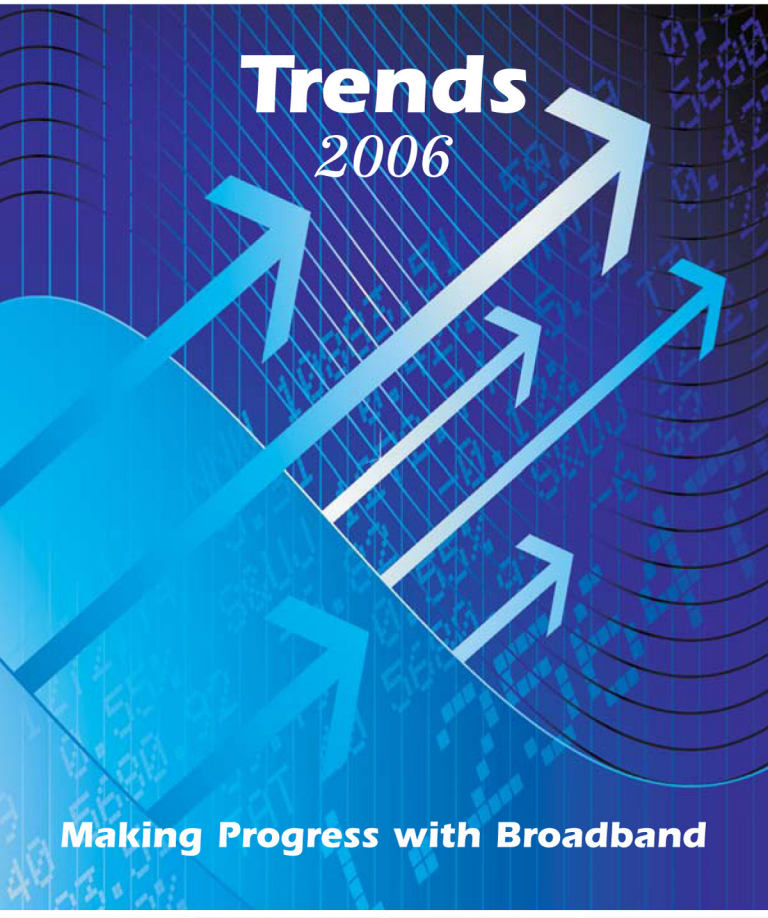
Trends 2006



Making Progress with Broadband

NECA

Trends 2006
Making Progress with Broadband

Prepared by NECA's
Technology Planning and Implementation Group

Introduction

NECA's *Trends 2006: Making Progress with Broadband* report is a snapshot of the technology employed by the local telephone company members participating in our Traffic Sensitive (TS) Pool. This report replaces the Access Market Survey (AMS) report from previous years. It illustrates how the rural network in America is evolving and how that evolution will enable our pool members to meet consumer demand for high quality voice, data and broadband service capabilities. Through the unique industry databases we update and maintain, as well as the studies we undertake, we are able to track the progress of network technology deployment and how those technologies are converging.

NECA continues to be a well-respected source of data collection, research, analysis and regulatory support for the rural telephone industry. This report is just one measurement of how rural telephone companies have progressed toward meeting the needs of their customers. The information presented in this report includes data on the status of rural broadband deployment and delivery of advanced communications services in rural markets. It builds upon the research presented in NECA's latest study, *The Packet Train Needs to Stop at Every Door*[1].

Maintaining and evolving rural network infrastructure remains critical to meeting the needs of rural consumers and their communities. This report shows to what extent our pool members are succeeding at delivering the services their customers want.

The evolution is gaining momentum

In our 2003 AMS report, rural telephone companies showed significant progress in building out advanced telecommunications networks. In the 2006 Trends report, there are several examples of how rural telephone companies are dealing with network convergence; an industry

[1] National Exchange Carrier Association, Inc., *The Packet Train Needs to Stop at Every Door* (2006).

wide shift in communications network technology that allows consumers to access content on the Internet and have access to multimedia content such as voice, data and video services over one broadband pipe.

For example, in 2006, more than 1000 TS pool members provided Digital Subscriber Line (DSL) access services to their customers, a significant increase from 2003. Clearly the infrastructure is being put in place to give rural consumers access to advanced services comparable to those available to urban consumers.

The packet revolution is now in full force. Rural telephone companies have begun installing packet switches as replacements for circuit switching devices. They have also upgraded cable and wire networks to provide high-speed broadband connections which enable the voice, data and video services.

Data aids our member companies

NECA proactively gathers information about the technical capabilities of the small, mostly rural telephone companies that participate in our TS Pool. These data assist us in responding to members' requests for new service offerings in NECA's Tariff FCC No. 5 or enhancements to existing interstate tariff offerings. In today's fast moving broadband environment it is essential for companies to offer the advanced services their customers require. Having access to state of the art communications capabilities is important to rural economies and supporting medical, educational and emergency response needs in rural markets. In addition to our various databases, NECA has several additional sources of data, including our interstate access tariff, wire center tariff and settlement systems, as well as focused studies we perform periodically to pinpoint technology trends.

The evolution — more than 25 years in the making

It's difficult to pinpoint when the evolution began toward converged broadband networks and multimedia services. It was way back in 1971 when Ray Tomlinson sent the first e-mail, but it wasn't until years later that

e-mail became popular. In 1980, voice was king and digital switches were coming of age. In 1993, the first digital connection by three rural independent telephone companies to a toll switch took place. Finally, in 1998, standardized ADSL[2] service made its debut. By 1999, virtually all rural network facilities and switches were digital and NECA filed its first DSL tariff.

Our role in rural technology

NECA plays a critical role in rural broadband deployment. In addition to data collection, analysis, and tariff development, we monitor regulatory actions that affect the ability of rural telephone companies to offer broadband services. It is through efforts such as the NECA broadband studies and this Trends report that NECA provides regulators and lawmakers with information to help them make decisions in the best interests of rural consumers.

[2] American National Standards Institute, Inc., *ANSI T1.413-1998, Network and Customer Installation Interfaces – Asymmetric Digital Subscriber Line (ADSL) Metallic Interface* (November 1998).

Characteristics of Rural Markets

As of June 2006, 1,120 rural telephone companies participated in NECA's Traffic Sensitive (TS) pool (see the center fold chart). Pool membership has remained stable since 2003. Line growth rose by less than 1% for TS pool members in 2003 when nationally it was declining. However, between 2003 and 2006 the number of access lines for TS pool participants declined by a total of 3.3% over the three year period. This is significantly less than the estimated national drop in access lines for the very largest of telephone companies of between 4% and 7% on an annualized basis. The FCC report on Local Telephone Competition[3] released in July, 2006 pointed to competition from CLEC operations, cable operations that offer VoIP services, and cellular service as the cause for much of the access line decline.

NECA data indicates that TS pool members provide service to less than 4% of total U.S. access lines over wide geographical areas that cover almost 40% of the U.S. land mass. Rural telephone companies do not enjoy the economies of scale afforded their large, non-rural counterparts. About half of the TS pool members serve fewer than ten access lines per square mile (see Figure 1).

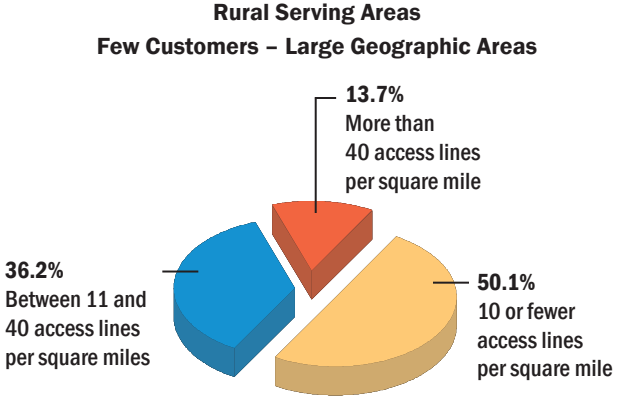


Figure 1
Access Line Density per square mile

[3] FCC Industry Analysis and Technology Division Wireline Competition Bureau, *Local Telephone Competition: Status as of December 31, 2005* (July 2006).

By contrast, larger, non-rural companies often serve many thousands of access lines per square mile. These characteristics affect company decisions about types of equipment and locations where voice services and more recently broadband services can be deployed.

These companies have installed 6,642 switches to handle the voice communications of a little more than 6.6 million access lines in support of their business and residential customers, an average of 997 access lines per switch. While the average company has nearly six switches, 34% have only one and 10% have more than ten switches in their serving area. These averages have varied little in the past fifteen years. Likewise, rural companies' customer bases are extremely small, averaging only 5,911 access lines per company. Forty five percent of the companies have 2,000 or fewer access lines (see Figure 2). Twenty four percent, or 269 companies, have fewer than 1,000 access lines.

Rural Serving Areas
Distribution of Companies by Line Size

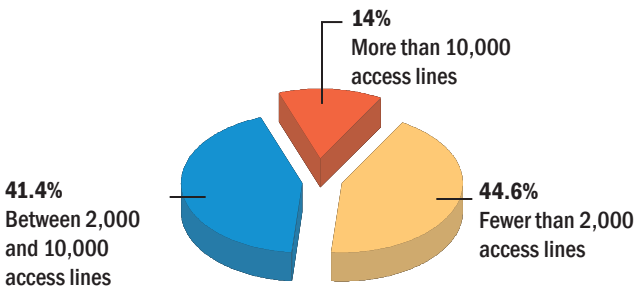


Figure 2
Number of Access Lines

More than half the TS pool members serve areas greater than 200 square miles (see Figure 3).

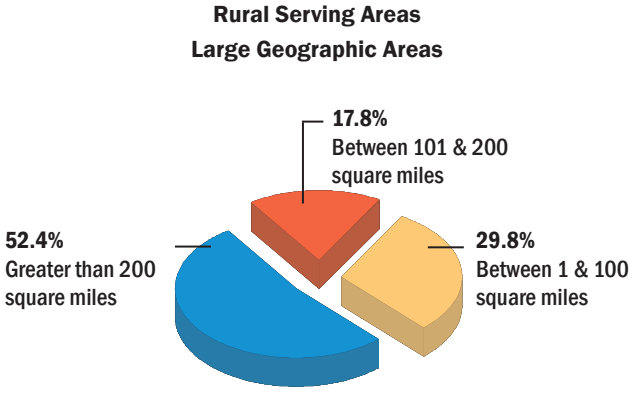


Figure 3
Rural Serving Areas

This requires extensive cable and additional transmission equipment, which drives up the cost of service. Additionally, the equipment needed in these areas to provide quality voice transmission – such as repeaters, load coils, line concentrators and loop carrier systems – severely limits the bandwidth needed for high-speed, advanced communications. TS pool members must make further accommodations for this equipment to allow for technologies such as DSL to work over these lines.

Network enhancements continue

There are many challenges in serving small customer bases over vast geographical areas, but NECA's pool members continue to improve their networks to provide their customers with the broadband services they want. Nearly 64% of companies use remote switches that are more economical and draw the features and functionalities needed to offer advanced voice-calling features (such as Caller ID) from a larger host switch. Remote switches and extensive use of Digital Loop Carrier (DLC) systems and Digital Subscriber Line Access Multiplexers (DSLAMs) allow rural telephone companies to serve customers

located great distances from the host switch with voice and advanced services such as DSL (see Figure 4).

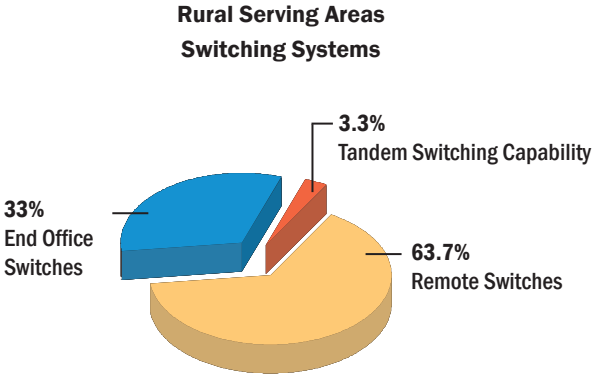


Figure 4
End-office, Remote and Tandem Switches

New Directions for Rural Telephone Companies

With their customers demanding more service capabilities from their communications service providers, rural telephone companies are beginning to deploy Ethernet, packet and softswitch technology to allow them to provide multimedia – voice, data and video services over a converged network. Rural telephone companies are also starting to use wireless technology to serve isolated customers with voice and broadband capabilities.

Rural market statistics by state appear in the center fold chart.

Today's Technologies in Rural America

Rural telephone companies are making progress in modernizing their local communications networks to accommodate the offering of combined voice, Internet and video services. However, despite their best efforts, there are many unique issues associated with serving small concentrations of customers spread over large geographic areas or located in isolated areas. These challenges are unique to rural telephone companies and make it difficult to meet the goals of providing voice and broadband services to all customers. Government policies need to reflect these unique market and technology challenges to insure that all Americans, regardless of where they choose to live, have access to affordable state of the art communications capabilities vital to their local economic health.

Cell and Packet Technology

Packet technologies are essential to delivering advanced services. Many different forms of packet technology have steadily evolved over the past forty five years. In the 1970s, X.25 Packet Switching was being tested. X.25 services became widely available in the 1980s. Ethernet was also developed in the 1970s and today is the most widely-installed Local Area Network (LAN) technology for business and residential computer applications. Ethernet is the de facto LAN standard and is quickly moving into the telecommunications network, as carrier-grade Ethernet equipment becomes available. Other technologies such as Fiber to the Home (FTTH), Integrated Services Digital Network (ISDN), Frame Relay, Asynchronous Transfer Mode (ATM), DSL and Internet Protocol (IP) have also contributed to the digital revolution.

DSL use is booming

DSL technology delivers low-cost, high-speed network access that supports many advanced communications capabilities. Asynchronous Digital Subscriber Line (ADSL) works on regular phone lines and is capable of transmitting voice, data, and (when sufficient bandwidth

is available) video traffic at high speeds.[4] In most applications, a customer's existing telephone line can carry voice telephone calls plus high-speed data and video communications simultaneously. This capability is transforming the rural public voice network into a broadband network capable of handling virtually all modes of telecommunications over the same wires and circuit equipment used to provide legacy voice service.

NECA's tariff offers many "flavors" of DSL to adapt to the varying needs of rural telephone company customers. From the basic voice and data ADSL to the high-speed service that provides transport for multimedia content such as games and videos, rural telephone companies are embracing this technology. From modest beginnings of 151 companies and 20,000 DSL lines in 1999, there are now 1044 TS pool members[5] providing over 630,000 ADSL and SDSL lines (see Figure 5 and the center fold chart).

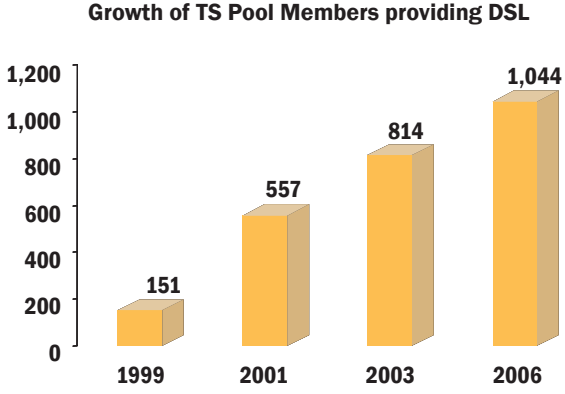


Figure 5
NECA TS Pool Members providing DSL service

[4] ADSL provides up to 8 Mbps, ADSL2 provides up to 12 Mbps, and ADSL2+ provides up to 24 Mbps downstream.

[5] The 1,044 TS pool members that offer DSL services include members who do not participate in NECA's FCC Tariff No. 5 for DSL services and offer DSL through their own tariff or on an unregulated basis.

Fiber to the Home aids with triple play

In addition to DSL, Fiber to the Home (FTTH) technology is also used to support triple play offerings of voice, data and video services. This technology is based on high speed transmission over a fiber optic link between an optical terminal and the end user. Fiber loops support bandwidths in the range of 10 to 100 Mbps to each end customer, while supporting simultaneous voice, data and video services. Some companies view deployment of fiber loops as a way to 'future proof' their access networks, since no one can predict how much bandwidth future services will require or how much bandwidth an end customer will desire in the future. Fiber loops also can go greater distances compared to copper loops (18,000 feet for copper compared to up to 12 miles for fiber without a need to add electrical devices). Telephone companies deploying fiber loops have reported initial installation costs for fiber and copper loops are essentially equivalent and overall maintenance costs for fiber loops are expected to decline.[6]

Frame Relay speeds data transport

Frame Relay service uses "virtual circuit" and packet switching technology to provide cost-effective data connections, which share network transport resources such as bandwidth among customers. Frame Relay networks are ideal for data traffic, which is "bursty" in nature, has limited need for additional service quality parameters, and relies on higher-level protocols for error detection and correction. This technology is used, for example, by large corporations for data communications among branch offices.

[6] "Ready, Aim, FIBER! Targeting FTTP for Last Mile Access," Lucent Technologies.

TS POOL MEMBER COMPANIES – 2006 VIEW

BROADBAND CAPABILITIES OF TS POOL MEMBER COMPANIES

Jurisdiction	Companies	Switches	Access Lines	Central Offices equipped for Equal Access	Companies equipped with DSL	ADSL Access Lines	Companies providing ATM service	SDSL & other broadband Access Lines**
Alabama	21	82	114,870	99%	95%	8,655	29%	3,797
Alaska	24	238	236,712	50%	88%	30,621	17%	7,080
Arizona	12	54	39,119	100%	75%	953	8%	n/a
American Samoa	1	4	10,244	100%	100%	*	*	*
Arkansas	26	242	322,931	100%	92%	19,321	38%	331
California	14	44	85,167	98%	93%	7,630	36%	1
Colorado	25	44	48,099	98%	88%	3,489	16%	744
Connecticut	1	14	24,462	100%	100%	*	*	*
Florida	6	13	77,254	100%	100%	9,494	25%	n/a
Georgia	28	104	307,750	97%	89%	50,182	14%	1,751
Guam	1	18	63,770	100%	100%	*	*	*
Hawaii	1	8	1,370	100%	100%	*	*	*
Idaho	15	58	42,967	100%	93%	1,571	20%	93
Illinois	27	73	41,009	100%	81%	4,970	22%	1,727
Indiana	34	81	120,499	100%	88%	15,042	29%	1,326
Iowa	139	297	200,616	99%	97%	21,389	7%	3,148
Kansas	31	167	103,222	99%	100%	20,084	26%	3,596
Kentucky	13	270	137,746	100%	100%	8,310	38%	3,217
Louisiana	18	101	136,281	99%	89%	11,212	62%	n/a
Maine	19	105	138,667	100%	100%	11,888	26%	199
Maryland	1	1	7,287	100%	100%	*	*	*
Massachusetts	2	3	3,856	100%	100%	427	0%	n/a
Michigan	31	98	98,380	99%	90%	7,633	23%	414
Minnesota	80	327	318,835	100%	83%	24,938	13%	6,416
Mississippi	17	69	79,619	94%	82%	4,024	50%	52
Missouri	35	291	228,001	98%	97%	12,797	54%	505
Montana	14	195	95,575	100%	100%	8,176	43%	n/a
Nebraska	31	120	57,083	100%	100%	6,631	13%	2,335
Nevada	7	23	32,360	100%	86%	4,269	50%	11
New Hampshire	9	31	55,127	100%	100%	8,357	56%	n/a
New Mexico	12	78	42,862	99%	100%	3,513	42%	157
New York	30	84	156,560	99%	100%	12,356	24%	1,389
North Carolina	16	254	363,535	100%	100%	22,373	44%	12,162
North Dakota	20	219	144,958	99%	100%	16,974	35%	4,693
Ohio	34	74	196,333	100%	85%	22,842	18%	1,883
Oklahoma	35	281	193,867	99%	89%	36,405	31%	167
Oregon	27	53	76,314	100%	85%	12,052	7%	132
Pennsylvania	21	611	541,510	100%	100%	14,528	19%	133
South Carolina	13	183	110,272	100%	100%	9,972	38%	2
South Dakota	27	178	127,989	100%	85%	5,905	22%	1,443
Tennessee	20	435	326,380	100%	100%	24,552	55%	n/a
Texas	46	346	274,770	98%	98%	27,683	30%	1,357
Utah	10	51	69,184	100%	100%	6,015	20%	158
Vermont	9	40	63,497	100%	100%	9,160	56%	154
Virginia	15	164	78,872	98%	93%	7,338	27%	472
Washington	18	31	79,713	100%	100%	10,994	28%	42
West Virginia	6	13	16,316	100%	100%	1,430	0%	310
Wisconsin	73	347	503,543	100%	84%	25,785	30%	8,044
Wyoming	5	25	24,725	96%	83%	3,315	20%	130
TOTALS	1,120	6,642	6,620,078	98%	94%	581,921	29%	74,790

** Individual data withheld to maintain company confidentiality. All data included in totals.*

*** 72% of these broadband lines are SDSL, and the other 28% are cable modems, fixed wireless, fiber, and satellite.*

ATM helps rural telephone companies provide advanced communications

ATM is a high-performance packet switching and multiplexing technology that integrates voice, data, and video services. ATM technology has been replacing circuit switched transport services in public and private networks. It has been the leading technology integrating DSL services within the local exchange, and is widely deployed in local and long distance markets. Using ATM technology in the public network allows rural telephone companies to offer their customers access to services on par with those in urban areas, allowing them to compete for business customers that might otherwise move to other areas. Virtually all telephone companies which deploy DSL have an ATM infrastructure for DSL traffic aggregation. In addition to deploying the ATM infrastructure which supports DSL services, 29% of TS pool members also offer ATM services to end customers, up from 16% in 2003.

IP and Ethernet are the next wave

Low-cost equipment based on IP and Ethernet technologies can also be used to integrate voice, data, and video services. IP switching and Ethernet transmission technologies are starting to replace circuit switching and Time Division Multiplexing (TDM) transmission equipment in public and private networks. These technologies are now widely used in new DSL and FTTH access equipment. IP and Ethernet technologies give the rural telephone company a low cost platform for offering multiple high speed services on par with those in urban areas. Currently more than 100 Ethernet ports are deployed by TS pool members for interstate applications.

Wireless Access Technologies

Rural telephone companies in some areas are increasingly offering wireless based services to provide exchange access and broadband services. A number of companies have provided fixed Basic Exchange Telephone Radio System (BETRS) service as a local exchange service in

particularly inaccessible areas where it is not otherwise feasible to provide services using either copper wire or fiber facilities. Rural telephone companies are also using new wireless technologies to reach isolated customers with voice and broadband services using licensed and unlicensed wireless technologies such as WiFi and WiMax. The evolution of wireless technologies has allowed companies to now provide a higher level of service (voice and broadband) under this provision, or to offer a non-regulated broadband wireless service to serve customers where cooper loops are not feasible. Many rural telephone companies also offer standard cellular mobile services through an unregulated affiliate.

Affiliated operations: wireless, video, and data

In addition to the core services offered through NECA's interstate access tariff, rural telephone companies are offering non-regulated wireless, video, and Internet access services directly or via affiliates to serve customers better and address increasing competition. By maximizing the use of their facilities, rural telephone companies are reducing their overall network costs.

Video Services. More than 100 TS pool members report providing or planning to provide video services using packet television technologies. More than 300 TS pool members have cable television (CATV) operations providing video services to their customers. Some are also providing broadband cable modem service. More than 50 TS pool members provide CATV services outside their serving area.

Information Service Provider (ISP) services. Information access services to the Internet are provided by 960 affiliates of TS pool members within their own serving areas. In addition, about 14% of the TS pool members also provide ISP services in other serving areas. Sixty-four TS pool members provide wireless data services to customers. With the growth of many broadband access technologies, we expect these numbers to continue to increase.

NECA broadband studies

NECA broadband studies document the challenges rural telephone companies face with broadband deployment. In 2000, the *Rural Broadband Cost Study*[7] examined the costs to update rural lines that were not broadband ready. In 2001, the *Middle Mile Broadband Cost Study*[8] focused on the cost of transporting Internet traffic between an ISP and the Internet backbone provider. In the 2006 *The Packet Train Needs to Stop at Every Door*, NECA looks at the transformation occurring in rural networks toward IP technology to meet evolving customer expectations for "triple play" multimedia services—a combination of voice, data and video. These services are driving the need for much higher delivery speeds in the "last mile." The study examines issues around maintaining and evolving rural network infrastructure that remains critical to meeting the needs of rural consumers and their communities, including the provision of new IP-based services like VoIP and multimedia services that are important to increased "take" rates for broadband.

Although the characteristics of rural service areas still require a Carrier of Last Resort, rural telephone companies are stepping up to meet this need. However, delivering these customer services requires significant additional investment in rural networks, and stable cost recovery mechanisms including intercarrier compensation and universal service funding. It also requires that all service providers have reasonable access to Internet backbones and to video content. The Packet Train study documents the emerging broadband revolution occurring in rural America and provides estimates on the cost of making a broadband pipe universally available in rural telephone company serving areas. In addition to identify-

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[7] National Exchange Carrier Association, Inc., *Rural Broadband Cost Study* (2000), Summary available at http://www.neca.org/media/broadban.pdf.

[8] National Exchange Carrier Association, Inc., *Middle Mile Broadband Cost Study* (2001).

ing costs and other impediments to delivering multimedia services to rural customers, the study relates findings to efforts underway to reform intercarrier compensation and universal service.

Market trends indicate rural telephone companies are shifting their investments toward broadband technologies to meet customer needs. Despite operating in low density, higher cost markets, rural telephone companies offering DSL have almost matched the DSL penetration rates of non-rural carriers. However, some rural telephone companies still do not offer DSL. Among companies offering DSL, the Packet Train study points out that broadband service is not universally available to their customers, and, in most cases, speeds do not support the multimedia packages customers want. While availability of video services in a multimedia package stimulates DSL demand, by itself it will not make DSL service universally available. Many rural areas are cost prohibitive to serve without additional support.

Based on current cost information provided by a sample of rural telephone companies, the Packet Train study estimated the additional investment cost of upgrading 5.9 million rural telephone access lines to 8 Mbps, a level capable of delivering a basic multimedia package to rural customers, is $11.9 billion (see Figure 6).

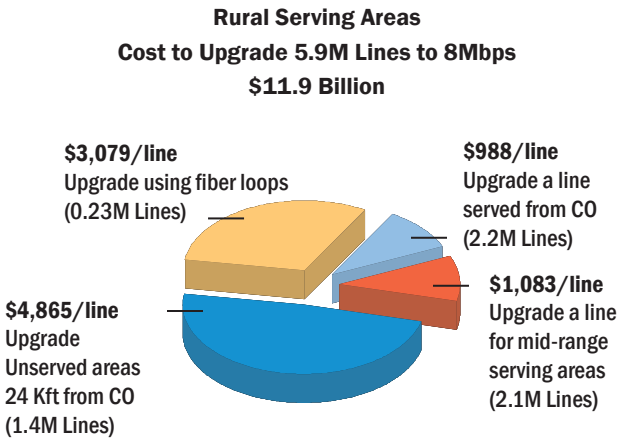

Figure 6
Per line breakdown for each upgrade category

Adding operating expenses, overhead expenses, and depreciation expenses plus a return on investment translates into a $3 billion annual revenue requirement.

In summary

The 2006 Trends report shows that DSL growth continues to be strong in the heartland. The number of TS pool members offering DSL and the number of DSL lines has increased substantially. In 1999, 151 TS pool members had 20,000 DSL lines. In 2006, these numbers have grown to 1,044 TS pool members serving over 630,000 ADSL and SDSL lines.

Rural telephone companies are making strong progress in building and enhancing their networks to provide the services their customers desire. Rural telephone companies are deploying Ethernet, packet and softswitch technology to provide their customers with the latest voice, data and video services.

However, delivering these services will require significant additional network investment, along with stable funding mechanisms such as adequate intercarrier compensation and sustainable universal service support. Rural America still requires a carrier of last resort due to the lower population density and higher costs inherent in these service areas. Moving forward, it is important that the regulatory policies reflect the realities of the rural market.

About NECA

NECA is a not-for-profit association of local telephone companies. We were established in 1983 at the direction of the Federal Communications Commission to administer the access charge plan following the breakup of AT&T and the Bell System. Interstate access charges are the fees that long distance companies pay to local telephone companies to complete interstate calls over the networks belonging to those local companies. The members of NECA's TS pool serve over six million access lines spread out over approximately 40% of the land mass of the continental United States.

NECA is a well respected source of data collection, research, analysis, and revenue distribution at the heart of the rural telephone economic system. We are a primary vehicle through which rural telephone companies provide vital telecommunications services to consumers at reasonable prices.

NECA is based in northern New Jersey and operates regional offices in Atlanta, Chicago, St. Louis, Omaha, Denver, and Concord, California. Our government relations office is located in Washington, D.C.

Glossary

Access Market Survey (AMS)
A biennial NECA survey conducted from 1989 to 2003 to determine the technical capabilities of small, mostly rural telephone companies that participate in NECA's Traffic Sensitive (TS) pool.

Asynchronous Digital Subscriber Line (ADSL)
An access technology that allows voice and high speed data to be sent simultaneously over local exchange facilities. The capability is asymmetric because the downstream data speed (to the end user customer) is higher than the upstream speed.

Asynchronous Transfer Mode (ATM)
ATM is a packet communications technology that allows for high-speed transmission of voice, video, and data over one common network infrastructure. ATM processes information in fixed length data cells (packets) which minimizes transmission delays. ATM customers are typically information service providers who need large, high-speed packet data delivery capabilities.

Basic Exchange Telephone Radio System (BETRS)
A fixed radio service where a multiplexed, digital radio link is used as the last segment of the local loop to provide wireless telephone service to subscribers in remote areas. BETRS technology was developed in the late 1980s and allows up to four subscribers to use a single radio channel pair, simultaneously, without interfering with one another.

Carrier of Last Resort (COLR)
State requirement imposed on a public utility (*e.g.,* the incumbent local exchange carrier) to provide service to any requesting customer in its serving area. The COLR may receive universal service support to offset the higher cost of providing service in certain areas and enable it to maintain reasonable rates.

Common Line Pool
The Pool that NECA administers for its local exchange carrier members' non-traffic sensitive costs of providing interstate access.

Competitive Local Exchange Carrier (CLEC)
A local exchange carrier that provides some or all of the interstate exchange access services used to send traffic to or from an end user and does not fall within the definition of Incumbent Local Exchange Carrier (ILEC).

Digital Loop Carrier (DLC)
A system that uses digital technology to develop a number of communication channels that are equivalent to those provided over copper pairs. Current generation systems typically use fiber transport facilities between the wire center and an electronic remote terminal located in the loop.

Digital Subscriber Line (DSL)
A technology that brings high-bandwidth information services to the home or small business over regular copper lines. It works by splitting the line to carry voice, which takes little bandwidth, and high speed data simultaneously over the same line. NECA offers DSL access services in its interstate access tariff so companies may offer the technology to their customers.

Digital Subscriber Line Access Multiplexer (DSLAM)
A packet multiplexer used in a variety of DSL technologies. It serves to multiplex data packets from multiple DSL subscribers in order to transmit them over one or more high speed circuits.

Equal Access
Provides customers with a choice of long distance carrier.

Ethernet
A local area network technology that connects computers, printers, servers, etc., in a physical location such as a building. Carrier Ethernet equipment is now available, which provides reliable Ethernet connectivity beyond the LAN through the telecommunications network. Ethernet uses twisted pair (copper), fiber optic, and coaxial cable and may also use wireless connectivity or transport.

Fiber to the Home (FTTH)
A technology which uses a high speed fiber connection to the home or business for transport of voice, data, and

video services. Fiber to the Curb (FTTC), Fiber to the Node (FTTN), and Fiber to the Premises (FTTP) are variations of FTTH. The primary difference between the systems depends on the location of the remote optical network unit.

Frame Relay
A packet delivery service designed to transmit data cost-effectively between local area networks (LANs) when traffic is intermittent. For most services, a permanent virtual circuit provides a continuous dedicated connection without having to pay for a full-time leased line. Frame relay is a mid-range service with speeds faster than ISDN, but slower than ATM and Ethernet.

Incumbent Local Exchange Carrier (ILEC)
The local exchange carrier that on the date of enactment of the Telecommunications Act of 1996, provided telephone exchange service in a specific area and was deemed to be a member (or successor to a member) of the exchange carrier association pursuant to section 69.601(b) of the Commission's regulations (47 C.F.R. 69.601(b)).

Internet Protocol (IP)
The method by which packet data is sent from one computer to another. Every server, router, and switch in an IP network is uniquely identified by at least one IP address.

Internet Protocol Television (IPTV)
IPTV is a system for delivering digital television service to subscribers via a broadband connection using Internet Protocol. IPTV often includes Video on Demand (VoD) and Personal Video Recording (PVR) services. It also may be combined with Internet access and voice services, and is often called Triple Play. Triple Play is typically provided by a broadband operator using a single converged infrastructure.

Local Area Network (LAN)
A computer network covering a limited geographic area, typically a single building. Most LANs are based on switched Ethernet technology running at 10, 100, or 1,000 Mbps (1 Gbps). A local area network may serve as

few as two or three users (in a small business or home network) or thousands of users.

Synchronous Optical Network (SONET)
A fiber optic technology capable of transmitting multiple digital signals of varying capacities. SONET provides an international standard for manufacturers. Ideally, it is configured in a physical ring for redundancy purposes.

Time Division Multiplexing (TDM)
A technique for transmitting multiple digitally encoded data, voice, and/or video signals simultaneously over a single communications medium by interleaving a portion of each signal one after another in specific time slots.

Traffic Sensitive (TS) Pool
NECA member companies that participate in the traffic sensitive pool by applying the TS tariff rate elements. The traffic sensitive portion of the network is where costs vary according to usage. NECA's Traffic Sensitive pooling process includes two components: Traffic Sensitive – Switched and Traffic Sensitive – Special Access.

Voice over Internet Protocol (VoIP)
A technology that allows you to make telephone calls using a broadband Internet connection instead of a regular (or analog) phone line.

Wireless Fidelity (WiFi)
A Wireless Local Area Network based on the Institute of Electronic and Electrical Engineers (IEEE) 802.11 Ethernet Standards.

Worldwide Interoperability for Microwave Access (WiMax)
WiMax is a standards-based (IEEE 802.16) technology intended to enable the delivery of last mile wireless broadband, as an alternative to cable and DSL.

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