CENTER *for* RURAL POLICY *and* DEVELOPMENT

MINNESOTA RURAL TELECOMMUNICATIONS INITIATIVE

Preliminary Draft Report I
Defining the Issues

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Seeking Solutions for Greater Minnesota's Future

Center for Rural Policy and Development

Minnesota Rural Telecommunications Policy Initiative

Providing Access to Information/Communications Technology for Rural Minnesota

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October 1999

I. Introduction

As those involved in economic development, the communications industry or state government have likely noticed, the term "telecommunications" is taking on the characteristics of a magic phrase representing the solution to rural Minnesota's economic hurdles. The issue of providing telecommunications to rural areas is becoming increasingly visible. No longer is it a question of whether rural communities need telecommunications and information services. The questions now are how much of a system is needed; how advanced must it be; and how fast can it be installed.

Telecommunications in and of itself is not a cure-all. It is, however, growing in importance, especially for rural communities, as a vital component of business, and in a virtual way, as an eliminator of distance and isolation. As Minnesota's rural communities find themselves competing more and more with each other, the metro area and the rest of the world for business and population, access to these needed advanced telecommunications and information services becomes increasingly important.

Just scratching the surface of the topic, however, immediately raises a multitude of further questions: If a community were to develop an advanced telecommunications infrastructure, how would it be used, and who would have access to it? Should interested parties be responsible for developing their own systems (i.e., let the market develop freely), or should one or more levels of government step in? How important is equitable access to everyone, and what are the options for achieving that? And there is the big question, cost. Can advanced telecommunications infrastructure and services be widely deployed and operated affordably, and is its intended use worth the price?

What happens now with telecommunications development will set the pace for economic development – in whatever form it takes – in rural Minnesota for years to come.

Objectives of this project

The Center for Rural Policy and Development and the Humphrey Institute's State and Local Policy Program have brought together this panel to address just such questions. The objectives of this panel will be to conduct discussion, research and analysis that will 1) inform policymakers about rural issues that should be considered in the drafting of the state's telecommunications laws, and 2) develop a framework and methodology for future research.

This paper is intended to serve as a starting point for discussions that will hopefully lead to substantial findings on these issues and recommend policy that will constructively shape the deployment and use of telecommunications throughout the state.

Why look at rural telecommunications at all?

In 1996, the Rural Policy Research Institute released a study of telecommunications use in 20 communities across six states in the Midwest.[1] Two of the study's major findings were:

- There were significant differences in technology use across rural residents' educational and household income levels and occupational

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[1] Rural Policy Research Institute, "Telecommunications in Rural Communities: Patterns, Perceptions and Changes," Jan. 18, 1996.p. 13-14.

status, but there is the universal belief that *telecommunications access* and *competitive pricing* is critical to community survival.

- Business owners make extensive, diverse use of telecommunications in business. The majority believed telecommunications technology increased business productivity and expanded markets, but did not substitute for labor.

The issue of telecommunications access has grown to be more than two people and two telephones. "Telecommunications" now includes local, long distance and data transfer service over an infrastructure consisting of high-speed lines which can be copper, fiber, xDSL, ISDN, T-1, coaxial cable, wireless or other means. Because of its growing importance in commerce, education, medicine and community life, access to high-speed telecommunications has the potential of becoming an equity issue. Several studies cite a fear of the development of a two-tier society, of "haves" and "have nots," divided by their ability to access adequate communications.

The rural telecommunications market's needs and conditions are different from those in urban areas. In the Twin Cities metropolitan area, the population density guarantees more potential customers at lower cost per capita, offering a cost-effective market where a supply of private providers are willing to step in and claim a piece. Many rural areas, however, particularly Minnesota's smaller cities, towns and farms, are faced with the dilemma of a less dense, even sparse, population base that does not create those same economies of scale, and therefore, competition does not form readily. As a result, unless the local telecom provider is willing to take the initiative and upgrade its system, these rural communities can be left with slow, inadequate and expensive service.

Typical applications

Rural communities need telecommunications and information services for all the reasons urban communities need them, but rural communities need them uniquely to reduce the costs of distance. Distance itself can increase the value of telecommunications to rural residents by reducing the cost of distance. E-mail, distance learning programs, telecommuting, all greatly reduce the time involved in communicating across distances and offer up a large number of alternatives and opportunities to rural residents.[2]

Probably the most widely recognized application for telecommunications is business and economic development. As businesses come to depend more and more on transfer of information and quick turnaround, reliable, fast and affordable communications access becomes an important component in doing business. New businesses looking for a place to set up shop are increasingly counting access to reliable and affordable communications as an important factor in choosing where to locate. It should also be recognized that, increasingly, the Internet is being used by businesses not so much to connect to consumers, but to connect to other businesses.

Along with business is telecommuting. Telecommuting and telework can give residents of rural communities a greater variety of employment opportunities without having to move. Likewise, businesses facing worker shortages receive an expanded labor pool.

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[2] National Telecommunications and Information Administration, "Falling Through the Net: A Survey of the 'Have Nots' in Rural and Urban America," July 1995, www.ntia.doc.gov.

Another application is education, particularly distance learning. One of the chief complaints of employers concerning the workforce shortage in Minnesota is not that there are not enough bodies to fill the jobs, but those bodies do not have the proper education or skills to do the jobs that need doing. Telecommunications connections capable of carrying complex web pages, video and sound will make it possible for remote communities to take advantage of learning opportunities from anywhere in the country or the world.

Another application is telemedicine. High-speed telecommunications make it possible for rural clinics and hospitals that lack specialists to transfer information and images and consult with doctors elsewhere, avoiding expensive and time-consuming travel. Telemedicine would allow hospitals and clinics to pool resources in places where they may have a difficult time maintaining staff and/or high-tech equipment.

On-line services have implications for community building as well. Access to government services is an application being developed in larger cities, but has strong potential for rural areas. Giving residents the ability to pay fees and fines on line or apply for permits, comment on budgets and register complaints can increase participation in government by eliminating the need to travel great distances. On-line forums can also give neighbors separated by distance the opportunity to discuss and better understand issues.

This paper

This initial round of research has revealed several issues regarding telecommunications in rural and sparsely populated areas that could be treated as obstacles or barriers to "adequate access" that can be addressed through public policy. These issues can be distilled into four broad categories:

- Infrastructure deployment and service provision: Ensuring adequate access
- Competition: Ensuring a fair, affordable price
- Community planning: Analyzing needs and applications and deciding what is necessary to make them a reality
- Anticipating the future: Planning for a rapidly changing technology future

Each category is broken down into a review of current conditions and knowledge, followed by suggestions for continued research in the form of research questions. The intention is not for the panel to forge solutions to all these questions. *The goal is to craft policy recommendations that will help communities and government at each level develop the best solutions for their needs.* The panel is, of course, not expected to adhere strictly to this framework of categories. It is simply a means to an organized beginning.

II. Current policy initiatives in Minnesota

Government-sponsored telecommunications projects appear to have slowed down somewhat in the last two to three years, but there are at least three major public telecommunications or telecom-related policy initiatives currently in the works.

"The Big Plan"

Governor Ventura's office this month released the first outlines of "The Big Plan," a comprehensive plan to enhance life in Minnesota. The plan targets areas such as

sustainable communities, transportation, tourism and economic development. Sections in this plan address using telecommunications as a tool for economic development through community networks, telework centers and electronic commerce. Also a priority is "building an information highway that leaves no community excluded."[3]

Part of The Big Plan includes a comprehensive survey carried out by the departments of Administration, Public Service and Planning to assess the extent of private infrastructure in the state. This survey is discussed further in the Infrastructure section of this paper.

Connecting Minnesota

The Minnesota Department of Transportation and Department of Administration have launched a plan to lay an 1,800-mile fiber optic backbone throughout Minnesota using the rights-of-way along the Interstate highway system and various U.S. highways. The state has contracted with a private firm, which will invest $125 million to install the fiber in exchange for one-time access to 1,000 miles of freeway rights-of-way. The network will be used in part to meet Mn/DOT's capacity needs for highway management. The project will also provide state and local governments access to 20 percent of network capacity for telecommunications use. The remainder of the capacity will be available for lease wholesale to telephone companies, long-distance carriers, Internet service providers and other service providers.

The first leg of this project, extending from Moorhead to St. Cloud along I-94, was started in November of 1998. According to the state, the intent of the project is to extend more capacity into rural areas of the state and to provide more competition in these areas. Private providers have disputed the deal, saying that the departments of Transportation and Administration overstepped their authority in granting access to the rights of way and violated the Telecommunications Act of 1996. See Map 1 in Appendix D for a map of the Connecting Minnesota architecture.

Legislative initiatives

At least ten bills were introduced in the Minnesota Legislature last session concerning telecommunications.

- A handful of bills addressed the telecommunications action grants and the Learning Network, a project to bring the Internet into the state's K-12 schools.
- Another bill creating a sales tax exemption for telecommunications services capital equipment was rolled into the omnibus tax bill.
- H.F. 1778, signed by the governor in May, authorizes providers of telecommunications services regulated by the Public Utilities Commission to offer pricing plans with reduced rates for basic and advanced telecommunications services to state agencies, public and private educational institutions, public corporations and other public entities. The plans are subject to approval by the PUC.
- H.F. 358, also signed by the governor in May, authorizes the PUC to issue penalties against telephone companies for a variety of violations, including discriminatory practices, anti-competitive behavior, interconnections

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[3] Office of the Governor, State of Minnesota, "The Big Plan: Healthy, Vital Communities," released Oct. 5, 1999, http://www.mainserver.state.mn.us/governor/healthy.html.

agreements and other requirements of state statute chapter 237 or the federal Telecommunications Act of 1996.

The focus of legislation in the next few years will, of course, be rewriting chapters 237 and 238, which define the state's telecommunications laws. Sen. Steve Kelley introduced a comprehensive rewrite of chapters 237 and 238 last spring, precipitating a continuing policy debate about the need for a fundamentally new approach in state law. It is anticipated that this bill and several others will be brought to the floor again in the next session. A summary description of Kelley's bill can be found in Appendix B.

III. Issues for initial discussion

A. Infrastructure and service
Policy questions:
❑ What is adequate access?
❑ Should the market alone be counted on to develop adequate infrastructure?
❑ How can the state best assist in reaching the goal that advanced telecommunications infrastructure and information services will be available all over the state?
❑ What role should government play? Provider of last resort? Manager of options to fill the market gaps? Setting standards as to when market failure exists? Or something else?

According to a report released this year by the National Telecommunications and Information Administration (part of the United States Department of Commerce), computer ownership and access to the Internet greatly increases with income and education. However, "[r]egardless of income, Americans living in rural areas lag behind in Internet access; at the lowest income levels, those in urban areas are more than twice as likely to have Internet access as those earning the same income in rural areas."[4]

To ensure that infrastructure and access are adequately distributed around the state, policymakers will have to address the several reasons that go into why this distribution is not even or adequate. There is some disagreement as to whether there is enough of a large network running through the state, acting as "big pipes" for data transfer. On the other hand, there is unanimous agreement that the largest problem is that of the "last mile," the connection from the large backbone to the house or business itself.

Cost appears to be the major factor in deploying a telecommunications infrastructure. In the Twin Cities metropolitan area, the population density guarantees a ready market for telecommunications products and services. Consequently, plenty of private providers are willing to step in and claim a piece of those markets. Some rural areas, however, are faced with the dilemma of a less dense, even sparse, population base that does not provide those same economies of scale, and therefore demand is not immediately strong enough to attract providers readily. Other rural communities are experiencing rapid growth and along with it, growing telecommunications needs, but each individual party in need of services is not able to deal with the issue on its own.

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[4] National Telecommunications and Information Administration, "Falling Through the Net: A Report on the Telecommunications and Information Technology Gap in America," July 1999, p. xiii.

The extent of infrastructure

Analyzing existing infrastructure is not particularly easy since much of it is owned by private companies that are not required to report the extent of their resources. Currently, the departments of Administration, Public Service and Planning are undertaking a broad survey of telecommunications providers in the state to ascertain the extent of their networks. The survey questions are included in Appendix C. As of the beginning of October information from about one half of the state's providers had been collected. We plan to make use of the complete survey report for this project when it is available.

As a summary, the state's population is served by approximately 90 incumbent local exchange carriers, or ILECs, who until recently held the monopoly on phone service. The largest providers in the state are US West, Sprint, Frontier, and GTE. As of 1998, these four companies were ILECs to 49.5 percent (359 out of 725) of the exchanges in the state and controlled 87.9 percent of the phone lines (2,546,843 out of 2,897,503). The balance of service is provided by independent ILECs[5] and a handful of competitive local exchange carriers (CLECs). GTE is currently in the process of selling its Minnesota exchanges, while US West has sold 43 of its rural exchanges to another firm.

Minnesota Department of Transportation maps show the extent of fiber in the ground as of 1995 (see Appendix D, Map 2). Also, private provider Onvoy, a collaborative of about two-thirds of the independent phone companies in the state, has an extensive fiber network around the state and connections to the larger national and international networks (see Appendix D, Map 3).

High-speed services that would be within the price range of residential consumers, specifically cable modem, xDSL and ISDN, are concentrated mostly in the Twin Cities metro area, although there are a growing number of providers adding these services around the state. US West provides ISDN in its exchange in Duluth, Rochester and St. Cloud. Cable modem service is available in Marshall, Hibbing and Winona, besides the Twin Cities. Currently US West and Onvoy offer xDSL, but a handful of outstate telcos are also adding this service.

Current models in private provision

Since the federal Telecommunications Act of 1996 was passed, other parties besides traditional telephone companies have been allowed to enter the field of telecommunications service provision. Besides the existing telcos, others introducing telecom services include:

Competitive telcos

These firms may come from the next county or across the country. Some firms requesting licenses to operate in Minnesota include ILECs who have made the decision to move into a neighboring exchange to compete with that ILEC. Other firms are new start-ups coming in to target specific markets by providing "niche services," which can include any kind of telecom service except local dial-up service. Other firms are large regional or national firms expanding their territory.

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[5] Independent is defined as not one of Minnesota's four large telecom providers: US West, Sprint, Frontier or GTE.

Municipal utilities

Municipal utilities often have their own telecommunications hardware already installed to connect offices and monitoring equipment, and many would like to take advantage of this by offering telecommunications services as well. Two municipal utilities (Barnesville and Cross Lake) are offering telephone service. A number of others are offering "local niche services," which can be anything except dial tone. In Alexandria, for example, Alexandria Light and Power, Runestone Electric Association and Runestone Telephone Association together offer Internet service for the Alexandria area. The service is expanding its local dial-up numbers to the surrounding communities, alleviating one of the complaints of rural Internet access, costly toll connections.

Cable companies

Cable companies are providing phone service in other parts of the United States and the world. MediaOne is currently one of a handful of cable operators in Minnesota offering high-speed internet access. Part of the rationale behind MediaOne's pending merger with AT&T is to give AT&T access to local phone markets through cable, one more step toward AT&T's goal of becoming a one-stop provider.

Public infrastructure

The state itself has installed infrastructure and supplies infrastructure and services to public agencies. The state, however, is not permitted to provide service in the private market where they are available from a private vendor.

- MNet/STARS

  The MNet system originated as STARS legislation in 1989, authorizing the development of a telecom service for the state. The system is made up of lines leased from local telecom providers and MCI and switches and hubs the state installed itself. The system carries data and video for state agencies around Minnesota.

- TAG grants

  TAG was started as an initiative to put video in K-12 schools across the state. The grants were authorized by the Minnesota Educational Technology Council, and MEANS was chosen to install T-1 lines to schools. However, the grants were considered one-time only, and some schools may not be able to continue to afford to continue the service.

- Telecommunications Collaboration Project

  This system was developed by the state to give every county seat in the state a T-1 line. By installing the large single line, various agencies operating out of the same county were able to eliminate the multiple low-bandwidth lines they were using and consolidate their usage, saving considerable dollars.

- Connecting Minnesota

  As described above, Connecting Minnesota is a statewide project using freeway rights of way to install an 1,800-mile fiber optic backbone around the state. The network is expected to be finished next year.

What role for wireless?

The use of wireless technology is more common in Europe, but use in the United States is growing, and it is now being looked at as part of the infrastructure solution in rural Minnesota. Because it does not involve laying cable or fiber in the ground (or not as much as in a typical wireline service), wireless technology has the potential to be more cost effective in sparsely populated areas where the expense of laying miles of line between remote customers could be prohibitive.

As with other types of telecommunications technology, wireless technology is advancing. New digital technology has made it possible to transmit the Internet wirelessly at speeds comparable to wireline services. New wireless technology can be used to connect communities to fiber lines through two-way point-to-multi-point broadcasting. Policymakers will need to consider wireless as part of a potential solution to infrastructure.

Barriers to development

Barriers are factors that must be taken into account since they serve as hindrances to infrastructure development. A 1996 Department of Administration report to the Governor provides a comprehensive list of barriers that can still apply today. The complete list is contained in Appendix E.

Other specific barriers that have come up in the course of this research:

- *Rights of way*. The use of rights of way has been a major bone of contention between providers and cities throughout the state. Providers need access to rights of way to install lines, but claim fees and delays imposed by local governments as impediments. Rights of way have been an ongoing subject at the Legislature.[6]
- *Necessary 65-percent approval*. Municipal utilities that wish to offer basic local phone service (local "dial tone") to their community must put the question on the ballot and have it pass by 65 percent. The city of Moorhead recently held an election on the question of allowing the municipality to offer local phone service, but the initiative did not pass, garnering only a 52-percent approval. These same utilities may offer any other kind of telecom service without this same approval process. Some feel the 65-percent required margin is archaic and should be re-examined.[7]
- *LATAs*. Local Access and Transport Areas (LATAs) were established after the breakup of AT&T in the 1980s to keep the Baby Bells from re-monopolizing their service territories. States were divided into LATAs (Minnesota has six), and providers offering local service in one LATA are not allowed to cross a LATA boundary to offer service in the next LATA. The company instead needs a third party to carry their signal across the boundary. Involving a third party increases costs to the provider, who passes it on to customers. The Southwest Regional Telecommunications Task Force's report recommends that the LATA system be revisited and eliminated.

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[6] Interview with Mike Nowick, Minnesota Telephone Association, July 28, 1999.
[7] Interview with Steve Downer, Minnesota Municipal Utilities Association, Sept. 22, 1999.

B. Competition
Policy question:
- ❏ To what degree should government be involved in shaping competition?
- ❏ Should access be assured before competition?
- ❏ Why does competition develop in some markets and not in others?
- ❏ Will there be markets where competition is not possible, and if so, how can policymakers assure affordable access for consumers in that market?

Access and competition

In telecommunications, access is the product, and its availability and price can depend on the degree of competition in a particular area. Competition is crucial to a healthy telecommunications market. As in any business, competition does two things:

- It tends to lower the price of the product to consumers
- It encourages the introduction of new and better technology as competitors try to outdo each other in their pursuit of customers

In the early years of telephone service, to ensure availability (universal service), and because of the high costs involved in starting up and maintaining telephone service, "The Phone Company" was allowed to operate as a monopoly. AT&T was heavily regulated to ensure universal access. Improving technology, however, made it possible for other companies to enter the market and offer service at competitive prices, and by the 1970s, the federal government had determined that AT&T's monopoly was no longer necessary or good for American consumers. AT&T's breakup opened the gate for other providers to enter the market. The federal Telecommunications Act of 1996 went even further by, among other things, removing the dividers between the different categories of telecommunications services and allowing providers to cross over in the services they offer, paving the way for technology convergence. The intent has been to promote as much competition as possible to keep consumer prices low and encourage technological innovation and service expansion.

Two primary obstacles that make competition difficult in a rural market

In many communities, providers have been willing to take the initiative themselves and upgrade their infrastructure and offering of services, even without the incentive of competition. Other providers do not have the incentive to expand and upgrade infrastructure and services, and consumers are unable to take advantage of competitive pricing. Understanding why competition happens in some markets and not in others and what effect that has on providers' decision-making process will be important when crafting a policy recommendation whose goal is to enhance competition.

There are two primary obstacles that are cited as making competition difficult in a rural market:

- Telecommunications providers may not feel there is enough of a market to support their investment.

This is a chicken-and-egg problem that plagues sparsely populated and other "hard-to-serve" areas of the country. Not only are there fewer potential customers, but the distances between customers involved makes the cost per customer higher. That lowered

potential return on investment can make providers reluctant to invest capital in an area without what they consider an adequate market. The market, however, has difficulty forming without the necessary telecommunications infrastructure.

- Rural markets may not be able to support multiple providers.

There are most likely areas of the state where the population is spread so thinly that there are not enough customers to support more than one provider. In these cases, the government is obliged to continue regulating the provider and the markets to ensure that there is no abuse of the monopoly situation. The Minnesota state legislature has already recognized this problem by passing legislation that gives the Public Utilities Commission authority to enforce penalties against those who may attempt to abuse their monopoly position.

Existing competition in Minnesota

There appears to be, however, a measurable amount of competition already forming in rural markets in Minnesota. According to the Minnesota Telephone Association, aggressive competition is taking place in some areas. St. Cloud in particular appears to have the most competitive market in the state, with at least three different providers offering local phone service. In other parts of the state, according to MTA, competition is coming from smaller, local companies, particularly incumbent local exchange carriers that have received licenses as competitive local exchange carriers to operate in a neighboring ILEC's exchange. Some of the communities where competition is present and some of the firms located there are:

- St. Cloud: NSP, Infotel, US Link
  US Link is a subsidiary of TDS, a larger company that serves as an ILEC in the Brainerd area and other rural areas of the upper Midwest. Infotel is a startup by individuals who previously operated an ILEC around Brainerd (which was subsequently sold to TDS).
- Fergus Falls: Ottertail Communications
- Moorhead: US Link
  The city of Moorhead is also attempting to have its municipal utility approved to offer local phone service.
- Park Rapids: Unitel
- Bemidji: Paul Bunyan Cooperative
- Iron Range, Grand Rapids: Minnesota Power & Light
- Princeton: Sherburne Telecommunications

On the other hand, while some companies are trying to move into exchanges, other providers are pulling out. US West this year sold its rural exchanges to Citizens Utilities, while GTE is also in the process of selling its Minnesota exchanges as it prepares for its merger with Bell Atlantic. Dakota Telecom Group, a South Dakota firm, had moved into southwestern Minnesota with the intentions of offering services in the communities there. DTG, however, was sold to McLeod Telecom, headquartered in Cedar Rapids, Iowa, and McLeod has stated its intentions to not pursue markets in southwest Minnesota.

Relationships among potential providers becoming complex

What is also apparent is that the relationships among telephone companies, electric and water utilities, municipalities and other potential providers are much more complex today and offer many more opportunities for relationships than were possible in the past. At least two municipal cable companies are attempting to gain approval to begin offering local phone service in their communities. As another example, Blue Earth Valley Communications describes itself in this way on their web site:

"Blue Earth Valley Communications includes a number of rural independent telephone companies, affiliated partnerships in cellular markets, and other affiliated companies providing business telephone systems, video-conferencing facilities and service, local Internet access, and other telecommunications-related products and services to business and residential customers in Southern Minnesota and North Central Iowa."

Potential market failures

Most of the studies looked at for this paper emphasized that developing markets to the point where they can work on their own is the desirable way to ensure adequate access for a community. Counting on competitive markets to provide this access, however, brings with it a set of hazards in the form of market failure. Some examples include:

- *Single-provider markets.* There are bound to be some areas in the state where, because of a lack of consumer base, it will be very difficult for more than one provider to survive on a cost-effective basis. In these cases, regulators will have to continue to regulate the existing provider as a monopoly to prevent anti-consumer behavior.
- *Difficult-to-enter markets.* There are also markets that can support more than one provider, but entering the market may be difficult for a competitor. Here, too, regulators will need to be vigilant in assuring that the incumbent provider does not behave in an anti-consumer or anti-competitive manner.

  This past session, lawmakers passed legislation (H.F. 358) giving the Public Utilities Commission the authority to penalize providers for a variety of anti-competitive practices, including violations concerning discriminatory practices, interconnection agreements, unbundling, resale and other service requirements in both the state statutes and the federal Telecommunications Act of 1996.

- *Prohibitively high costs to consumers.* One of the steps of deregulating the industry has involved "de-averaging" phone rates. In the past, regulators recognized that the costs of providing service went up as the density of the population served went down. To guarantee that rural consumers received service at rates comparable to what urban consumers paid, providers were required to average their prices. To prevent rural rates from shooting up to their "real" market level in a deregulated market, state and federal governments are developing rules for a universal service fund to subsidize providers operating in areas where costs would make rates prohibitively expensive.

Further research is necessary to determine why competition is developing in some markets and not in others and what effect the presence of competition is having on the availability and variety of advanced telecommunications services.

The special problem of Native Americans on reservations

America's Indian reservations pose special problems concerning infrastructure and competition. While the average rate of basic telephone service penetration across the United States is estimated to be 94 percent (on average 94 percent of American households have at least one phone), on Indian reservations, phone penetration averages 40 to 55 percent. On some reservations it is estimated to be as low as 10 to 25 percent. At a Federal Communications Commission hearing in New Mexico in January 1999, Indian nation leaders testified that reservations often had few lines coming in and phone service was very basic, busy, slow and unreliable.[8] Requests for service generally wait for months or even years, and those making the requests are quoted prices in the thousands and tens of thousands of dollars.

Reservations share the same dilemmas as other rural areas: their remoteness and isolation increase the costs of installing hardware and providing service. However, these problems appear to be compounded by acute, persistent poverty, lack of information about special programs and complex rules made more complex by the Indian nations' sovereign status and their special relationship with the federal government. Besides the long waits and high prices, some other issues cited at the hearing include:

- Telecommunications companies have run fiber optic backbones near or through reservations, even near Indian communities, but these communities are not able to tap into these lines.
- Some reservations were able to use special programs to get lines into their libraries and schools for Internet access, but they then had to carefully ration anyone else's access (i.e., police or administration) so as not to tie up the lines.
- Local calling areas are very small, making a call to a neighboring community very expensive.

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[8] Federal Communications Commission, public hearing, Jan. 29, 1999, Indian Pueblo Cultural Center, Albuquerque, N.M., http://www.fcc.gov/Panel_Discussions/Teleservice_reservations/tr-newmx.txt.

- Lack of access has been not only bad for business development, but also creates serious problems in emergencies. People are forced to go for miles to find a telephone to dial 911.
- Many residents are unaware of federal programs that subsidize phone service for low-income customers.

Adding to the problem is a bureaucracy special to Native Americans that has evolved over the years. Because of their sovereign status, Native Americans often have a different system of laws and their own set of federal agencies to deal with. According to an extensive study on telecommunications and Native Americans,

> "federal agencies with major responsibility for telecommunications policy, such as the Federal Communications Commission (FCC) and National Telecommunications and Information Administration (NTIA), have not applied Indian law to telecommunications policy. The federal agencies with lead responsibility for Native programs, such as the Bureau of Indian Affairs (BIA), Indian Health Service (IHS), and Administration for Native Americans (ANA), do not have a Native American telecommunications policy."[9]

It was suggested during the New Mexico FCC hearing that the concept of "federal trust," that the federal government is responsible for the well-being of Native Americans, implies the assurance of adequate phone service. No single government department, however, may be equipped to deal with the combination of telecommunications and the Native American community. In addition, state governments may not be sure what their roles are. Providers, on the other hand, may be unsure as to whom they are responsible.

Some questions the panel may want to consider when thinking about Native American reservation communities:
- What is the current state of telecommunications services on Minnesota's reservations?
- How can researchers get to the core reasons for lack of service on reservations?
- What role are state policymakers able to take in this situation?
- Where does the universal service fund fit?
- Are some reservations creating successful initiatives that can be studied and applied elsewhere?

C. Community planning and cooperation: harnessing potential
   Policy questions
   ❑ How can policymakers help the various parties within a community communicate and coordinate their planning and investment?

Coordinated community planning is recommended for forming effective systems
The goal of developing a sound telecommunications system in a community is to give residents an important tool for economic and community development. With that in

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[9] U.S. Congress, Office of Technology Assessment, "Telecommunications Technology and Native Americans: Opportunities and Challenges," August 1995, p. 92.

mind, some studies reviewed indicate that many communities already have adequate infrastructure in the ground and in the sky, put there by individual groups solving their last mile problems on their own. But while there may be numerous resources available, they could be owned or controlled by a number of different parties and/or be unavailable to outside users, or many potential users are simply unaware of the existence of these resources.

Whether a community has adequate resources or not, these studies suggest that an important means of improving those resources is to aggregate demand.[10] As discussed above, probably the chief reason a rural community does not have a provider already serving their area with advanced services is that the provider's return on investment may be too low to make such an investment worthwhile. Many communities, however, could already have a large enough user base to demand better service if they could pool their demand.

In considering policies that will help communities coordinate their planning efforts, policymakers should include *both* public and private users and include a strong educational component explaining the potential uses of telecom services. They should also consider, however, that aggregating demand could actually reduce telecommunications competition in a community.

D. Anticipating the future
Policy questions:
- ❑ What are the implications for rural Minnesota of not developing an advanced telecom system?
- ❑ Can policies be created that encourage first-rate service now, but remain flexible enough to accommodate future technology?
- ❑ What does demographic forecasting contribute to telecommunications planning?
- ❑ The big picture: What other amenities are needed besides telecommunications infrastructure and information services for effective community development?

The questions above point out the more abstract issues policymakers must consider when dealing with the rapidly changing technology of communications. First, there is the question of whether we should do anything. Some policymakers will want ample evidence of the effect telecommunications or the lack thereof can have on a community. Second, legislators and others drafting policy and funding initiatives should be willing to do two things: 1) consult with a variety of technical experts to get a broad opinion on the future directions of particular technologies, and 2) engage in long-term planning and avoid quick fixes and special interest projects. In both cases, the object is to avoid creating ineffective band-aid solutions or locking into a narrow product that may soon become obsolete and expensive to upgrade.

Third, policymakers may need to examine demographic forecasts on the population shifts within the state to see if they reveal any information about where and how to focus future efforts.

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[10] Southwest Regional Telecommunications Task Force, "Report of Findings and Recommendations Regarding Telecommunications in Southwestern Minnesota," January 1997.

Finally, it is recognized that for a community to not just exist but thrive and grow, much more is needed than an advanced telecommunications infrastructure and information services platform. An educated work force, community services, a supportive government (i.e., regulatory) environment, availability of capital, schools, parks, and other amenities need to be considered and their development studied.

IV. Develop a framework and methodology for future research.

The first goal of this project is to develop policy recommendations, while the second goal is to develop a framework and methodology for future research on the subject of telecommunications in rural areas. This is, admittedly, an ambitious aim. Beginning points would be to discuss what research projects the panel members already have planned, identify priorities for future research and develop a discrete list of indicators to measure telecommunications use and extent. Such research would be helpful in identifying research gaps and informing future legislative policy recommendations.

Appendices:

A. Studies
        Summary of issues
                Patterns, trends
                Research questions raised
        Annotated bibliography of studies

B. Summary of Kelley bill
C. Survey questions
D. Maps
E. Admin's obstacles and barriers
F. Mendoza and Fisher lists of questions

Appendix C

Obstacles and Barriers Clusters

From: "Supporting Minnesota's Information Infrastructure: Platform Recommendations,"
Minnesota Department of Administration, June 1996

A. Roles
Roles:
➢ Need for compliance with national goals
➢ Conflicting opinions on role of government
➢ Public vs. private role must be agreed upon
➢ Different perspectives of roles and responsibility: government, providers/business, communities

Government as Buyer:
➢ Budget constraints override optimization
➢ Budgeting and financial systems that support government
➢ Financing of infrastructure for educational institutions

Government as Regulator:
➢ Multiple LATAs in Minnesota
➢ Obsolete regulatory framework structure
➢ Being in transition from regulation to competition
➢ Telecom Act has drawn significant attention while adding confusion
➢ Effects of new Telecom Act

Government as Catalyst:
➢ Economic development model to serve users, transmission provider and content providers
➢ Mechanisms to support and facilitate a "community" approach to building infrastructure
➢ Minnesota's tax climate discourages business development and expansion

B. Resources
Private Investment:
➢ Demand for large bandwidth service
➢ High costs for broadband services
➢ Lack of volume, particularly for high speed or high bandwidth services
➢ Speed/bandwidth of publicly available telecommunications network not adequate to meet today's needs

Economic Resources:
➢ High risk-uncertain reward
➢ Lack of statistical data
➢ Disincentive to industry/lack of clear strategy

➢ Investment policies encourage conversion to digital technologies from analog

C. Technology

Technical Services:
➢ Lack of standards, particularly in most advanced technologies
➢ Lack of standardized protocols
➢ Lack of standards that ensure interconnectivity of various systems
➢ Lack of coordination
➢ Lack of clarity around the role and extent of government
➢ No boundaries as to the extent of government responsibility
➢ Lack of a plan and vision with understandable roles and principles of interaction

Demographic Challenge:
➢ Local phone access to Internet
➢ Much of Minnesota is remote
➢ Multiple small phone service providers
➢ Rural cost to provide access
➢ High cost of access (until recent legislation)
➢ Provider fragmentation of state and communities

Pace of Technology Change:
➢ Rapid obsolescence of information technology
➢ Evolving technologies

D. Citizen Education and Attitude:
➢ Resistance to change or reengineering (minimizing technological advantages)
➢ Citizen acceptance
➢ Relevant information on technical education
➢ Lack of education and training in technical and technology issues
➢ Overcoming cynicism due to failed efforts
➢ Technology tools and knowledge not available to all citizens
➢ Lack of training in using telecommunication tools
➢ Policy makers lacking technical appreciation
➢ Resistance to understanding the technical and economic issues

Located on the campus of Minnesota State University, Mankato, the Center for Rural Policy and Development is a private, not-for-profit, research organization dedicated to the study of the social, economic and cultural forces that impact rural Minnesota. The Center's mission is:

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