

## **Universal Service: The Rural Challenge Changing Requirements and Policy Options**

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### **1. The Changing Rural Environment**

#### **1.1. The New Rural Economy**

The U.S. economy is undergoing many wrenching transitions, with declines in primary industries and manufacturing, while services are now the most rapidly growing sector. This structural shift is mirrored in rural economies, where public and private services now generally dwarf agriculture and manufacturing. Yet the shift to services is only part of the change. Information-based activities account for the largest part of the growth in services, and other sectors are becoming increasingly information intensive. Thus access to information is an increasingly important requirement for rural development.

Historically, rural development took place where there was geographic advantage in the form of arable land or natural resources. Increasingly, new economic development depends on human resources and telecommunications and information-processing infrastructure. In the provision of physical goods and services, rural areas could only compete across barriers of distance and geography if they had a natural resource advantage. In the provision of information goods and services, reliable telecommunications infrastructure can make geography and distance irrelevant.

#### **1.2. Education and Medical Services**

Rural education and medical services are also facing wrenching changes. Shrinking rural populations in many areas make rural community schools and hospitals hard to justify. Many states have legislated new curricula designed to raise the standards of schools and teachers, and the competence of students. Rural schools generally lack the funds to attract specialized teachers for physics and foreign languages, for example. To take these courses, rural students must be bussed to larger regional schools, and, if the school is forced to close, the community loses one of its cornerstones.

Many rural areas are also experiencing severe shortages of physicians. The result is that residents must travel long distances to regional health centers, and many go without treatment or preventive care until their condition becomes critical. Rural health care services are also vital to rural economies: "If a community doesn't recognize the value of its health care system and loses it, it doesn't just lose the health care system. It loses a great big piece of the economic machine of that community."<sup>1</sup>

### 1.3. Increased Demand for Rural Services

Rural demand for high quality telecommunications is growing substantially, largely because of the types of applications outlined above. Facsimile communication is particularly important in rural areas where mail delivery is often slow and unreliable. The need for access to centralized data bases, whether for libraries, inventory control and ordering, or updating of government records, has resulted in increased demand for data communications. Electronic mail and computer conferencing are also spreading to rural areas where they can be particularly effective in saving time and/or travel costs. And demands for access to a wider range of educational opportunities as well as restrictions on educational budgets are leading to growing interest in distance education using telecommunications.

## 2. The Changing Technological Environment

As we are all well aware, technological change continues at what often feels like warp speed. Yet buried in the hype for everything from personal digital assistants to multimedia are implications that many of these recent technological innovations can make rural service more reliable and cheaper to provide. Among these innovations are:

- **Wireless technologies:** Advances in radio technology such as cellular radio and rural radio subscriber systems offer affordable means of reaching less isolated rural customers. These technologies make it possible to serve rural communities without laying cable or stringing copper wire.
- **Compressed voice:** Compression algorithms can be used to "compress" digital voice signals, so that 8 or more conversations can be carried on a 64 kbps voice channel, thus reducing transmission costs.
- **Voice Messaging:** Messaging can be important to individuals looking for work and families scattered in several locations, as well as to businesses and public services. Voice messaging is available as a Centrex feature on most local carriers' exchanges, making the functions of accessing and manipulating messages accessible to individuals as well as to organizations. But voice messaging systems can do much more than replace analog answering machines. They can provide "virtual telephone service." In some urban homeless shelters, voice mail boxes enable jobseekers to be contacted by prospective employers. In rural areas voice mail could also be used to provide access to a message service for people temporarily without telephone service. (This approach is being used by a telephone company in northeastern Brazil for people who are still without individual telephone service.)
- **Compressed video:** Digitized video can be compressed to make possible transmission of motion video over as few as 2 telephone lines (128 kbps). Compressed video offers the possibility of relatively low cost video for distance education, and for transmission of medical imagery.

### 3. Telecommunications and Rural Development

#### 3.1. The Importance of Information

To link these trends with the subject of universal service, we must first recognize that information is vital to social and economic development. What drew me to this field was what I learned about the importance of information, initially from people living in remote areas of Alaska and the Canadian North where telecommunications facilities were limited or nonexistent. From them I learned that access to information and the ability to share information are critical to the development process -- to get help when you need it, to keep in touch with family and friends, to upgrade the quality of education and social services, and to run businesses and government activities.

Access to information is therefore key to a wide range of social and economic activities. Telecommunications infrastructure provides a means of transmitting and sharing information, thus making the developmental benefits of information widely accessible. Research on the role of telecommunications has shown that instantaneous communication can help improve:

- *efficiency*, or the ratio of output to cost;
- *effectiveness*, or the quality of products and services; and
- *equity*, or the distribution of benefits throughout the society.

However, many other factors may influence whether and to what extent telecommunications may make an impact. Generally, certain levels of other basic infrastructure as well as organizational activity are required for the indirect benefits of telecommunications to be realized -- that is, telecommunications may be seen a *complement* in development -- not a sole contributor. Telecommunications may also serve as a *catalyst* at certain stages of the rural development process, becoming particularly important when other innovations are introduced such as improved farming practices, lines of credit, incentives for decentralization and diversification of the rural economic base.

#### 4. The Need for Vision: A Developmental Approach

Telecommunications can be used for a wide range of applications -- for stores on rural main streets, for education, libraries, health care and social services, for agriculture, tourism and other rural industries, and for other applications not yet discovered. The operative word is *can* -- whether these applications will be widely implemented may depend on the vision of state and federal policy makers and regulators. The underlying rationale must be that universal access to information is critical to the development process.

To start with, we need a vision of the future that includes both social and economic goals for the nation's development, including its rural areas, and recognizes that information -- access, sharing, and dissemination -- will contribute to achieving these goals. The next step is to ensure that Americans in every state have available the telecommunications facilities and services to meet their information needs.

I believe that four fundamental criteria are critical in implementing this vision:

- *Accessibility:* We should strive to ensure that the widest range of telecommunications facilities and services are available throughout each state, and that all Americans have access to basic services.

- *Equity:* We need to ensure that there are not disparities in access to telecommunications technologies and services. That is, in addition to maintaining universal access to basic services (however they are to be defined), we need make sure that Americans are not penalized because of where they live or what companies offer services to them.

In order to ensure that telecommunications technologies and services can be put to optimal use for rural development, the basic goal should be to provide in rural and remote areas affordable access to telecommunications and information services *comparable to those available in urban areas*. For example, information services need to be available in rural as well as metropolitan areas, in inner cities as well as suburbs -- in each and every state. And rates for access to these services should not vary significantly throughout the country even if they are provided by different companies or using different technologies.

- *Connectivity:* I think there is not a simple answer at this point to the question of whether there should be one or many providers, but that multiple providers are likely to be inevitable in some rural as well as many urban areas. But we need to ensure that there is universal connectivity, so that Americans can communicate with each other and with information sources regardless of who provides their services or what technology links them to networks.

- *Flexibility:* We must recognize that changing technologies and the introduction of new services mean that we will have to be flexible in setting universal service targets and adjusting to change.

### 5. Universal Service: A Moving Target

With the almost daily announcements of new products and new industry alliances, it is obvious that both the technology and the industry itself are changing dramatically, and that policy makers and regulators must expect change to be the norm in telecommunications. Universal service must therefore be a moving target. Thus goals should not be stated in terms of a specific technology or service provider (such as optical fiber to the home provided by the local telephone company) but in terms of functions and capabilities (such as ability to transmit voice and data and possibly video in some cases; and ability to access information services).

The following are proposed as specific near term goals for universal service in both rural and urban areas:

- **Universal Single Party Touchtone Service:** Telephone service should be universally available. Single party service should be required to facilitate facsimile and data communications. Switching should become totally digital so

that everyone has the option of using touchtone phones to access information services.

- **Service Quality Sufficient for Voice, Fax, and Data:** Line quality should be adequate for data transmission at up to 9600 bps. As noted above, party lines should also be eliminated.
- **Rates based on Community of Interest:** Rate structures should take into consideration rural calling patterns so that rural residents are not unduly penalized for calling businesses and government agencies that urban dwellers could reach with a local call. Optional flat rate plans such as Extended Area Service should be introduced.
- **Universal Enhanced 911 (Emergency Services):** All subscribers should have enhanced emergency service access. The telephone number is linked to a data base, so that when the emergency number is dialed, the operator immediately sees the address and any special information such as medical conditions or disabilities, etc. (This service is being implemented in urban areas, but is not yet generally available in rural areas.)
- **Access to Optional Information Services:** All subscribers should be able to access optional information services such as remote data bases and electronic mail services through a local or toll free call to a gateway. (Rural subscribers usually have to pay long distance charges to reach a gateway, whereas urban subscribers require only a local call. Where 800 number access is available, customers typically pay much higher hourly connect time rates to information providers.)
- **Mobile Services:** Mobile services also need to be universally available. Mobile communications can be particularly important to people who spend much of their time on the land far from their homes, or who travel long distances across the countryside. Technologies such as cellular radio that are dedicated to mobile use in cities may also be the least cost way of providing primary service to isolated villages and homesteads.

The following sections examine these goals in greater detail, and propose strategies for achieving them.

## 6. Service Quality and Upgrading

### 6.1. Transmission Quality

While quality of service is certainly not a uniquely rural concern, it is likely to remain an important rural issue because carriers responsible for urban and rural areas are likely to invest more in upgrading and maintaining the higher density and potentially more profitable urban and suburban networks.

- **Single party service:** The near term goals noted above include single party service, primarily because shared lines are not practicable for facsimile and data transmission. Again, small independent telcos are ahead of the BOCs in many states in eliminating multiparty service. The problem is minor in some regions, but still significant in some western and southern states.
- **Line quality:** Party lines are likely to have poor line quality, but some single party service using open wire or other old outside plant is also likely to provide substandard quality for fax and data transmission. If poor line quality requires multiple transmission attempts to correct errors or only very low data rates to be used, the cost to rural compared to urban users will be even greater than it would be given toll charges alone.
- **Rural Disparities:** In addition to rural/urban disparities, there may be disparities in service quality within rural areas, with high quality networks available only to some users. For example, in many states, the state lotteries have data communications links with every county, while rural residents, schools, and businesses may still be waiting for access to comparable facilities.

## 6.2. New Technologies: Part of the Solution

The "moving target" definition of universal service does not specify a particular technology, but assumes that as facilities and services become widely available in urban areas, they should also be extended to rural areas. According to conventional wisdom, the costs of providing such access may be prohibitive, given lower population densities and greater distances between subscribers. Yet new technologies may change the conventional analysis. The technologies used to deliver the services in rural areas may differ from those installed in urban areas; for example, satellite links and radio networks may be less costly for rural communications than optical fiber or even copper wire.

Indicators that the industry is re-assessing the economics of providing rural services are recent acquisitions by some of the smaller players. While companies such as GTE and US West are selling rural franchises, other companies with a more optimistic assessment of rural profitability are buying them. For example, Rochester Telephone has bought properties in the rural east and midwest. Citizens Communications spent \$1.1 billion to buy 500,000 access lines, primarily in the rural western states. And Pacific Telecom, the parent of Alascom, has also recently bought rural properties.

One of the key requirements for many of the services cited here is digital switching. In fact, small rural telephone companies have upgraded to fully digital switching faster than the BOCs.<sup>2</sup> While the BOCs all have plans to upgrade to fully digital networks, the rural areas are generally the last to reap the benefits. For example, Pacific Bell does not plan to be fully digital in California until 1997. This means that customers of smaller phone companies may have access to more services than customers of the BOCs, but even the customers of the small telcos may not be able to access the services available through the adjacent BOC.

Digital switches can become platforms for a wide range services such as compressed digital video for teleconferencing and distance education. Another enhancement is Common Channel Signaling System 7 (known as SS7), a digital switching enhancement that separates

signaling and transmission functions, with several advantages including extending signaling information to subscribers and ability to set up services through access to databases.

SS7 access can be important to many rural businesses. During the past few months, I have heard from both customers and carriers about limited rural access. The potential customers included a forest products company in Oregon and a nonprofit organization in northern California. According to the customers, the local exchange carrier (LEC) in California claimed to be several years away from providing SS7 in the customer's territory, while the LEC in Oregon said it had no plans to provide the service in that region. A small telephone company from another part of northern California said it had installed the software, but was unable to offer services to its customers because the Bell Operating Company it connected with does not offer the service in that region.

## 7. Pricing Issues

Rural users are concerned about price as well as quality of service, especially where LEC boundaries, intraLATA tariffs, and limited access to competing interexchange carriers (IXCs) may contribute to high costs in reaching their communities of interest.

### 7.1. Reducing the Distance Penalty

Rural subscribers often have to pay toll charges to call places such as government agencies, doctors' offices, and stores and services that urban dwellers can reach with a local call. A way to reduce these disparities is to consider **communities of interest** in pricing of services. For example, local calling areas for rural residents can be designed to generate the same percentage of local calls compared to all intraLATA calls as are made by urban residents. Alternatively, toll free access can be provided to frequently contacted public services. Some specific solutions include:

- **Extended Area Service (EAS):** EAS offers callers an option of discounted or flat rate calling within a zone. For example, the Washington State Utilities and Transportation Commission required carriers to identify exchanges where less than 80 percent of intraLATA calls are local calls, and then to extend local calling areas until 80 percent of intraLATA calls are local calls.
- **Toll Free Access to Government Services:** Various approaches can be used to offer toll free calling to regional government offices or other important social services. States including Colorado, Georgia and Louisiana have extended local calling areas to enable rural citizens to reach county government offices with a local call.

Other approaches may be used to reduce the disparities in cost to rural users of accessing services available locally in urban areas. For example:

- **Distance-Insensitive Tariffs:** Tariffs may be rebalanced to eliminate distance penalties. While distance has traditionally been used as the basic criterion for constructing tariffs, there may be little technical justification for this approach

today. For example, satellites and wireless technologies have costs that are virtually independent of distance. Value added carriers typically price according to volume and time of day rather than distance. Eliminating distance can also be viewed as a rural development strategy. (In Sweden, all calls over 100 km. are now charged at a flat rate. This policy is known as "making Sweden rounder.")

- **Local Access to Information Services:** Increasingly, rural residents want to use online data bases and other information services. Yet even if these services are available, they may not be readily accessible because there are few rural gateways, so that rural customers are required to pay toll charges. The Colorado Advanced Technology Institute (CATI) has provided gateways in several rural communities to its statewide network, which in turn can be used to access the Internet.

### **7.2. Low Income and High Cost Programs:**

Lack of telephone service in the rural U.S. is generally related more to income than to isolation. We will therefore need to retain targeted subsidy programs such as Lifeline (reduced monthly rates for low income subscribers) and Linkup (reduced installation charges).

However, there are some locations, particularly in the inter-mountain West, where the cost of installing service is prohibitive to all but wealthy residents, and typical Linkup subsidies are too limited to make these connections affordable. Solutions may include subsidies to the carriers along the model of the industry-administered High Cost Fund, interest-free loans or extended payments schedules for subscribers, and/or incentives to carriers to use lower cost transmission links such as microwave or fixed cellular systems.

## **8. Policy Options and Strategies**

### **8.1. Incentive Strategies**

Regulators and policy makers may need to use incentives to achieve the goals where the marketplace alone is insufficient -- for example, incentives for upgrading of services in isolated rural areas; incentives to encourage carriers to conduct pilot projects and offer attractive rates to education and social service users; and incentives to maintain service quality standards.

An alternative to financial incentives would be a management by objectives approach where regulators would set objectives and carriers would be rewarded for achieving them. Several states have used incentives to the carriers to spur upgrading of rural facilities in return for more flexibility in pricing. Incentives might be tied to other goals such as quality of service. Carriers would have to show that they met quality performance targets in each local exchange area (not on a statewide or LATA wide average) in order to obtain regulatory flexibility.

Incentives could also be tied to performance in rural areas that are part of carriers' franchised territory. For example:

- **Serve it or lose it:** There are still some pockets of the country where franchised carriers have not made services available. Large carriers may



determine that some rural areas are too unprofitable to serve in the near term. However, this conclusion may be based on assumptions about the cost of technologies and implementation that may be inappropriate. These areas should be opened up for applications by other carriers willing to provide service.

- **Serve it well or lose it:** Carriers that do not meet service quality performance standards should lose territories where they have not performed. These areas could be opened up to other applicants, as described above.

### **8.2. Encouraging Innovation: Education and Social Services Applications**

As noted above, some regions may have high quality facilities that are being used by only one customer such as the state lottery, other government agency or rural business. Carriers often state that they do not know how to offer access to surplus capacity and comply with state tariff regulations. Regulators need to facilitate experimentation and usage of surplus capacity.

Carriers could also be required to propose innovative strategies for encouraging educational and social service applications such as pilot projects and trials, use of off-peak, bulk rate, or other discount rates. Regulators, in turn, could provide waivers of existing rates for trial periods and for educational or other social services.

In other cases, regulators could create incentives that will allow market forces to work, for example, by facilitating aggregation of demand, so that many small users can obtain the services they need at affordable rates, or that schools can share facilities with commercial users.

### **8.3. Aggregating User Demand**

Rural areas often lack economies of scale that would make provision of new services attractive. An approach to reducing costs per customer and to attracting new services is to aggregate demand. Both carriers and customers can take steps to aggregate demand in low volume rural areas. Small telephone companies may aggregate their traffic to provide sufficient demand to attract new services. Iowa Network Services is a consortium of small telephone companies in Iowa that have joined together to build a fiber network to deliver their traffic to a Point of Presence (POP) where the traffic can be picked up by long distance carriers. INS made this investment to attract additional long distance carriers and to provide an attractive market for other new services.

School systems have also pooled demand and expertise. Using telecommunications for curriculum-sharing, schools can be linked so that courses available at one school can be taught to students at other schools in the region. If no specialized expertise exists in the region, schools may rely on an outside source that delivers the course content to the schools. (Several of these approaches have been supported by the federally-funded STAR Schools Program.)

### **8.4. Sharing Access**

Another approach is to encourage sharing of facilities that are already available. As noted above, state lotteries may already have high quality data links in rural areas. Other government agencies may also have leased facilities from rural carriers or installed their own networks. The spare capacity can be made available for other public service users.

### **8.5. Funding Strategies**

Strategies to seek funding for pilot projects and trials, targeted subsidies, and consumer education will also be needed. The industry itself should contribute to funding for these efforts. Commissions could mandate that a small percentage of revenues from each provider would be collected and pooled to provide a State Telecommunications Fund that would be allocated for these purposes. A board composed of industry, regulators, and consumer representatives could oversee disbursements from the fund.

States can also apply to federal sources which are offering telecommunications support. There are several opportunities:

- NTIA's Public Telecommunications Facilities Program has increased its budget significantly under the new Administration;
- the Rural Electrification Administration (REA) offers Distance Learning and Medical Link Grants, Rural Business Incubator loans, Rural Economic Development Loans and Grants; loan payment deferments for rural development.

Other sources could include the National Institute for Science and Technology (NIST) and the Small Business Investment Corporation.

Another strategy is to involve state agencies and other state and local initiatives or organizations in telecommunications initiatives. For example, state government telecommunications networks may serve as testbeds for innovative applications.

States may also stimulate activity by providing seed money for pilot projects. For example, in Colorado, the Colorado Advanced Technology Institute (CATI) has a Rural Telecommunications Program which provides seed money for rural communities to plan telecommunications projects.

### **8.6. Consumer Education**

In a more complex technological environment with numerous carriers, providing universal access may not be enough to facilitate widespread use of telecommunications. We will also need ongoing consumer education so that individuals and organizations are aware of the options available to them, are able to make informed decisions about these options, understand the pricing of the services, and know how to get assistance if they have problems with reliability, bills, privacy, and other problems.

### **8.7. Coordination**

There should be coordination within states among regulators and state legislators, public service agencies, and consumer representatives involved with rural telecommunications. We also need communication among the states and between state and federal agencies. The goal is to work toward a shared national vision. It is not to implement identical goals and strategies in each state, but to share information on state initiatives and regulatory decisions, and to ensure that there are not major disparities in various parts of the country in terms of availability of facilities, access to services, and pricing.

## 9. Monitoring Progress

It is likely that the marketplace will be the best mechanism for bringing innovative and affordable services to most Americans, including the majority in rural areas. However, we will need to monitor progress to determine whether there are disparities in access, quality of services, or pricing that need to be addressed.

Therefore, it will be necessary to establish a set of performance indicators and measurements to track progress toward reaching rural universal service goals.<sup>3</sup> These are not likely to be wholly appropriate for each state, but they could be a useful starting point. The intent is to develop some simple ongoing way to measure progress, especially when staff and funding resources for extensive data collection are limited.

This approach assumes that regulators will monitor carrier performance. In order for such monitoring to be meaningful for rural areas, there must be requirements that data be disaggregated, for example, by exchange. Otherwise, aggregate carrier service area data will mask any disparities within the entire franchise area.

## 10. Implementing the Vision

Telecommunications policy and rural development policy in the past have seemed be "two solitudes." However, the importance of access to information for economic development activities and social service delivery now point to the need to bridge the gap between these disciplines and responsibilities. The above approach, which may be termed a "rural development-based approach to universal service" is based on the assumption that telecommunication planners must consider the socio-economic implications of telecommunications policies.

This approach assumes a broadening of the definition of "public interest" beyond the simple assessment of connection to the network and pricing of basic services. It involves an analysis of the potential benefits of access to education and social services; the impact of geographical as well as income-related disparities; the potential economic benefits of affordable access to information for both individual and collective activities.

Many of the steps in implementing the vision will need to come from other entities: the communications industries themselves, government agencies that can fund pilot projects, users that can identify needs and develop strategies to aggregate demand and share costs. Yet policy makers must take a prominent role, both in the agenda-setting process and in devising incentive based strategies to achieve national communications goals.

As Harlan Cleveland has noted: "The passing of remoteness is one of the great unheralded macro-trends of our extraordinary time....The fusion of rapid microprocessing and global telecommunications presents nearly all of us with the choice between relevance and remoteness." Whether this promise is realized depends on providing access to rural telecommunications infrastructure and services based on an understanding of rural development information needs and priorities. Without such information access capabilities, rural residents will find it more difficult to survive economically, let alone to prosper.

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## Appendix A:

### Recommendations from *Electronic Byways*<sup>4</sup>

#### A. Goals for Rural Telecommunications

In order to ensure that telecommunications technologies and services can be put to optimal use for rural development, the basic goal should be to provide in rural and remote areas affordable access to telecommunications and information services *comparable to those available in urban areas*. The underlying rationale is that universal access to information is critical to the development process. It should be noted that this goal is in effect a "moving target": it does not specify a particular technology, but assumes that as facilities and services become widely available in urban areas, they should also be extended to rural areas.

The goal should apply to both fixed and mobile services. Mobile communications can be particularly important to people who work on the land or who travel long distances across the countryside. Technologies such as cellular radio that are dedicated to mobile use in cities may also be the least cost way of providing primary service to isolated villages and homesteads.

The following are specific service goals designed to guide regulators and telecommunications carriers:

- **Universal Single Party Touchtone Service:** Telephone service should be universally available. Single party service should be required to facilitate facsimile and data communications. Switching should become totally digital so that everyone has the option of using touchtone phones to access information services.
- **Service Quality Sufficient for Voice, Fax, and Data:** Line quality should be adequate for data transmission at up to 9600 bps. As noted above, party lines should also be eliminated.
- **Rates based on Community of Interest:** Rate structures should take into consideration rural calling patterns so that rural residents are not unduly penalized for calling businesses and government agencies that urban dwellers could reach with a local call. Optional flat rate plans such as Extended Area Service should be introduced.
- **Universal Enhanced 911 (Emergency Services):** All subscribers should have enhanced emergency service access. The telephone number is linked to a data base, so that when the emergency number is dialed, the operator immediately sees the address and any special information such as medical conditions or disabilities, etc. (This service is being implemented in urban areas in the U.S., but is not yet generally available in rural areas.)
- **Access to Optional Information Services:** All subscribers should be able to access optional information services such as remote data bases and electronic mail services through a local or toll free call to a gateway. (In the U.S., rural subscribers usually have to pay long distance charges to reach a gateway, whereas urban subscribers require only a local call.)

#### **B. Recommendations for Legislators and Policy Makers:**

- Develop a comprehensive telecommunications plan for the state or region, taking into consideration its social and economic development goals and strategies.
- Establish high level centralized communications authority to coordinate and set priorities for the state's or region's telecommunications efforts. This entity

should include representation from a variety of planning and development agencies as well as communications planners.

- Use the government procurement process to help develop a modernized public switched network. By specifying requirements that could be provided through the public network, governments may provide an incentive to carriers to upgrade facilities that will benefit other customers as well. For example, in some states, the government-operated lottery has high quality data communications links in rural areas, but similar services are not available to local users. A better strategy would be to allow users such as businesses and schools to piggyback on new networks.
- Support telecommunications pilot projects that could benefit rural development. Such projects provide an opportunity to explore new applications at relatively low cost. Successful projects may then be extended to other sites and/or be replicated in other regions.
- Authorize development agencies to advocate telecommunications policies that serve economic development goals. Regulatory commissions hear about service benefits often only from consumer groups. Development agencies should also be prepared to participate in hearings and other fora where regulators are reviewing service access, quality, and pricing.
- Design government telecommunications services to increase citizens' access without regard to location or income. Toll free numbers and free access to government data bases are examples of how government services can be made more accessible using telecommunications.

### **C. Recommendations for Regulatory Commissions**

- Use incentive regulation to foster efficiency and to encourage investment in and upgrading of rural facilities. As noted above, several U.S. states have used incentives to the carriers to spur upgrading of rural facilities in return for more flexibility in pricing. This strategy should not only result in greater efficiency than the "rate of return" regulatory model, but can also accelerate investment in rural or other underserved areas.
- Consider socio-economic implications of telecommunications regulatory policies. Commissions should include assessments of indirect benefits of telecommunications investment and utilization to the economy and the society in framing their policies and regulations.
- Establish performance measures to monitor progress toward meeting telecommunications goals. These measures can provide feedback to planners and regulators on the status and effectiveness of facilities and services. A list of sample performance measures is presented below.

- Conduct hearings in both urban and rural locations to identify development needs as part of the process of establishing telecommunications policies in support of development goals.

#### **D. Recommendations for Development Agencies**

- Work with regulatory agencies to establish a formal mechanism to coordinate policies and programs to achieve economic development goals.
- Hold regional workshops to gather and to share information about innovative uses of telecommunications and about the role of telecommunications in development generally.
- Sponsor task forces to prepare a set of specific goals and plans for the implementation and use of modernized telecommunications networks and services that could further the state's general development goals.
- Prepare and distribute an inventory of the telecommunications infrastructure and services in their state or region.
- Build a telecommunication component into small business assistance programs in order to foster better understanding by small businesses and rural communities of how they can use the available telecommunications services.
- Arrange for a training course or program on telecommunications for community and economic development professionals.
- Work with local colleges in establishing telecommunications training courses in order to provide adequate training for the rural workforce to meet the telecommunications needs and opportunities of business.
- Encourage and support the establishment and expansion of distance learning programs.



## Appendix B:

### Examples of Performance Measures

The following are examples of performance measures that can be used to monitor progress toward telecommunications goals:<sup>5</sup>

- Universal telephone service:  
percentage of households with telephone;
- Single party service:  
percentage of households/businesses with single party service;
- Touchtone service:  
percentage of residential/business lines on which a touchtone phone would operate without change ("works now" status);
- Service quality: (sufficient for fax and 9600 bps data without line conditioning)  
percentage of residential/business lines meeting this standard;
- Extended Area Service:  
percentage of exchanges in which 80 percent or more of intra-LATA (regional) calls are local or flat rate calls;  
percentage of exchanges where call to seat of government is local or toll free call;
- Enhanced Emergency Service:  
percentage of exchanges with all lines served by 911 (emergency service);  
percentage of exchanges with all lines served by E911 (enhanced emergency service);
- Equal Access:  
percentage of exchanges with equal access to competitive carriers on all lines;
- Mobile Service:  
percentage of territory with access to mobile telephone service;
- Optional Services:  
percentage exchanges with access to custom calling features from all lines;  
percentage of exchanges with access to voice messaging and audiotext services without toll charges to reach provider;

- Information Gateway and Other Data Services:
  - percentage of exchanges with access to information gateways without toll charges;
  - percentage of exchanges with access to switched broadband service;
  
- Distance Learning and other Video Information Services:
  - percentage of schools with access to video distance learning;
  - percentage of communities with access to telemedicine, business videoconferencing services, etc.

#### **Endnotes**

1. Lyons (1991).
2. Parker and Hudson (1992).
3. Examples from Parker and Hudson (1992) are included in the appendix to this chapter.
4. From Parker and Hudson (1992).
5. From Parker and Hudson (1992).