

**UNIVERSAL SERVICE IN THE UNITED STATES:
DIMENSIONS OF THE DEBATE**

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EXECUTIVE SUMMARY

Universal service is a widely used but not fully understood concept that policy makers and regulators have relied upon to provide guidance for a number of issues. In the stable predivestiture period, universal service meant rotary dial and voice grade service. Affordability was generally not a dominant concern during this time. Additionally, although telephone service had a recognized role in economic growth and development, few envisioned telecommunications as a leading economic sector.

Changes in technology, customer demands, and market structure are the main reasons why the universal service concept offers somewhat less guidance than it did in the past. Digital switching, radio technology, and fiber cable have allowed different portions of the public switched telecommunications networks to be reevaluated and selected by firms as sites of competitive activity. Cellular and personal communications systems, for example, hold some promise for bypassing the local loops. Fiber technology allows great traffic concentration, which increases the economic efficiency of the network. Competitive access providers, cable television companies, and local exchange companies have all acted to build efficient and high-volume subnetworks using fiber.

Market structure was significantly affected by regulatory changes that have allowed competition in customer premises equipment (CPE), toll, local loop, switching, and customer services. Previously, the revenues for each of these services were collected by the monopoly local exchange carrier (LEC). These revenues were used for various purposes including the promotion of rural telephone service. With the advent of competition in each of these areas, revenues once used to support universal service may no longer be available.

This report identifies and analyzes various funding mechanisms and identifies telecommunications services that have been used in the United States to promote universal service. The effort to promote universal service has occurred at the federal and state level. This report also identifies newer universal service concerns associated with services to disabled citizens, cellular communications, and competition.

The report develops the concept that universal service has two components. The first is universal basic service. The second is universally available service. In the predivestiture period, very little difference existed between universal basic and universally available service. Tone dialing was one example of a universally available service that was generally not considered as a part of the basic voice-grade telephone source.

In recent times the variety of universally available services has greatly increased due to the greater number of services possible from the digital switching platform. Filings of the Regional Bell Holding Companies for open network architecture (ONA) produced lists of hundreds of new services that could be available.

Consumers, regulators, and policy makers know that not all available services should be included in the set of basic services. This report examines the common carriage concept and various service offerings used in its analysis of the definition of universal service for the 1990's. Several listings and frameworks are identified that present sets of services that define universal basic service. The principles and assumptions underlying the frameworks are also examined.

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FOREWORD

Universal service is one of the key concepts underlying the regulation of telecommunications utilities. Most regulatory policies are intended to promote universally available and affordable telephone service. However, as the structure of telecommunications markets change, it is important to understand the concept and its relevance in new types of markets. This report provides a basic overview of the universal service concept and provides regulators, policy makers, legislators, and telecommunications providers and consumers with objective information and analysis.

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CHAPTER I

INTRODUCTION

Universal service is the subject of increasing discussion and debate in the United States. The principle that telephone services should be available to everyone at affordable prices, so far as practicable, has been a central policy objective since the U.S. Congress enacted the Communications Act of 1934. The Act had the stated purpose:

To make available so far as possible, to all people in the United States, a rapid, efficient, nationwide, and worldwide wire and radio communications service with adequate facilities at reasonable cost.¹

Markets for wire-based telecommunications were essentially monopolies through the fifty years following the Act. Improvements in technology were introduced by the monopoly carriers as being more efficient for the provision of existing services. New services were added when the new technologies made them practical and cost efficient. The vertically integrated pre-1984 Bell System not only provided the services to the end users but also manufactured the equipment and conducted the research and development efforts. With this monopoly structure, good progress was made toward achieving the universal service objective. Services were available to virtually all of the people of the United States. Services were affordable and increasingly rapid, efficient, and nationwide. Links were made to connect all users to the world wide network. Mechanisms were in place to make prices reasonable for the users even when the costs of serving some of them were quite high. By 1990, 93.3 percent of the homes in the United States had telephone service.² For residential customers a system of cost assignments and transfer payments was in place that created parity in telephone service total cost between the urban and rural areas. On the average,

¹ Section 1, Title I, Communications Act of 1934.

² Robert A. Mosbacher et al., "The NTIA Infra Structure Report, Telecommunications in the Age of Information," U.S. Department of Commerce, Special Publication 91-26 (Washington, DC: Government Printing Office, 1991).

customers in each of these classifications were paying approximately \$600 per year, less than 3 percent of their household income, on telephone service.³

This report examines the current status of the universal service objective. The practices that existed prior to the break-up of the Bell System in 1984 are important because they supported the universal service objective. Not all of those methods will be relevant as the nation moves toward increasing reliance on competitive markets and as technology brings ever increasing capabilities and choices to telephone users. The debate today seeks to find a means of reconciling the conflicts between the methods used to foster universal service and the realities of changing telecommunications markets.

The universal service objective of telephone service in each home was not impaired by the restructuring of the Bell System through 1990. In fact household penetration rose from 91.6 percent in 1984 to over 93 percent six years later.⁴ The initial transition to competition and market driven telecommunications policy left the provision of local exchange service unchanged. With a monopoly market for basic end user access and interstate carrier access many of the mechanisms that kept local service prices low remained in effect. Cost recovery was partially shifted from usage of long distance services to end user access charges. However, coupled with other transfer mechanisms, this change did not substantially affect the balance of total telecommunication costs to the various end users. Circumstances may be different if the character of the local exchange market changes.

Importantly, as the various debates proceed, there is not a voice raised in opposition of the principle of a universal service objective. There is, however, substantial discussion of what telecommunication services are sufficient to constitute adequate service. There is debate about what constitutes reasonable costs and fair prices. There is considerable debate about the mechanisms that should be used to achieve fair prices. However, there is no debate about the need for adequate telephone service at affordable prices or that this should remain a national objective.

With the emergence of a procompetitive public policy, requirements to interconnect with other networks have been placed upon the LECs. This new, universal service-like requirement has become a part of the end user universal service mandate by the inclusion of access to these networks as a service to be provided end users. This is a fundamental change. The other networks frequently provide services that compete with services that the LEC provides. One

³ Carol Weinhaus, et al., "What is the Price of Universal Service? Impact of Deaveraging Nationwide Urban/Rural Rates," presentation to the Summer 1993 NARUC Communications Subcommittee Meeting, San Francisco (July 26, 1993).

⁴ Mosbacher et al., "The Infra Structure Report."

clear example of this occurs in the interconnection requirements for alternative local loop providers, such as cellular. Alternative access providers are, and personal communications services providers will be, alternatives for the "last mile" services of the LECs. LECs, not inaccurately, view these as bypass of their network. To the extent that end users choose the services of the other carriers, they may utilize the LEC's services less. That impact of alternative providers may undermine some of the mechanisms that support the costs of universal services by the LECs. Additionally, the added costs of providing the capability for these other carriers to connect to the network increases costs for LECs. A critical issue is the prices charged for access. Higher access prices mean that the costs for the other carriers increase, affecting acceptance of their services by customers. Lower prices may reduce the ability of the LEC to maintain affordable prices for basic end user services by reducing contribution from this source. In the extreme, the LEC may not receive sufficient revenues from the other carriers to meet the costs of provisioning the network for interconnection.

Since universal service is an end user based objective, the requirement for interconnection to other carriers and other service suppliers has been stated in terms of providing access for end users. It is just as accurately, and more concisely stated as an expansion of the universal service concept to include *an objective* of reasonably priced universal access to the public switched telephone network by other suppliers of telephone services. This requirement has created costs for the local exchange customers which are funded by some of the same mechanisms traditionally used to fund end user universal service objectives. When the services provided by the other carriers displace services previously supplied by the LECs, funding sources supporting traditional universal service may be threatened.

At issue are what services are to be included in the universal service objective, to what extent is it necessary to provide funding arrangements to achieve the objectives, and what methods are best to achieve the funding.

In chapter two of this report, the philosophy of universal service is examined in terms of the services covered and funding mechanisms. Federal programs advancing universal service are identified and examined from a regulatory perspective in chapter three.

Two states with especially active universal service efforts, New York and California, are examined in chapter four. The last chapters review selected services and universal service issues and conclude with some observations about the evaluation of the universal concept.

CHAPTER II

PHILOSOPHY OF UNIVERSAL SERVICE

A. Defining Universal Service

"Perhaps no other regulatory goal has been so extensively discussed without an established definition as universal service."¹ In this chapter the various meanings of universal service are explored and a definition is synthesized. The discussion of universal service proceeds in an environment of transition from regulated monopoly provision of telecommunications services to reduced regulation, and increasingly open markets. Within a tightly regulated system, universal service is an action oriented public policy goal. Regulators can require regulated monopoly providers to implement regulatory edicts. The rules constraining state and federal regulators require that compensation mechanisms be provided for costs imposed by regulation. Without competitive market constraints, regulators can devise effective mechanisms for compensation. Regulatory oversight of the telecommunications providers permits regulatory definition of universal service objectives and monopoly service provision permits regulatory design of compensation for universal service. Changing market structure erodes both of these premises and, therefore, basically changes the meaning of universal service. In the tightly regulated situation universal service was defined as the set of services that the regulators required to be ubiquitously offered, the minimum service quality that the regulators proclaimed to be required, and the entire interlinked pricing structure that the regulators devised to compensate the providers. Regulation defines universal service in a tightly regulated monopoly environment.

Relaxed regulation and greater reliance on market forces changes the concept of universal service. The most apparent change is the disruption of the ability of the regulator to devise reliable compensation schemes. With the potential or reality of alternative suppliers of services, LEC prices that are set higher than the costs of service by alternative suppliers are not sustainable. If revenues from those services were intended to fund universal service objectives, the objectives may not be achieved for lack of funding. Much of the current universal service debate focuses on the funding issue.

¹ Larry Pressler and Kevin V. Schieffer, "A Proposal for Universal Telecommunications Service," *Federal Communications Law Journal* 40, no. 3.

A second impact of a procompetitive public policy on universal service is the creation of the mechanisms necessary to encourage the entry of competitors into the various markets. The opening of markets to competitive entry has been far more than simple removal of legal prohibitions to their entry. Incumbent providers have been required to facilitate their competitors' operations. Universal access to competitors of the incumbent regulated telecommunications utility's facilities has become intrinsic part of the universal service objective.

A third impact of procompetitive policies has been objections raised by competitors that the established carriers are the recipient of funds intended to provision the network for ubiquitous services. Competitors have contended that they should be permitted to provide some of these services and be the recipients of the funds to support that provision. For example, third party relay services for hearing impaired users can be provided by the established LECs or any of a number of other telecommunications suppliers. The designated provider receives compensation for the service and enjoys an expansion in the scale and scope of its operations. In this example, competitors have successfully argued that they should have the opportunity to provide services targeted under the universal service objective.

The fourth impact of procompetitive policies is the introduction of a wider variety of telecommunications services. When telecommunications were provided by a single supplier with an objective of uniform, ubiquitous nationwide system, no customer or geographic area would be particularly disadvantaged. While deployment of new services was not simultaneous throughout the country, there was recognition that deployment was proceeding with a rationale that was accepted by regulators. More importantly, there was recognition that ubiquitous deployment was the objective that could be expected to occur. With the entry of competitors, niche services emerge. The competitors are not necessarily committed to ubiquitous offerings. When the new services offered by competitors are particularly advantageous to users, concerns will arise about the areas and customers not served.

Competition is one goal of government consideration of telecommunications. Another strong policy objective has been expressed by the Clinton administration.

As a matter of fundamental fairness, this nation cannot accept a division of our people among telecommunications 'haves' and 'have-nots.' The Administration is committed to developing a broad, modern concept of Universal Service) one that would emphasize giving all Americans who desire it easy, affordable access to

advanced communication and information services, regardless of income, disability, or location.²

There are two aspects of universal service. One is that all Americans will have a telephone and basic communications capabilities. If people do not have telephone service, whether that is because of lack of access to services or because of the inability or even unwillingness to pay for the service, the universal service goal is not met. Affordability, usefulness, and access are all included within this formulation of the universal service objective. The second formulation of the universal service objective deals primarily with availability. Here, universal service is defined by the ability of the deployed telecommunications facilities to provide services ubiquitously. If potential customers do not chose to use the services, that failure is not considered a failure to achieve this aspect of universal service. These are fundamentally different definitions of universal service, but the term "universal service" is commonly used in either sense. To avoid confusion in further discussions, the term *basic universal service* will be used when referring to the concept of all Americans being connected to the network and having some basic and defined set of services. *Universal availability* will be used for the concept stressing the ubiquitous deployment of telecommunications capability with less emphasis on the actual utilization of the services by all potential customers.

Universal service refers to the combination of basic universal service and universal availability. Universal service is defined as the actual connection to the public switched network of all citizens with a defined service set capability included with the connection and with access to advanced services.

When these two concepts, basic universal service and universal availability, are combined with a category of services that are not subject to either universal service concept, an ordered scheme of service classification is created. The classification scheme facilitates the discussion of changes of services and the dynamics of public policy. Figure 2-1 shows this categorization.

On the left side of the figure are services considered necessary. These are the basic services that are subject to the basic universal service requirements. Public policymakers will take those actions necessary to assure that users actually have these services.

² Information Infrastructure Task Force, "The National Information Infrastructure: Agenda for Action," (Washington, DC: NTIA NII Office, September 1993).

On the far right of the figure are services that are not subject to universal service public policy. These services are not considered necessary to the extent that they need to be either universally used (basic) nor universally available. While there may be public policy motivations for encouraging the emergence of such services, that policy motivation is not a universal service policy.

Between the extremes of the figure are services that may have public policy implications. Near the basic service extreme are services for which it may be desirable to have universal availability.

Figure 2-2 shows the normal progression of a service over time through the categories. A new service usually enters on the right side of the chart. There is no established need for the service and hence for a public policy supporting universal deployment or use. As the service is used it may prove to be worthwhile for customers. It may provide a business advantage for business customers. It may be a convenience for residential customers. Assuming it is successful, there will be interest in its further deployment. It will move to the left of the diagram. The

further it moves, the more likely it is to become an objective of universal service. In the normal progression, the

universal service objective will be first for universal availability and then, ultimately, the most successful services will be included in the universal basic category. Successful services move from right to left on the continuum. Services which are intrinsically valuable to a limited population, such as those with disabilities, also progress in usefulness. Their progression would be judged relative to the total number of potential users.

Figure 2-3 shows the imposition of regulatory requirements. Regulators chose some point (a-a) at which a service is so important that it is required to be included as a part of basic universal service. They chose some other point (b-b) to the right to define services that are subject to a requirement of universal availability. Over time the regulatory policies regarding universal service may shift. This will change the boundary in the diagram. A commission that accepts policies that rely more heavily on market forces to define customer needs will move its boundaries to the left of the diagram. A commission that becomes more concerned about the potential of some areas being disadvantaged by outmoded telecommunications services will shift the availability boundary to the right.

Of course, the regulators do not express their policies in terms of shifting boundaries on the continuum. Rather, they make individual decisions about individual services, or classes of service. None the less, it is useful to recognize the separate process of a service progressing in the continuum toward becoming increasingly necessary and the shifting regulatory policies defining requirements imposed upon carriers.

Figure 2-4 shows the effect of alternative suppliers on the continuum of service classifications. The availability of each service from providers other than the LEC is considered. The LEC may have a monopoly on the service. There may be a few alternative suppliers and they may be available in only localized areas, or there may be a fully functioning open market for the service with widespread effective competition. Conceptually, when plotting the market characteristic of the service on the vertical axis with increased competitiveness plotted upward, the movement of services over time can be shown two dimensionally. A service moves right or left with respect to its usefulness and moves up or down in regard to the availability of alternative

sources. The regulatory boundaries have two segments, one is based upon the usefulness/necessity continuum

FIGURE 2-4

and another is based upon the availability of alternative suppliers. Regulatory choices of the location of the boundaries and evaluation of the status of individual services relative to those boundaries are the focus of the universal service debate.

B. Defining the Specific Services To Be Included in Universal Service

Universal service has several dimensions. The first is availability and the second is the level and type of service to be provided. Availability is an elusive but important concept. It means that a service is available throughout the utility's service area. As a part of its exclusive franchise agreement, a utility agrees to make the services it sells available to any customer located in its service territory. This means that universal service, integrated services digital network (ISDN), and customer local area signalling services (CLASS) could be universally available, but might, for example, have radically different penetration rates. In this example basic universal service could have a 94 percent penetration rate, ISDN could have a 20 percent penetration rate, and CLASS services could have a 1 percent penetration rate, even though each is universally available upon demand in the carriers' service territory.

Universal availability necessarily requires a universal deployment of network technology before any demand can be met. In the case of ISDN, digital switching needs to be universally deployed. For CLASS services, Signal System 7 is required.

Regulated telephone utilities have followed a technology deployment and modernization pattern that has universal deployment as its goal, but deploys on a "prove-in" basis where individual components are first placed in areas most likely to use the offered service. Traditional deployment patterns serve urban areas before rural, businesses before residential, and wealthier customers before poor customers. Geography, physical terrain, and the strength of the local economy may also affect the rate and pattern of deployment. A tension exists between the need for universal availability and the economic benefits that flow from following a "prove-in" deployment approach.

The second aspect of universal service is the set of services that is defined by the regulator as constituting basic universal service. Basic universal service can be defined by designation or by penetration levels. In the above example neither CLASS nor ISDN would properly be regarded as basic universal service because the penetration levels are too low because no regulator had designated the ISDN or CLASS services as basic. On the other hand, the penetration rate for the voice-grade service, widely thought of as basic universal service, has a household penetration rate in excess of 94 percent and has been defined by regulators as basic. Defining basic universal service by penetration levels, however, works only when the overwhelming majority of residential households want the same service. Until recently, the services now thought of by regulators as

basic universal service did not truly involve any consumer choice or conscious selection. Traditionally, the only choice was to have or not to have telephone service. If you ordered service, you got "plain vanilla" basic universal service because it was the only one available.

The high quality, low cost, and very reliable plain vanilla basic universal service residential service provided a "comfort level" that has become the implicit benchmark against which all forward-looking basic universal service standards are measured. Unfortunately, this benchmark may not be translatable into a world where technology and competition make many more choices available. By way of a simple analogy, the basic universal service of the past decade is as much like the basic universal service of the future as the traditional neighborhood store is to an enclosed shopping mall. Given a wide array of choices and nondiscriminatory pricing, it may turn out that we discover that there are different types of customers that use different clusters of services. This perspective would argue that basic universal service, defined only by penetration rate, is an historical artifact of a particular set of circumstances not likely to be repeated.

Approaches to define the specific services to include in the definition of universal service have taken one of two directions. The first is to define the specific services by stipulation. The second is to establish criteria or a framework. Examples of each approach is presented below. The approaches overlap somewhat because both ultimately produce a listing of basic universal services that should be universally available.

1. Stipulative Approach

In the stipulative approach a telecommunications expert or an agency define basic universal service by the minimum level of services that will be available to all customers for a monthly rate. In some locations it is possible to purchase a "lifeline" service, for the poor or elderly, which has fewer services than are available under a basic universal service standard. These lifeline rates, however, are conscious and deliberate deviations set by regulatory authorities that are aimed at a minimal rather than a standard level of service. In some places lifeline services are identical to basic universal service and differ because the basic universal service is available to the targeted subscriber at a lower price.

Dr. Carl Hunt, former Colorado Commission staff telephone expert, reviewed several prominent stipulative definitions of universal service in order to develop one that included network access and the necessity of the features for economic and social integration. Three

illustrative stipulative definitions are presented below, along with Dr. Hunt's synthesizing definition of universal service.³

a. Wendling Testimony

Warren Wendling of the Colorado Public Utilities Commission stated that basic service should include the following:⁴

- * universal service,
- * one-party service available upon request without construction charges,
- * tone dialing,
- * digital or stored program control central offices providing access to advanced services,
- * digital interoffice facilities,
- * a local calling area encompassing the user's community of interest, and
- * access to the network services through an open network architecture.⁵

b. New York

The New York Department of Public Service submitted the following outline to the Commission listing what they considered basic service.

³ Carl E. Hunt, *Defining and Costing POTS: A Common Carrier Approach Using The Joint Products Method* (Columbus, OH: The National Regulatory Research Institute, 1992).

⁴ Wendling defines the term universal service to mean no unserved customers.

⁵ Warren L. Wendling, testimony before the Colorado Public Utilities Commission in Docket No. 90A-655T, 14.

Network Services

- * link: terminating equipment at customer premises and connection (line) between customer premises and serving central offices;
- * port: terminating equipment at central office;
- * usage: primary calling area and extended calling area (other local/intraLATA toll calls, and interLATA carrier access);
- * installation of basic service; and
- * complementary service (e.g., tone dialing).

Public Service Adjuncts⁶

- * emergency calling systems,
- * statewide relay,
- * directory assistance, and
- * operator services associated with local calling,

Customer Services

- * business office,
- * repair, and
- * billing and collection.⁷

⁶ This includes those services not directly part of network service or customer service.

⁷ New York Department of Public Service, Communications Division, Memo to the Commission, March 1990, 5-6.

c. Pacific Bell

In 1991 Pacific Bell convened The Intelligent Network Task Force, which concluded that universal service should be redefined to include access to the intelligent network. Although the recommendations have been widely criticized because important costing and pricing issues were not fully considered, the identified services and features listing is a useful if unscientific sampling of future universal service needs. The following services are seen as needing to be available to all residential and business customers:⁸

- * a transparent gateway to databases and other information services provided from a variety of sources;
- * network protocol conversions between unlike computer systems;
- * assured privacy for communications and transactions handled via the network;
- * simultaneous voice and data services;
- * store-and-forward services such as voice mail, software delivery, some form of video text and audio text, and advanced 976 services;
- * transmission and routing for such home-oriented services as household security, health care monitoring, and remote environmental control;
- * provision for network access by disabled persons and those not fluent in English;
- * automatic language translation as technology advances;
- * tone dialing services, which is a prerequisite to many intelligent network services;
- * conventional phone service, including long distance access, access to 911, 411, and so on;

⁸ *Pacific Bell's Response to Intelligent Network Task Force Report*, pp 22-23, as reported in Carl E. Hunt *Defining and Costing POTS*, 17-18.

- * access to publicly supported information services (including databases and public library services) and
- * access to information services integral to public education.

d. Hunt Universal Service Stipulative Definition

Based upon his review of available stipulative definitions, Dr. Carl Hunt identifies the following services as the ones to be included in a basic universal service definition:

- * access to local exchange service;
- * access to interexchange carriers;
- * ability to receive local and long distance calls;
- * access to emergency services;
- * universal service to include a lifeline rate for low-income customers;
- * a local calling area sufficiently large to encompass the user's community of interest;
- * a standard of one-party service available without construction charges;
- * tone dialing;
- * transmission quality to transport low-speed data (2,400 bps) facsimile (fax) transmission, as well as voice;
- * access to advanced services provided in digital or stored program control central offices;
- * access to information services and 800 services;
- * local directory assistance;

- * directory listing and residential and business directory;
- * local operator services;
- * customer service including billing; and
- * installation and set up of basic universal service.⁹

There is some level of consensus here on the services to be included in the definition of universal service. However, as in all public policy arenas it is the areas of "nonagreement" that seems to occupy the attention of regulators. The primary advantage of the stipulative approach is the simple listing of the services. This allows for a more focused policy debate and a clearer understanding by all parties regarding what services are included. This approach also allows the definition to be expanded by adding new services to the definition. The primary disadvantage of a pure stipulation approach is that it does not have clearly defined criteria that allow a regulator to quickly determine if a new service should be included in the universal service definition.

2. Framework Approach

a. Basic and Enhanced Services

In the Computer I, II, and III inquiries the Federal Communications Commission (FCC) developed several policy positions that have influenced our understanding of the basic universal service concept. In 1973 the First Computer Inquiry (Computer I) was completed and recognized two types of services: regulated communications and unregulated data processing. In 1976 the Second Computer Inquiry was launched (Computer II) and it divided services into basic services, and enhanced services and data processing.¹⁰ In 1987 the FCC concluded its Computer III inquiry and concluded that dominant carriers could provide both basic and enhanced services through one company and resolve cross subsidization issues through accounting controls. Subsequent court

⁹ Hunt, *Defining And Costing POTS*, 36.

¹⁰ Basic services were defined as "pure transmission capability over a communications path that is virtually transparent in terms of its interaction with customer-supplied information." Enhanced services were defined as those that "combine basic service with computer processing applications that act on the format, content, code protocol, or similar aspects of the subscriber's transmitted information, or provide the subscriber additional, different, or restructured information, or involves subscriber interaction with stored information." See Hunt, *Defining and Costing POTS*, 10.

and regulatory actions have also recognized that there are advantages to providing basic and enhanced services through separate organizations.

b. Single Highway Concept

The debate about whether basic and enhanced, and regulated and competitive services are best provided by integrated organizations or by separate companies has not been resolved. Recent proposals by Ameritech and Rochester Telephone to offer a single, common, information highway in their respective territories and to be allowed to offer, through separate and unseparated entities, enhanced and competitive services indicate the continued evolution of this issue. If dial tone and access are all that each residential customer can get from the single (likely digital and fiber) highway provided to all buyers and sellers by the LEC, then this would be the new basic universal service. Video, toll, data, and other services would not be included in basic universal service and would be available from regulated and unregulated firms, some of which would be owned by the LEC. To have a more expansive definition of basic universal service would limit the number of services and the sales of unregulated telecommunications firms.

If multiple highways occur, or are preferred by policymakers, then the definition of universal service may become even more important. If sustained, ubiquitous competition occurred, then no definition of universal service would be needed, and residential and business customers could pick the services they needed from the different vendors available on the multiple highways. Universal service would have little or no meaning beyond access. Regulatory oversight would be directed towards antitrust and lifeline goals. If the multiple highway/multiple vendors scenario does not produce competitive results¹¹ regulatory action would be needed to define the highways as common carriers having the responsibility to provide universal service at commission-approved prices.

¹¹ Cellular markets in the U.S. offer multiple highways but are only as competitive as one would expect a duopolistic market to be.

c. Public Versus Private Goods

Another important way to determine how to define and price universal service is through the use of a public good/private good framework, initially developed by Dr. Lee L Selwyn.¹² This perspective recognizes that private goods are consumed by, paid for, and benefit specific users. Public goods reflect a total societal benefit, usage, and cost responsibility. Selwyn argues that either perspective applied properly can identify the basic universal service objectives for the network. He further notes that the public switched network actually is an intermediate good. However, he says that once a policymaker explicitly chooses either a public or private goods framework the application of the resulting principles will more quickly resolve definitional, costing, and pricing issues associated with universal service.

Selwyn uses a definition of a public good that includes "...any publicly induced or provided collective good" that "arise[s] whenever some segment of the public collectively wants and is prepared to pay for a different bundle of goods and services than the unhampered market will produce."¹³ In this approach the modernization of the public switched telecommunications network would be supported by a notion of total societal benefit and cost-sharing even though not all segments of society benefit proportionately. Rural telephony, handicapped services, lifeline services, and universal service have traditionally been justified on the basis of public benefit. This is a supply-driven perspective that would provide state-of-the-art network infrastructure ubiquitously and which would be paid for by the general body of ratepayers. The problem that occurs under this approach is that there may easily be a twenty-year gap between the first use of an advanced service, such as occurred with tone dialing, and the use of it by 50 percent of residential customers. The strength of this approach is that it clearly answers the "who pays" and "who benefits" concerns of regulators and policymakers.

A private goods model is demand-driven and deploys infrastructure and services when they will be demanded by, benefit, and be paid for by identifiable customers. Under this perspective, the basic universal service customer is frozen at today's level and type of service. All other services, both existing and those developed in the future, are nonbasic and their costs are exclusively the responsibility of the users and beneficiaries of these services. Nonbasic services would be available only to those customers willing to pay the incremental cost of augmenting the network as required to support their provisioning. The primary advantages of this approach are

¹² Patricia D. Kravtin, Lee L. Selwyn, and Paul S. Keller, *A Public Good/Private Good Framework For Identifying POTS Objectives For The Public Switched Network* (Columbus, OH: The National Regulatory Research Institute, 1991).

¹³ *Ibid.*, 73.

that it is market or demand-driven and that it allows users with low needs to pay only for basic service and allows the other users to pay for those additional services that they desire. Video dial tone, CLASS services, such as caller identification, distinctive ringing, and automatic call back, would be nonbasic services that only benefit and are only paid for by the users. The main drawback is that a slower deployment of infrastructure and services occurs and this may result in there being "information-rich" and "information-poor" sectors in society.

Implementation and application of these approaches in an intermediate goods network is a problem. Selwyn has developed a classification scheme that identifies basic and nonbasic services. Basic services are those associated with the public aspects of the public switched telecommunications network and these include tone dialing and basic access. Nonbasic services reflect the private aspects of the network and include CLASS services and voice mail.¹⁴

Each of these three frameworks ultimately produces a listing of basic universal services. The advantage of the approach is that concepts and criteria can be used to guide the definition of universal service. The stipulative approach suffers somewhat because it is not always clear why one service is included and another one is not. The framework approach has its weakness in the inherent difficulty experienced when services must be classified by administrative criteria, as opposed to market criteria.

Basic universal service is a subset of all possible services and are the services that the local exchange telephone company must provide as a part of its minimum service obligation. Basic universal service carries with it the implicit requirement that the service be affordable to the potential customers. The more services that are included, the more costly they are. A cost limit is a secondary characteristic of basic universal service. The definition of basic universal service is influenced by the cost implications but not necessarily controlled by cost considerations. The means of funding or providing financial support for basic universal service is the subject of a later section of this report. Not only are specific services included in the basic universal set, the quality and reliability of the service, and some services that are not generally thought of as telecommunications services are also included. For example, protection of privacy may be a requirement imposed on the LEC for both basic and advanced services. Rules establishing procedures and conditions for disconnection are also typically part of the regulatory requirements. The availability of service personnel to repair defects promptly is a required part of basic universal service. Typically each local exchange telephone company will have a service territory assigned, and it must make basic service available throughout that territory.

¹⁴ CLASS services include calling number identification ("Caller ID"), selective call rejection, distinctive ringing, automatic call back, and call trace. These services are supported by digital switches equipped for common channel signalling system seven (SS7).

In the ten years since the Bell System was restructured, considerable progress has been made in disaggregating the elements of telecommunications service into more fundamental elements. Multiple providers desired to sell services making it necessary to expand LEC service offerings to include access to the public switched network by new entrants. Also, since new providers might provide services that replace certain elements of the service previously supplied exclusively by the old Bell System, it was necessary to break the service offerings to end users into pieces so that they could choose to use the service offered by a competitor of the LEC. The disaggregation of services into more fundamental elements already has begun and is proceeding ahead of the actual emergence of the competitive service providers. In some instances the unbundling of services is a necessary prerequisite for the potential competitor to enter the market. For example, it was necessary for CPE to be separated from basic service so that alternative CPE suppliers could enter that market. This has set in motion an episodic examination at state and federal commissions that has simplified and clarified the process of defining basic universal service. This disaggregation has allowed the debate concerning what services are to be included in mandated universal service to develop somewhat independently for the various elements that comprise telecommunication service. The unbundling process has advanced from an ad hoc service-by-service determination to a policy supported by administrative procedure in the Federal open network architecture proceedings.

C. Universal Service Considerations of Specific Services

The current universal service debate includes examination of virtually all of the service requirements placed upon the LECs. For the most part, the result of this reexamination has been an expansion of both basic universal service and universal access requirements of the LECs. The following section of this report discusses the many elements of telephone service either currently provided by, or potentially providable by LECs. The discussion draws from responses to a 1993 survey, a review of published materials on the current status of these services, and other sources.

1. Network Access

Network access is perhaps the most basic service provided by the LEC. The debate surrounding network access is complicated by the emergence of the "network of networks." In addition to the public switched network there are networks built for private use. The interexchange carriers each have their own network. Other networks exist both as physically distinct entities and as virtual networks comprised of pieces of other networks arranged to act as an independent network. Network access at the local exchange level means the ability to access the public switched network, to signal it of the users' intentions, and to be able to communicate over it. LECs are required to provide this capability throughout their assigned service territories. Network access includes provision of the local loop, i.e. the outside plant facilities necessary to connect the user to the switch.

There is substantial discussion about the local loop portion of network access. A class of companies has emerged that is providing alternative facilities for connection from customer premises to the network. Initially these companies specialized in carrying private communications between diverse locations of single businesses and delivering traffic to interexchange carriers, bypassing the LEC. Now they are beginning to offer alternative loop connections from customer premises to the public switch network switch of the LEC. Three states have authorized this arrangement. Authorization entails a requirement placed upon the LEC to connect to the loops of the alternative access providers. The issue in these discussions has been the terms and conditions of the interconnection.

Universal service issues also arise in regard to the LEC when the new competitive loop provider pays only for the connection at the switch. Since loop costs vary significantly over the LEC territory, and current network access pricing policies include rate averaging for local access, the alternative providers can target low cost loops and compete against average loop prices the carrier charges. Further, to the extent that universal service funding is supported by the carrier access charges collected by LECs, and to the extent that the alternative loop providers take away the interexchange traffic from the LEC, and deliver it directly to the interexchange carrier, the LEC also loses that revenue.

When telecommunications services were provided in a monopoly environment, average pricing was the natural result of considerations of equity among customers. Average pricing, where customers pay the same rates in spite of differences in the cost of serving them is not unique to the telephone business. Average pricing always has the advantage of being seen as "fair", it is administratively simple, and when the net revenues gathered using an average price system cover the short run incremental cost of even the more costly customers, average pricing can't be said to be grossly inefficient. The possible elimination of average pricing in

telecommunications has been a primary argument sponsored by those opposed to the reduction of regulatory protections. If average pricing erodes, many will claim that the procompetitive initiatives have failed to adequately serve the public interest. Given the sensitivity to the issue, carriers and regulators are very cautious in regard to deviations from established average pricing policies. What erosion has occurred has primarily been in permitting discounting (within limits) to some customers, while retaining averaging for all remaining customers.

It is difficult to determine to what extent public sensitivity, regulatory preference, and administrative efficiency contribute to the retention of average pricing. Whatever the prevailing reasons, average pricing for network access and most other services remains the norm.

2. Single Party Service

Single-party telephone service is required to be ubiquitously available in nearly every state. A state may not require single party residential service be included as a part of basic universal service. For instance, it is believed that lower grade service, particularly two party service, is a lesser cost option for those customers who find the cost of telephone service an impediment to connection. Preservation of this option has been supported on this cost reduction basis, although no statistics demonstrating its contribution to universal service were found.

3. Local Usage

The current status of local usage is that it is part of the basic universal service objective of the various states. Local usage is beginning to be discussed in terms of its exclusion from basic universal service. At least one regional operating company (Ameritech) has suggested that the rates for usage should not be subject to tight regulatory control. The implication of that suggestion is that telephone companies could eventually price usage to maximize net revenues instead of the low prices that regulators encourage for public policy reasons.

4. Extended Area Service

Extended area service is a rate design concept. The rate structure for local calls is different than that for long distance calls. Typically residential customers have a rate structure available that is not usage sensitive for local calls and when usage sensitive rates do apply to local call they are typically much less expensive than toll calls. The extent of the geographic area included in the local rate structure is specified for each originating exchange in terms of the other exchanges that can be called under the local service rate. As exchanges are added to the local calling area, extended area service is established. The inclusion within the local calling area of a customer's "community of interest" has been and is a part of basic universal service. Various states use different standards to specify the community of interest.¹⁵ States define community of interest in four principal ways. The first is by direct measurement of calling rates between exchanges. Some states establish trigger calling rates, for example an average of three calls per line per month, and require extension of the local calling area when the criteria is met. Others use calling rates as a precondition for further consideration of establishing extended area service. A second means of determining community of interest is by polling the residents of an exchange to determine their interest in a change in calling area. The surveys normally include information about an increase in the price of basic service that would be imposed if the area were extended. The third way community of interest is defined is by governmental unit boundaries. A state may establish a requirement that each customer must be able to call the exchange of his or her seat of county government as a local call. City boundaries have frequently been used to define the minimum extent of local calling areas. Finally, the availability of services such as hospitals, doctors, schools and shopping within each persons local calling area has been a community of interest criteria.

Inclusion within the set of basic universal services has resulted in pricing discounts from toll rates for local calling in the extended areas. Competitive interexchange carriers are interested in providing short-haul toll service but cannot compete with a discounted extended area service local service pricing structure. Interexchange carriers are suggesting that extended area service should not a part of basic universal service. For example, AT&T, an interexchange carrier, has stated:

AT&T does not include Extended Area Service in its definition of Basic Telephone Service and, therefore, it would not be a factor in its definition of Universal Service.

¹⁵ For a discussion of local calling area issues see Raymond W. Lawton and John Borrows, *Factors Affecting the Definition of the Local Calling Area: An Assessment of Trends* (Columbus, OH: The National Regulatory Research Institute, 1990).

AT&T's position on Extended Area Service is that all usage should be cost based and that competition will provide customers with the most economical and efficient choices. Converting what is now intraLATA toll service to local exchange service and precluding competition through subsidized local exchange rates will not be in all customers best interests in the long run.¹⁶

Optional extended area service plans are an alternative to expanding the local calling area. Many states have instituted these rate alternatives that provide individual users with the opportunity to expand their local calling area for an increased monthly charge. The availability of optional local calling areas is an expansion of basic universal service and is an example of the creativity that commissions and LECs bring to bear on universal service issues. The universal service objective of affordable service, meeting an individual customer's needs, is met without committing resources to providing toll free service to all customers within an exchange. Depending on the level of the rates for the calling plan, the service may not cover the fully distributed costs. However, these optional plans reduce the pressure on the commissions to increase the local calling area for all customers. If all customers have a larger local calling area there will be more pressure to increase basic rates.

Optional budget toll plans are another rate offering solution effecting the affordability of service. With these plans, customers purchase, for a monthly charge, a reduction in their toll rates for a selected area. Optional budget toll plans have many of the effects of optional extended area service on universal service considerations.

5. Customer Premise Equipment

CPE was a focus in implementing procompetitive public policy. When the telephone system was a government sanctioned monopoly, end to end, telephone sets were part of universal service. As rules were changed to accommodate alternative CPE suppliers, and suppliers entered the market, the rationale for universal provision of the telephone by the access provider evaporated. Telephones were removed from the list of services in the basic universal service set. This experience may be indicative of future reduction of the breadth of services to be included in universal service, however telephones are quite different than network based services. Telephones are physical elements which are transportable and subject to uniform interconnection standards. Telephones can be purchased from a variety of vendors and stores and through the mail.

¹⁶ AT&T, "Response to Universal Service Questionnaire," November 1993, unpublished.

Services based on network capabilities are not transportable nor marketable through durable goods channels. The experience with the telephone instrument does suggest that those elements of universal service that are physical and subject to standardization can be removed from universal service programs. Premise wiring reinforces this observation. While not transportable, premise wiring is a physical element of the network which can be standardized and furnished by a variety of suppliers. Premise wiring has also been deleted from the basic universal service set. As is discussed, under ISDN and for disabled customers, concerns for the affordability of CPE for certain services is surfacing. The status of CPE in universal service, therefore, may not be fully settled.

6. Carrier Access

Intrastate interexchange carrier equal access is the subject of much current debate and carries substantial universal service implications. The FCC has established equal access for all interexchange carriers as a requirement for interstate calling by LECs. This federal mandate is not binding to the states when determining policy for intrastate calls. The companies that were part of the Bell System before divestiture are banned from carrying interLATA traffic. However, traffic within the LATA includes toll service. The states determine policy for this traffic. They have three principal choices. They can prohibit new entrants into the intraLATA markets. Some calls may still flow to the interexchange carriers, but they will be limited to calls that use the carrier access code to achieve routing out of the LEC network. The further dialing of the destination telephone number will be interpreted by the interexchange carrier's switch and the call will be routed back to the LEC. Since the outgoing leg addressed by carrier access code will look no different to the local switch than a call intended for interstate routing and the terminating leg looks no different than the termination of an interstate call, the intrastate nature of the call will not be detected at the local switch. The second policy option for the states is to allow carriers other than the LECs to carry the intraLATA traffic) that is accept tariffs and certify them as intrastate utilities, without providing dialing parity with the LECs. The third option is to require the LEC to offer presubscribed carrier of choice options for the customer. The universal service implications of these policy choices include the quality of basic universal service in that the choice defines the service to be included in basic service (with or without customer presubscription to an intrastate toll carrier) and universal service funding. Toll revenues contribute to meeting the LEC costs. The loss of these revenues might reduce the ability of the commission to fund low cost basic service, at the same time that imposition of carrier presubscription raises the cost of providing local service. Proceedings in several states are currently examining the dialing parity issue.

Generally the states have been reluctant to fully embrace the procompetitive arguments of opening the intraLATA toll markets to the interexchange carriers.

7. Tone Signalling

Tone dialing is yet another service under review. Tone dialing also raises the two issues of universal service: which services to include within the basic universal service objective and the funding of universal service. As is discussed later in the report, under Funding Mechanisms, high prices relative to costs for "vertical services" is a primary mechanism for the commissions and LECs to keep the prices for basic service low. Prices charged for tone dialing are typically in the one to two dollar range for the residential subscribers and are a dollar more for business lines. With per-line penetration rates of approximately 60 percent and the costs of providing the service virtually zero in a digital environment, the revenues from tone dialing are significant. Overhead costs of billing for the service are partially offset by separate charges for initiating the service, which cover establishing the records necessary to support billing. Tone signalling capability is useful to the customer in a growing number of auxiliary services. Automated answering systems, for example, are widely deployed and are activated by the tones generated by tone CPE. Interexchange carrier access may require tone signalling. Customers without tone signalling capability are deprived of full use of the services available over the network. While it is possible for the customer to use dual capability CPE to signal the LEC via pulse dialing and then to change the signal output of the CPE to tone for other services, this has not proven popular. Some states are now including tone dialing in the basic service package. In most instances where that choice was made, the LEC was in a position of having revenues in excess of revenue requirements, so that the service could be added to the basic package with little or no increase in basic service rates.

8. Other Services

Other technical capabilities of the modern switched network do not have the same level of acceptance by customers as does tone dialing. Services such as call forwarding, three-way calling, and call waiting are not under consideration as basic universal service requirements. Commissions have undertaken initiatives to assure the deployment and availability of these services throughout the networks. In addition to requiring LECs to commit to network upgrades which make these services available, commissions have approved relatively high mark-ups in pricing the services. This policy provides financial incentives for universal deployment. It appears that services of this type will not immediately face substantial competitive threat unless alternative

loop providers gain a substantial foot hold. There is little current discussion about these services in the universal service debate.

LECs have suggested changes in the revenue requirement basis, such as price caps, for setting telephone rates. If price cap and pricing flexibility methods that abandoned the revenue requirement tests on a total company basis were adopted, the rates for basic services could, at least theoretically, be set independently from the revenue and profit potential of the vertical services. However, this does not pose an immediate threat to universal service objectives because to the extent that the link between total company profitability and rates is severed in procedures such as price caps, a safety net review process involving company profitability has generally been retained and substantial commitments regarding future basic service prices have been extracted as a precondition to alternative regulatory approaches.

Caller ID is a special sort of vertical service. Caller ID provides the calling telephone number to the called line. The number is displayed on special CPE at the called premise, or used in conjunction with sophisticated screening equipment by the called party. The Caller ID technology also permits the offering by the LEC at the called end of additional call processing services. Selective call forwarding and distinctive ringing are examples of these services. Caller ID has become part of the universal service discussion in two ways. The introduction of the service has raised the issue of privacy as a service that the telephone company may provide. The blockage of the transmission of the calling party's number is a service. There has been much debate about number blocking in virtually every state. Many states have added number transmission blocking to their basic service requirements, some on a per-line basis and some on a per-call basis.

Narrow band ISDN is the vehicle for digital connectivity for the general user. Recently standards have been finalized and switch manufactures are adjusting to the national standard and CPE is beginning to become available. State regulators see ISDN capability as an element for work at home, distance learning, and advanced telecommunications health care services. The cost of ISDN-capable CPE remains prohibitive for most households so that there is no established customer base for either mass produced CPE or services provided over digital links. None the less, a few states are encouraging the deployment of ISDN capability throughout the public switched network in their states. The experience in one such state is discussed later in this report. From a universal service perspective, there is active dispute regarding whether ISDN should be made a requirement for universal availability. The cost of CPE has caused the issue of affordability to resurface. Particularly in regard to distance learning applications, CPE affordability is discussed in terms of its potential to deny access to advanced education methods to poorer school systems or poorer students. Access to educational opportunity is as much a part of the American agenda as is universal telephone service. The convergence of these two powerful

objectives may result in a substantial enlargement in the scope of universal telephone service and the cost of meeting the objectives. The debate concerning funding is only beginning. It will become more prevalent as actual distance learning applications materialize.

When a caller dials 911, enhanced 911 provides the emergency response personnel with the location of the calling telephone as recorded in a data base maintained by the LEC. E-911 also provides custom call routing capability based upon the calling number. Deployment of E-911 has occurred, principally, after 1984 during the period of growing attention to the changes that the procompetitive public policy would bring to the industry. The funding of the service reflects the changes in policies of state commissions. In the predivestiture world, one would have expected to see a service with such broad public benefit implications to be furnished by the telephone company, rolled into the total cost of service and paid for as a general cost of service spread over all rates. E-911 services are typically paid for by a surcharge applied to each access line served by a particular E-911 implementation. The emergence of this funding mechanism demonstrates that regulators feel more constrained today in their funding of universal service programs. Surcharges raise the price of basic services.

Directory assistance is another service that has migrated from inclusion in basic universal service to a separately priced service. That migration started before divestiture and is not yet complete. Typically state commissions have retained some small number of "free" directory assistance calls in basic service and instituted a charge for calls over the limit. The FCC permits charges for interstate directory assistance. The treatment of directory assistance charges is illustrative of the service-by-service universal service debate. On the one hand, charging for directory assistance removes it from the basic universal service package, but doing so also, at least potentially, makes the remaining basic service more affordable. Public policymakers examine these conflicting effects in rendering universal service decisions. Not infrequently it is other considerations which shape the final outcome, after the examination of universal service ramifications are inconclusive. In the case of directory assistance, the argument that charging for the service would be more efficient in an economic sense, persuaded the commission's to remove it from basic service entitlements.

Other operator services used by residential customers, such as completing calls, checking busy lines for use, etc. have not been made subject to separate charges. The issue has not come up, probably because there is not nearly so much use or perceived abuse of these services. Twenty-four hour repair service remains a requirement for LECs. The change in repair service during the last ten years has been the migration from end-to-end responsibility to the shared responsibility of the functioning of telephone service among multiple suppliers and customer provided elements. With this change, commissions have authorized charges for repair services when the difficulties are not found to be in the LEC's equipment. These charges do raise the total

cost of telephone service, but transferring revenue requirements from the general operations of the telephone company to separately compensated repair services protects the basic service rates from costs incurred because of faulty nontelephone company equipment.

Local directories have long been and remain part of basic universal service. All state commissions require that each local exchange telephone company provide each customer with an annual listing of local telephone numbers. No one has suggested that directories should be removed from basic service. The advertising revenue producing Yellow Pages have been the focus of considerable debate since divestiture. In AT&T's original divestiture proposal Yellow Pages would not have remained with the LECs but would have been transferred to AT&T. This proposal was rejected by the court supervising divestiture. In doing so the court specifically cited the contribution that the advertising revenues make to keeping basic services affordable. Yellow Pages were retained by the operating companies. The operating companies transferred their Yellow Pages operations to their newly created parent holding company. Compensation mechanisms were devised to enable the local operating companies to receive funds from the advertising. Generally the operating companies argued that consolidating the directory operations at the regional level would be efficient and lead to greater contribution than separate operations in each operating company. Subsequently, some of the regional companies attempted to reduce or eliminate the compensation to the local companies.¹⁷

At the forefront of the expanding basic universal service requirements is access to services provided over local access lines by nonLECs. Among those new capabilities emerging, or thought to be about to emerge, are health care services, interactive education, services that work with CATV companies to activate video programming and information services of various kinds. The FCC has initiated a program of open network architecture that requires the LEC to facilitate these services by unbundling network capabilities to allow other service providers to purchase those network capabilities they need for their services.¹⁸ A dynamic of this debate is the anticipation by Bell operating companies that the restrictions that remain from divestiture may be lifted, so long as they are precluded from participation in the direct provision of some services they may be reluctant to accommodate the needs of other vendors to establish markets for these services. Should the operating companies be permitted to enter the markets, they would be no

¹⁷ Evan D. White and Michael F. Sheehan, "Monopoly, the Holding Company, and Asset Stripping: The Case of Yellow Pages," *Journal of Economic Issues* 26, no. 1 (March 1992): 159-82.

¹⁸ For a report on the status of the unbundling of network capabilities including discussion of the unresolved issues of unbundling see John Borrows and Robert F. Graniere, *An Open Network Architecture Primer for State Regulators* (Columbus, OH: The National Regulatory Research Institute, November 1991).

more enthusiastic in supporting their competitors, but they might effectively establish the services. A judgement is not made that the operating companies are hindering the development of potential competitors. Rather, an observation is made concerning the incentives for such activities. The rules which the FCC has promulgated to allow entry by information service providers are extensive, and the proceedings have been active for several years. Perhaps the most valid observation is that regulations alone are insufficient to assure the full cooperation of key players in the development of expanded telecommunication service capability.

D. Common Carrier Requirements

The previous discussion of imposition of open network requirements on LECs has an interesting analogy within the universal service debate. It has been proposed that all facilities-based transmission service providers be required to offer common carrier services. This concept would broaden the universal service concept to another tier of service providers. Should such a requirement be put into force, presumably with open network rules similar to the FCC rules for LECs, each customer would have access to the transmission capabilities of any vendor to which connection could be made. The common carrier proposal has not advanced far enough for the development of the pros and cons of the idea, but its emergence does suggest that the future of universal service may not be pursued solely with traditional providers.

Cellular service providers and personal communications system providers are required to offer their services as common carriers. That condition is attached to the allocation of frequency spectrum. Spectrum allocation is a Federal responsibility. These carriers also need certification as utilities within the states so that they may exercise eminent domain rights for their location sensitive facilities. They also need local utility status for construction of commercial facilities in areas where local property use zoning otherwise prohibits such land use. Finally, their operations meet state laws requiring certification for companies engaged in common carriage communications services. While federal regulation is fairly pervasive in regard to the service offerings themselves, the state authority affecting transmitter siting and access to rights of ways are sufficient to make it prudent for these carriers to seek a cooperative atmosphere with state authorities. Some states have encouraged deployment of cellular service into unserved areas. Since they lack the authority to require deployment, these efforts are generally not documented in commission orders. However, the inquiries as to deployment plans that are typically a part of certification proceedings effectively communicate the commission's preferences to the carriers.

Video dial tone is an emerging topic. It is like all other technology improvements, in that it should begin with availability in relatively few areas and early acceptance by a few customers. A difference is that it is perceived as the "silver bullet" service. That is, video dial tone is a service

expected to be quickly adopted by the mass of customers. Cable television is the closest current offering to video dial tone. CATV operators are not common carriers and arguments are advanced that video dial tone providers should, by analogy, not be required to provide common carrier services. The universal service element of this discussion takes on a different perspective than the traditional arguments. Traditionally, the debate has been how much to spend on universal service and where to raise the money. In regard to video dial tone, the argument is made by potential carriers that only by control over the programming and retention of the revenue from the programming can the video dial tone capable network be built. A company offering common carriage only cannot afford the construction or network upgrade costs of deployment. In essence, this argument says that the path to universal service is not imposition of universal service requirements (common carriage) but encouragement of unfettered service offerings, pricing, and profitability.

Direct end user subsidies are a means to help targeted customers afford telephone service. Telephone company participation in these programs by identification of qualified customers through out reach programs, verification of eligibility, special handling of bills and credits, special processing of service orders for certain types of customers etc. add to the cost of service and is required by regulatory authorities. The costs are part of the cost of achieving the universal service objectives. They are treated as general overhead and recovered accordingly. They are part of the basic universal service package because they are tariffed services required to be provided by local exchange telephone companies.

Rounding out the listing of basic universal services are published rates, protections from disconnect,¹⁹ due process procedures for complaint resolution, and other "ways of doing business" that are imposed upon LECs by regulators. These basic requirements are so pervasive that most telephone companies are exempt from the fair commercial practice laws of the states. Instead, the commissions establish comprehensive regulations.

The services that are included within basic universal service are those for which there is a consensus of the value of the service. The consensus is demonstrated by one of two characteristics:

- (1) There is significant demand for the service as evidenced by a high percentage of use by those customers that have the option of selecting it.

¹⁹ Protections from disconnect include notice requirements, opportunities to make payment arrangements, limitations on deposit requirements, and provisions that limit disconnection to certain customer conduct. For example, customers may not be disconnected from local service for failure to pay the portion of their bill due to enhanced service providers.

- (2) For a service with significant general public benefit, there is an expectation by the public that it will be available.

A service of the first category is tone dialing. Enhanced 911 service is an example of a service of the second category. The second category provides two routes for an established basic universal service to be removed from the service requirement of the LEC. A service may be reexamined and removed if it becomes generally available from sources other than the LEC. It may also be removed if, upon examination, it is determined to be primarily a private benefit for a small number of customers, rather than a general advantage to all. The emergence of competitors has provided for the general availability of CPE and justified its removal from basic universal service. Free access to directory assistance has been eliminated from basic service because its benefits were concentrated on a few heavy users.

The observed characteristics of universal availability services differ from those of basic universal service in degree. Universal availability is a sort of half-way status for services without the requisites for inclusion in the basic service set but with sufficient credentials to demonstrate a public benefit in their deployment. In regard to new technology, the anticipation of usefulness is sometimes sufficient to persuade policymakers to require that a new technology be made available.

All of the decisions concerning which services should receive funding support to foster their use have financial consequences. In the monopoly environment costs for specific services were not necessarily controlling because so long as an overall satisfactory result was achieved in terms of affordability and total company cost coverage, the costs of individual decisions were not crucial. In a more competitive atmosphere the standard of choice by customers of services that may be priced to contribute to overall objectives is not merely the question "Is the service of the phone company worth the price?", but rather the question, "Is the service of the phone company worth the price and is it the cheapest available?"

E. The Generalized Universal Service Concept

Ameliorating the constraints of geography, disability, and economic status on enjoyment of the benefits of the telecommunications system is the objective of universal service programs. The previous section discussed which particular services are part of universal service, to what degree they are a part of it, and the underlying rationale for inclusion within the universal service objective. The universal service concept arose in a closely regulated monopoly environment. Today that environment no longer exists, but the benefits of universal service persist. The evolution of thinking and definition that has accompanied the change in market structure, and which continues, require definitions that are suitable for combined competitive and monopoly markets. For example, the universal service goal as stated by the Clinton administration is:

The telecommunications industry should seek to make the nation's telecommunications infrastructure transparent, in terms of providing users access to such capabilities, throughout the nation....Thus, in addition to the 'basic service package'...a residential user ultimately should have access, at competitive prices that reflect costs, to the features available to other U.S. residential users.²⁰

²⁰ Mosbacher, et al., "The NTIA Infrastructure Report."

This particular formulation of universal service policy places less emphasis on affordability. However, clearly affordability is part of the equation necessary to fulfill the objective. There is a growing belief that open markets are the route to universal service, recognizing that not all services will become available to all users at the same time. Markets are expected to efficiently pace the rate of dispersion of the services and ultimately make all useful services available to all customers. In the long run it may be that total reliance on markets to provide services universally will make sense. However, the markets are not fully competitive now and there is no real expectation that suitably competitive markets will ubiquitously emerge in the near term. Regulators remain involved in choosing methods and affecting the pace of deployment.

The following framework is intended to clarify and emphasize the characteristics of universal service. The model provides a definition of universal service that accommodates those services that are not necessarily valued by all customers. The model consolidates and organizes the concepts that are encountered across a wide variety of individual regulatory proceedings, and public discussions.

1. A Universal Service Model

For individual end user decisions the required conditions for use of any service are:

- (1) The service must be available.
- (2) The service must be useful.
- (3) The service must be affordable.

When all three conditions are met, the decision is made to use the service.

The aggregate utilization of the service is the sum of all of the individual usage decisions. A measure of the aggregate utilization is penetration. For services for which penetration is meaningful, such as access, the aggregation takes the following form:

$$\mathbf{Penetration = Availability * Usefulness * Affordability}$$

Each element is expressed as a percentage.

Programs designed to increase utilization of services can usually be classified according to which of the parameters the program is intended to affect. Some government programs address availability, some affordability. Usefulness is not commonly an explicit part of government programs, but it is not totally absent.

If usefulness at the end user level is defined as: The service is useful if it would be used if it were free, the following definition of universal service emerges:

Universal Service exists if:

$$\frac{\text{Penetration}}{\text{Usefulness}} = 1$$

This working definition allows the universal service concept to be applied to services that are not wanted or needed by all end users.

Availability is a physical characteristic of the network. It is the most easily measured and is under the direct control of the service provider. The regulator can order availability.

Availability is not more important than the other two requisites for adoption of the service but neither usefulness nor affordability is directly measurable. If a service is available but not adopted it may not be clear whether the failure is due to its cost or its value to potential customers, or a combination of the two. Regulators have been reluctant to hold companies responsible for the failure of customers to adopt a service.

Regulators have control over the price charged for a service. If adoption falls below their expectations they may choose to make it more affordable by lowering the price. Telephone companies also have direct influence on price. Particularly in the past ten years, regulators have extended pricing flexibility to carriers. However, the utility makes its pricing decisions in pursuit of profit maximization, as opposed to some public policy objective such as universal service. While profit maximization may have positive impacts in terms of sustaining low prices for basic service (which are not flexibly priced), it generally will not result in minimum pricing.

Regulators cannot legislate usefulness. The company can influence usefulness by making the service easy to use and advising customers of its utility. Regulators can and do require companies to promote certain services, such as assistance for financially qualified customers. Requirements for the promotion of new technology are less common.

ISDN is a service that may have its utility to customers positively affected by regulatory actions. Regulators are considering facilitating educational use of ISDN by requiring deployment of the capability to schools. As the service is adopted by schools and they acquire the equipment and skills to use it, they may create usefulness for ISDN interconnection to homes. While this scenario will almost certainly occur in some areas, the regulators are not overtly promoting a program of universal ISDN service but rather pursuing educational objectives.

Finally, the lack of measurements for usefulness and affordability makes it difficult to discern which is responsible for lagging service adoption. Penetration statistics in conjunction with availability statistics measure the combined effect of usefulness and affordability. If demographic statistics are available and there is a relation between family income and adoption it may be surmised that cost is an impediment to adoption. This is precisely the focus of discussion of the remaining few percent of households without basic service.

As carriers pursue lessened regulation, universal service requirements are an impediment. The role of regulation in requiring availability, controlling prices and promoting usefulness is understood to be an important contribution to universal service. Carriers are particularly adverse to price controls and regulatory requirements concerning their promotion of products. Carriers are sponsoring the idea that universal service objectives are met when the services are available.

Table 2-1 shows the relative influence the regulator has on the three prerequisites for service adoption.

F. Funding Universal Service

Mechanisms to make service affordable have two distinct elements: who is to receive contributions for affordability and who is to fund the service? The recipients of compensation can be narrowly targeted individual customers, larger classes of customers, all customers of specific services, or all customers of specified providers of targeted services. Each of these means of distributing contributions is in use. Contributions may come from other customers of the service provider to the targeted customers or from customers of another telecommunications provider or from the general public. It is generally accepted that telephone utilities pass on the costs of "contributions" on to their customers. However, it is convenient to attribute funding sources to companies. For example, it is suggested that interexchange carriers contribute to basic service affordability through access charges. The authors adopt this convention of reference, recognizing that the ultimate impact of access charges is on rates charged to end users of interexchange carriers. Similarly, the authors adopt the convention of referring to carriers as the recipient of contributions recognizing that ultimately these carriers are expected to pass the contributions through to their customers.

**TABLE 2-1
REGULATORY INFLUENCE**

Requisites for Service Adoption	Potential Regulatory Influence
Availability	Order deployment Provide deployment incentive Monitor deployment Provide for entry by alternate suppliers
Affordability	Set specific rate Set upper rate limit Establish subsidy for qualified customers Allow profitability in other rates
Usefulness	Require active LEC role in facilitating usefulness Provide incentive to LEC for customer adoption Monitor adoption

1. Direct End User Methods

Recipients of direct universal service support are defined by household income. Recipients are required to be a client of some other welfare program. The advantage of using this method of qualification is that income or other standards are verified by the referenced program reducing the administrative costs of the telephone company program. The life-line programs described in the next chapter are the primary programs directed to specific customers.

Inferior service offerings (as measured by amount of service) are a means of lowering phone costs to customers and making service affordable to more customers. A common rate offering of this sort is measured local service. Recall that the norm for universal basic service includes local service usage. By offering a service that provides less than the defined basic service for a reduced rate, truly marginal customers might be attracted to or retained by these rate options. Measured local service options are not directed primarily to the universal service objective. It is a rate option attractive to lower use customers, but it undoubtedly does have some universal service effects.

The next most specific mechanism supports low prices for a class of customers, such that residential customers receive service for rates different, and lower than business customers. Because of the large number of customers this preference involves the greatest amount of money of all of the mechanisms used to further universal service goals. Verification of qualification for the residential preference is essentially self policing. The key element is a rule that prohibits the mixing of residential and business lines on the same premise. Since only business lines are listed in the Yellow Pages, businesses won't forego the Yellow Page's listing in order to get the cheaper residential rate.

Preference pricing for specific services also operates within a customer class. The basic services can be priced at lower levels if other services are priced relatively higher.

2. Targeted Carrier Methods

A more general (less specifically targeted) mechanism provides support for entire LECs. The NECA pool described later in this report is the primary example of this technique. Some individual states use pooling of access revenues to support high cost companies. Even without pooling, access charges are a method of making low basic rates sustainable. The LEC can receive sufficient revenues to cover its costs by a combination of high access charges and low basic local service rates.

3. Separations

Separations is a regulatory mechanism that assigns cost among services. Specifically it assigns LEC costs between the federal and the state jurisdictions. It is perhaps the dominant mechanisms affecting the costs that must be charged for basic local service and it will be discussed in some detail.

The separations process is an effort to allocate telephone company costs between the federal and state jurisdictions. Telephone services are provided over jointly used facilities. The same loop, the same local telephone company switch, and the same trunk facilities between local telephone company switches are used to provide local and toll services. It would be difficult enough to formulate a process to allocate joint costs to each of these services without the added complication of dual jurisdiction. In the United States, however, that added complication exists.

State public utility commissions regulate local and state toll services, while the FCC regulates interstate toll. It is important, therefore, to decide what portion of a telephone company's costs falls into the state jurisdiction and what portion falls into the interstate. The separations process is designed to do that.

Separations procedures are codified in the FCC's Rules and Regulations; they are Part 36 of the FCC Rules. Separations, or Part 36, is a multistep process. The first step is to categorize all of a telephone company's investments. These investments are broken down into categories according to their function. The main categories are:

Central Office Equipment (COE):

- Category 1: Operator Systems Equipment
- Category 2: Tandem Switching Equipment
- Category 3: Local Switching Equipment
- Category 4: Circuit Equipment

Cable & Wire Facilities (C&WF):

- Category 1: Exchange Line Cable and Wire
- Category 2: Wideband and Exchange Trunk
- Category 3: Interexchange Cable and Wire
- Category 4: Host/Remote Cable and Wire

The next step is to allocate these categories between state and interstate (and incidentally between local and toll) using specific usage factors. COE Category 1, Operator Systems, for example, is allocated based on Weighted Standard Work Seconds. In other words, operators' activities are tracked by type of call and jurisdiction of call. The results are expressed in Weighted Standard Work Seconds; the interstate percentage of the Weighted Standard Work Seconds is applied to total COE Category 1 investment to arrive at the investment amount to be allocated to the interstate jurisdiction. COE Category 3, Local Switching Equipment, is allocated on Dial Equipment Minutes of use. A study is done to determine the jurisdiction of the minutes flowing through the switching equipment; the interstate percentage is applied to COE Category 3 investment to identify the investment amount to be allocated to interstate.

Mileage is included in the allocation of C&WF. C&WF Category 3, Interexchange Cable and Wire, is allocated between state and interstate based on Conversation Minute Miles. In other words, a study is done to determine the number of conversation minutes flowing over the exchange facilities and also the miles of exchange facilities involved. The jurisdiction of these conversation minutes is also determined and an interstate percentage identified. This interstate

percentage is used to establish the amount of C&WF Category 3 investment which should be considered interstate.

Once the relative percentages of investment are determined, the expenses of a telephone company are allocated between state and interstate jurisdictions based on the investment. The result of this lengthy Part 36 process is a separation of a telephone company's total assets into state and interstate "buckets." The interstate portion comes under the purview of the FCC; regulation of the remaining portion belongs to the state commissions.

Prior to the divestiture of AT&T in 1984, the separations process was used by the independent telephone companies (the local telephone companies which were not a part of the AT&T system) to establish their "settlements" with AT&T. Before 1984, AT&T was, for all practical purposes, the only interstate toll provider. AT&T set toll rates, with FCC approval, provided toll services, collected toll revenues from subscribers. AT&T used the facilities of the independent telephone companies in this process and in turn paid the independent telephone companies for use of their facilities. The payment, or settlement amount, AT&T paid was based on the results of the independents' individual separations studies. AT&T paid the independents a return on the interstate portion of their investment and also paid them for their interstate expenses,

Within the AT&T system, the investment and expenses of the Bell companies, at that time part of AT&T, were allocated between state and interstate by use of the same separations process.

While it would be inaccurate to say that the results of the separations process were used directly to establish rates for telephone services, it would be accurate to say that the results of the separations process had a profound effect on telephone rates. AT&T and the FCC certainly considered the amount of investment and expense allocated to the interstate jurisdiction when determining interstate toll rates. State commissions in turn looked at how much telephone companies were recovering from the separations and settlements process when they considered whether to raise state rates, especially local rates.

The predominant method of regulation at the state level has been rate of return regulation. In this system of regulation, a telephone company is allowed to earn its revenue requirement. The revenue requirement is made up of a specified rate of return on investment and the expenses involved in providing services. Taxes are included in expenses. In its simplest form, the rate of return formula is as follows:

$$\text{revenue requirement} = (\text{return} \times \text{investment}) + \text{expenses}$$

If a telephone company does not earn its allowed revenue requirement under rate of return regulation, it can come to the state commission seeking an increase in its charges to customers. The telephone company demonstrates that it has not earned its revenue requirement by showing that its revenues are not adequate to cover expenses and still provide its allowed return on its investment. The formula for this procedure is as follows:

$$\begin{aligned} \text{revenues} - \text{expenses} &= \text{profit} \\ \text{profit}/\text{investment} &= \text{earned return} \end{aligned}$$

If the earned return is less than the allowed return, the telephone company will in most cases be allowed to increase rates in order to generate enough revenues to increase its earned return.

The separations process has been important within this rate of return system. State commissioners are not anxious to raise rates, particularly local rates. If more of a telephone company's investment and expense are allocated out of the state into the interstate jurisdiction, there is less revenue requirement at the state level and so less of a basis for high state rates. In some states, all of a telephone company's revenues, investment, and expenses are looked at in the revenue requirement process. If the telephone company is earning a higher rate of return on its interstate business, the state commission can target a lower state rate of return on the state side of the company's business. The result is also lower state rates.

It is easy to see that the separations process is very complex. Any changes in allocation can shift large dollar amounts between state and interstate jurisdictions. The FCC's Part 36 Rules are formulated and changed only after a long process of joint decision making by the state commissions and the FCC. For politically difficult questions, the FCC will convene a Joint Board, a group which includes both state commissioners and FCC commissioners. It is in the Joint Boards that compromises are reached regarding allocation procedures acceptable to both state and federal regulators.

(1) Board to Board versus Station to Station Philosophy.

An underlying question regarding the allocation of joint costs among telephone services is the treatment of the connection between the customer and the customer's first point of switching, the local telephone company switch. There are two diametrically opposed views of how these facilities should be treated.

In the board-to-board approach, the investment and expense involved in connecting the customer should be covered by local rates. Toll services are seen as merely being add-on services. The theory is that customers primarily receive local service through their connection to

the network. Any connection to toll services themselves are incidental. The costs involved in providing toll services are seen as being those involved in the trunk portion of the telephone switch, in the trunk facilities between switches, and in the operator toll boards. Those who espouse this view see no reason to allocate any loop costs or any costs associated with the line side of a local telephone company switch to the toll services. The board-to-board approach results in relatively high local rates and relatively low toll rates. It was the approach taken during the early years of telephone service.

The station-to-station approach, on the other hand, holds that toll services are only possible if the connection between the customer and the local telephone switch is available. In this view, toll services are not an add-on. They are a jointly provided service with toll, using the same facilities and so sharing a portion of the cost of the loop and the line side of the local switch. The station-to-station approach also has a jurisdictional aspect since it suggests that there should be an allocation of costs to interstate toll services. The telephone industry and its regulators began to move toward a station-to-station approach after the *Smith versus Illinois* decision by the Supreme Court in 1930.²¹ That decision noted that the local loop and other local facilities were used in the provision of interstate toll services, and so some measurement of that use should be made and considered.

Following the *Smith* case, regulators and the industry showed an increasing tendency to allocate more of the costs of the local connection to the interstate arena. Given the impetus to keep local rates low in order to facilitate the universal service goal, this tendency should not be surprising. As Weinhaus and Oettinger have noted in their excellent study of cost allocations in the telephone industry:

The high cost of the local loop and its crucial position in the network made subscriber plant the focus of the industry and of its regulators. Payment of the costs solely through local rates has historically been unacceptable in an environment where regulators believe basic local rates must remain relatively low to encourage the broadest possible distribution of service.²²

It is important to remember that the board-to-board versus station-to-station controversy explains some of the arguments about whether there are subsidies between telephone services. If the board-to-board approach is taken, any allocation of local costs to toll is in effect a subsidy, an

²¹ *Smith vs. Illinois Bell Telephone Company*, 282 U.S. 133 (1930).

²² Carol L. Weinhaus and Anthony G. Oettinger, *Behind the Telephone Debates* (Norwood, New Jersey: Ablex Publishing Corporation, 1988), 63.

arbitrary allocation of inappropriate costs. Toll in effect subsidizes local. In the station-to-station approach, the allocation of local costs to toll is an appropriate step. Unless the allocated amount is out of line, no subsidy exists.

(2) The Ozark Plan.

The industry's struggle to determine how much of the local connection to the network should be allocated to all toll, and to interstate toll in particular, culminated in the Ozark Plan in 1971. The Ozark Plan became the separations manual for the industry for over a decade. A very important component of the Ozark Plan was the creation of the subscriber plant factor (SPF). SPF became the factor which determined the interstate allocation of the local connection to the network.

Until the Ozark Plan, the local connection to the network was allocated between state and interstate based on the subscriber line usage factor (SLU). SLU merely measured the relative percentage of minutes which were interstate and state. The Ozark Plan changed that allocation from SLU to SPF and applied SPF to what became known as the nontraffic sensitive plant, or NTS plant. The NTS plant included the loop, the main distribution frame in the central office, and the line-side connection into the switch. This investment was regarded as NTS because it did not vary with usage.

The SPF formula was arbitrary and the result of a great deal of political negotiations. The formula itself, which was calculated by each individual company, is as follows:

$$\text{SPF} = (.85 + 2 \times \text{CSR Ratio}) \times \text{SLU}$$

The composite station rate ratio (CSR), attempted to bring mileage into the formula. The CSR ratio was the result of dividing the average interstate toll rate by the average total toll rate (both state and interstate). The CSR itself took into account the price and distance of three minute toll calls. Since interstate toll calls usually cover a longer distance than do state toll calls, the CSR ratio would have a tendency to allocate more to the interstate jurisdiction.

In fact, the whole SPF formula tended to allocate more and more costs to the interstate arena. Since SLU is a percentage of total usage, if the interstate portion of a company's total usage increased, SLU would tend to increase SPF in the formula. Interstate usage during the 1970's did increase, and SPF increased with it. In fact, from 1972 to 1982, the federal allocation of SPF increased from 17.5 percent to 26.9 percent; this represented an increase from \$1.87

billion to \$9.88 billion.²³ Because of the dynamics of the formula, it was possible for some companies to calculate a SPF in excess of 100 percent. To prevent such an occurrence, SPF was capped at 85 percent, which meant that no company could allocate more than 85 percent of its NTS plant to the interstate jurisdiction.

The effect of SPF was to allocate significant amounts of investment, and associated expense, into the interstate arena, leaving less revenue requirement to be recovered from state, especially local, rates. This tendency to keep local rates low was seen as a significant benefit to the accomplishment of universal service. The allocation of NTS costs to interstate toll, however, was one element which kept toll rates high during this period, or at least higher than they would have been without the effects of SPF.

As business customers and heavy toll users began to complain about toll costs and as the FCC began to take a more procompetitive approach to the industry, the Ozark Plan, and SPF, no longer reinforced federal regulatory objectives. In its *Computer Inquiries*, the FCC was charting a path of competition for the CPE and inside wire markets. In its *Access Order* in 1983, the FCC also charted a course designed to pave the way for interstate toll competition. The Ozark Plan had to be amended to accommodate both of these developments. In 1980, the FCC convened a Joint Board which established a five-year period during which CPE investment would be phased out of the local telephone company ratebase, and out of the separations process. This same Joint Board recommended that SPF be frozen at current levels. In 1983, the FCC determined that SPF should be phased down to a uniform 25 percent for all companies. The phase-down began in 1986 and was completed in 1993.

²³ *Ibid.*, 81.

4. Access Charges

With divestiture and with the advent of toll competition, the relationship between the local telephone companies and AT&T changed significantly. Before divestiture, AT&T consisted of local telephone companies (Bell companies) which operated in the state arena and of the "long lines" part of the company which handled interstate toll. With divestiture, the Bell companies became entities independent of AT&T. With competition, AT&T became just another toll provider, seeking to use Bell company, and independent telephone company, facilities in order to originate and terminate interstate toll calls. The former settlements process was no longer possible. A new mechanism was needed to give local telephone companies some way of recovering their costs for providing the "local portion" of interstate toll calls. That new mechanism was access charges.

Local telephone companies (the Bell companies and the independents) file access charges with the FCC. These charges are for the use of the local loop, the telephone company's local switch, and the telephone company's interexchange trunk by AT&T, MCI, Sprint, and other interexchange carriers in the provision of long distance services. Access charges include a carrier common line (CCL) charge for the local loop, Local Switching charges for the telephone company switch, and local transport charge for use of interexchange trunk between telephone company switches and interexchange carrier switches.

Access charges are developed through a process outlined in the FCC's Rules and Regulations. Part 69 of the FCC Rules specify the creation of access charges. Part 69, however, begins with the interstate output from Part 36, the separations process. In establishing a new pricing mechanism, the FCC still had to begin by determining the split between state and interstate allocated costs.

Just as the old Ozark Plan focused a great deal of attention on NTS plant, so too did the access plan. At the beginning of the access charge regimen, the CCL charge was by far the greatest charge. The first proposed CCL rate was \$.0461; the first rate actually levied on interexchange carriers in May of 1984 was \$.0433. Since access charges were levied at both the originating and terminating portion of a call, interexchange carriers were paying in excess of \$.08 per minute. The initial CCL charge reflected a full station-to-station approach to nontraffic sensitive (NTS) costs. All NTS costs allocated to the interstate jurisdiction were levied on interexchange carriers, and so absorbed by toll charges.

The FCC, with Joint Board approval, moved toward a more board-to-board approach to NTS cost recovery with the introduction of Subscriber Line Charges (SLCs). The SLC for multiline business users is \$6.00. The SLC for Centrex users began at \$2 and \$3 and rose to \$6.00. The SLC for residential customers was introduced gradually, largely as a result of Congressional pressure to keep such rates low. The schedule for the residential SLC was:

June 1, 1985:	\$1.00
June 1, 1986:	\$2.00
July 1, 1987:	\$2.60
December 1, 1988:	\$3.20
April 1, 1989:	\$3.50

The residential SLC has remained at \$3.50 since April 1989. The imposition of a SLC charge has created a hybrid approach to the recovery of NTS costs. The 25 percent SPF allocator still assigns NTS costs to the interstate jurisdiction. The resulting costs are recovered by both toll charges (through the CCL charge) and by charges to subscribers (through the SLC).

Because the FCC determined that decreases in the CCL charge to interexchange carriers resulting from the SLCs be passed through to toll customers through lower toll charges, the imposition of the SLC has resulted in a significant decrease in interstate toll charges. The imposition of the SLC charge itself, however, has increased the price paid by all subscribers for their connection to the network.

5. Price Averaging

Unequal contribution to company costs arise within a LEC because the cost of service for various customers is not the same although the company charges the same rate for all. The customers who are served at lower costs contribute more to the revenue requirements on a net of cost basis than do those who are more costly to serve. The introduction of competitive providers threatens price averaging. For example, alternative access providers are beginning to offer a substitute for local loops. They are building facilities in dense urban areas. To the extent that they attract the high margin traffic from the LEC, the current contribution that traffic makes will be lost. New York has included an element for support of local universal service in its tariffs for the interconnection of alternative access providers to the switch of the LEC.

6. Subsidized Capital

Rural LECs qualify for assistance in obtaining capital. Loan subsidy programs operated by the Rural Electrification Administration in the U.S. Department of Agriculture make capital available to the companies at low interest rates. The smallest companies might not be able to attract capital without the guarantee provisions of the REA loans. Clearly, the loan programs have contributed to the affordability of service. In addition, because the construction plans must be approved by the REA as a precondition for the loans, a vehicle for imposing service standards exists within the program. The REA has comprehensive construction standards including requirements that the companies must upgrade from multiparty service, must meet outside plant construction standards, must employ modern switching systems, etc. These loan requirements have contributed to the quality of service provided by small rural telephone companies.

Figure 2-5 shows the paths of financial support for universal service objectives. Table 2-2 shows the challenges to the status quo currently under examination.

G. Universal Funding and Competition

In this discussion the authors have distinguished between contribution and subsidy. The authors further distinguish between the source of contributions and the use of contribution. Source contribution is defined as the amount of money that a customer pays in excess of the marginal cost of providing the service to that customer. Source subsidy is the amount of money that a customer pays in excess of the cost to that customer of the least cost alternative to the provision of the service by the utility. Sustained source subsidy can only exist when there are sustained constraints on the customer (or the market) that prevent the customer from access to the lesser cost alternative. It is important to distinguish between source contribution and source subsidy because source subsidies are not sustainable in an open market. Source contributions are sustainable to the extent that they are less than source subsidy.

From the recipients point of view, there is not a way of distinguishing between benefits that are funded by source subsidy and those funded by source contribution. In fact, the recipients' primary information is price. The recipient does not have sufficient information to determine whether the price is made lower by contributions to costs. An exception exists when users receive a direct reduction in price or a payment to offset their service cost. Funds or price preferences to qualifying customers, when qualification

figure 2-5

TABLE 2-2

CHALLENGES TO CONTRIBUTION FLOWS

Contribution Flow	Challenge
Within Residential	
Low Cost to High Cost	Bypass (CATV; Cellular, PCS)
Basic to Poor	Desire to remove internal subsidy
Within Local Exchange Company	
Business Basic	Bypass (alternative access providers, interexchange carriers, private systems)
Business Vertical	Advanced CPE, enhanced service providers, LEC restructuring
LEC Toll	Interexchange carriers, other bypass
Residential Vertical	Advanced CPE, enhanced service providers, LEC restructuring
Ancillary	Alternate suppliers, LEC restructuring
From Outside LEC	
Access Charges	Bypass, desire to remove inefficient high prices, separations changes
NECA, FCC, and REA	Congressional, administrative debate

is based on the circumstances of the customer, will generally be perceived as a subsidy by the recipient.

To clarify the difference between subsidy and contribution and to emphasize the importance of the distinction consider the example of access charges. A recent United States Telephone Association study estimated the contribution from access charges and toll to be as high \$20 billion.²⁴ While the methodology of the study has been challenged,²⁵ a critical observation is that the methodology assumes that alternative suppliers of access and toll could produce the service as cheaply as the established LECs. The study presumes that the marginal cost of access and toll for the incumbents would be the market driven price for the service. This analysis does not recognize that markets will drive prices only toward the marginal costs for the second most efficient supplier. There is no reason for the most efficient supplier to price much lower than that. The resulting mark-up in the price driven by the costs of the second most efficient supplier and that of the most efficient supplier is not subsidy, but is contribution. Contribution of this sort, arising as it does from the regulatorily-established circumstance of the incumbent) fifty plus years of protected monopoly status) is available for directed use to serve public policy ends.

H. Universal Service Pricing Dimensions

Universal service has several important pricing dimensions. The very first published tariffs in the United States, which were used before federal and state regulatory commissions were established, made distinctions between local and toll rates and between business and residential rates. These distinctions have persisted over time and appear to still be used by regulated, partially-regulated, and unregulated telecommunications companies. As will be seen below, these pricing categories have influenced both the definition of universal service, as well as the funding mechanisms chosen to provide funds for universal service.

²⁴ Calvin S. Monson and Jeffrey H. Rohlfs, "The \$20 Billion Impact of Local Competition in Telecommunications," Strategic Policy Research, Inc., Bethesda, Maryland, (July 16, 1993).

²⁵ See for example: Teleport Communications Group, "What \$20 billion Impact? A Reply to USTA" (New York, NY, September 1993).

1. Externalities

While the funding mechanisms used are discussed in more detail elsewhere in the report, the basic universal service funding notion has been guided by three unwritten principles. Universal service fund (USFs) may (1) originate in toll and flow to local, (2) originate in business and flow to residential, (3) originate and terminate in toll. These principles explain the direction of the arrows in figure 2-6 and all major universal service programs fit in this classification scheme. Most funding mechanisms originate in toll and the most frequent recipient is residential local.²⁶

The flow of contribution to residential basic services makes sense as few universal service programs have toll or business as targets of USFs. Toll can be a recipient when averaged or uniform toll costs are used. What is particularly noteworthy is that residential local is primarily seen as a recipient rather than as a source of universal funding.

The flow of the various USFs is designed to promote universal basic service, primarily for residential users. The rationale for imposing an artificial or extra layer of costs on some users of the public switched telecommunications network, so that some other citizens can use the network, is justified by reference to the externalities connected with the public switched network.

It is widely accepted that the value received by the users of the public switched telecommunications network is increased by the addition of new users. An externality occurs because more value or service is received because more people can call or be called by the user. Extension or outreach actions designed to attract or maintain users on the system are cost justified, in part, because of these received externalities. In addition to the direct benefit, each user is better off because the communication capability of society has been increased. It is commonly thought that schools, businesses, hospitals, units of government, families, neighborhoods, and public safety institutions benefit and function more efficiently and effectively if all of society has telecommunications service. The underlying logic here is that if society benefits from universal deployment, then society should pay the cost incurred. In the United States this decision has meant that regulatory commission-approved prices for telecommunications services may include various costs that will be used to pay for the extra benefits all users receive from increasing the universality of deployment. An

²⁶ The existence and use of a basic universal service funding mechanism is not necessarily a cross-subsidy. A subsidy exists if and only if a service is being provided below its short-run marginal cost. A service, or customer class, or region can receive revenues to help achieve universal service goals without a cross-subsidy occurring.

alternative to including these costs in the prices charged would be to use general purpose federal, or state, or local tax revenues to pay the added cost of extending universal basic telephone service. Funds could be paid directly to the potential customer or to the telephone company service the area where a candidate customer lives.

The public switched telecommunications network has a declining cost structure such that the incremental cost of adding a service or customer is generally less than the average cost of serving existing network customers. Viewed from a universal service perspective, this may mean that the "extra" cost of adding new customers may be disproportionately lower and the benefits greater.

2. Market Failure

Market failure is one important rationale advanced for both the public provisioning of telecommunications services and the regulation of investor-owned telephone companies. The thought here is that the natural working of a competitive telecommunications market, in this case,

does not result in a universal penetration of an affordable and socially-stipulated quality or level of telephone service. On the other hand, viewed from an economic perspective no market failure occurs because those unserved have voluntarily chosen not to pay the price necessary for telephone service.

The difference in perspective, however, can be resolved by focusing on the terms "affordable" and "socially-stipulated quality or level of service." Society, through its legislative and regulatory agents, determines what an affordable price is and this may not always be sufficient to attract either regulated or unregulated telephone service. Society also defines the set of basic universal services that each candidate customer should receive for the affordable price. Market failure occurs when the price for stipulated telephone service exceeds the affordable price.

The universal service goals, policies, and programs described in this report are designed to overcome actual, perceived, or forecasted market failure by focussing on affordability and achieving at least minimal levels of telephone service. Avoidance of market failure and the associated costs are justified on the basis of the positive benefits and externalities achieved.

3. Economies of Scale and Scope

The reason most generally advanced for monopoly provisioning of telephone service is that customers benefit from the cost savings that occur. The source of these savings is the economies of scale and scope. Economies of scale occur because production gains increase with size such that one firm can provide service to an area at a lower cost than two or more (smaller) firms. Economies of scope occur because the same set of network facilities can be used jointly to provide different services, such as local and toll. The cost of each service is less than it would otherwise have been because some costs are able to be shared among different services.

From a universal service perspective, government and regulated telephone monopolies were seen as having an additional and positive side effect. Universal basic service could be extended because all parties would gain from the addition of size and scope economies. It was clearly recognized, however, that there were practical limits to the economy of scale and scope benefits that could be realized.

The academic, economic, and regulatory literatures have contained occasional arguments over whether or not the Bell companies in the United States were natural monopolies. From the viewpoint of regulators, this argument was largely an academic one until the breakup of the Bell System in 1984. Since that time regulators have pursued policies managing the evolution of competition and protecting customers where little or no competition existed.

It could be argued that these transitional policies have had the effect (holding technology and all other efficiency-increasing factors constant) of decreasing the monopoly's scale and scope

economies as more and more of the telecommunications market is opened to competition and is lost to the monopoly. In actuality, however, the efficiency-increasing forces of technology, pricing freedoms, relaxed regulation, and competition have more than offset any "inefficiencies" due to the loss of monopoly scale and scope economies.

The only real impact is that universal service programs were partially justified and funded out of monopoly scale and scope economies, which may no longer be available. Policymakers and regulators can still choose to authoritatively assign universal service-type costs to regulated and unregulated providers; the justification is no longer based on monopoly-derived economies. Justification for authoritatively adding costs would, instead, be more clearly based upon the government's use of its taxation and other powers to achieve social objectives.

4. Average Pricing

One traditional hallmark of regulated prices is that an average price was used. Social benefits and positive externalities were used to justify averaging the high, medium, and low cost residential customers into one residential cost, which was then translated into one residential price. It was recognized that this method violated cost-causation principles, which state that the cost-causer should be responsible. High-cost residential customers explicitly benefitted from an average price that was made possible only by the inclusion of low-cost customers in the "cost pool." The benefit of extending telephone service to high-cost customers was commonly cited as offsetting any disadvantages arising from violating the cost-causation principle.

Acceptance of an average cost pricing method allowed regulators the ready means to generate revenues needed to cover the cost of achieving universal service goals. The advent of competition greatly eroded average pricing in toll and some local markets. New entrants followed "cream-skimming" strategies and used cost-based pricing strategies to lure away some of the telephone company's low-cost customers. Low-cost customers immediately benefitted and the incumbent lost some revenues, unless its average usage or price increased.

Average pricing strategies may become less and less sustainable where markets become competitive. This eliminates an easy way to produce revenue that can be pooled and used to obtain universal service goals.

5. Price Caps

Price caps is a system of pricing telephone service, where the price ceiling fluctuates with changes in a general economic index, such as the Consumer Price Index.²⁷ Unlike the previous pricing trends that noted an erosion in the ability to sustain prices that included universal service costs, price caps may still allow significant universal service costs to continue to be recovered.

The reason for this is that price cap systems start with a base price that already includes universal service costs. Subsequent inflation- or productivity-driven price changes do not eliminate these universal service-eligible revenues. Only competitive pressures that erode the sustainability of the entire price caps system cause basic universal service revenues to diminish.

As competition has developed, the ability of traditional pricing and related economic concepts to provide a conceptual justification and funding mechanism for achieving universal service goals has diminished. This does not mean that universal service can no longer be justified. Rather, it means that some of the underlying traditional pricing and economic concepts that were intended for a monopolistic and noncompetitive telecommunications market should not be expected to necessarily function as well in markets with competition.

I. Regulatory Influence on Providers

The strongest requirement that regulators use to assure universal availability is minimum service standards enforced on a carrier of last resort. "The carrier of last resort" is the term of art used when a market is no longer protected from entry by government edict to refer to the carrier that has the obligation to serve any customer requesting service within a designated service territory. The incumbent, established LEC is the carrier of last resort. Since that carrier's responsibilities were developed in a monopoly service environment, the requirement to serve is implicitly or explicitly included in the regulatory framework in which those carriers operate. For example, AT&T effectively functions as the long distance toll carrier of last resort throughout the United States. The designation of a carrier of last resort is necessary to assure that specific services are universally available. The services that are subject to universal availability and their characteristics are specified in the minimum service standards or by means of requirements included in the carrier of last resort's tariffs. All carrier tariffs specify the conditions under which the various services will be provided. The geographic area of availability is one of the conditions within the filed tariffs. The regulators use the requirement that telephone services must be provided under approved tariffs to impose the carrier of last resort responsibility on designated carriers for selected services. When the carrier applies for tariff approval the commission requires

²⁷ Price caps are far more complex, but for purposes of an analysis of universal service, this level of abstraction is sufficient.

that the availability provisions satisfy their universal availability objectives as a prerequisite for tariff approval.

Regulators use the tariff approval mechanism to provide for the future deployment of services in cases where a new service is being introduced but the carrier's network is not equipped to provide the service ubiquitously. In these cases the availability terms of the tariff may include a provision that the service is available on an "equipment available" basis. Such a provision may be so specific as to define the manufacture and model of the switch serving the customer. Such a provision effectively imposes a requirement that the carrier equip switches with software and hardware upgrades to bring the new services to more customers. The introduction of Caller ID is an example where several states have approved the introduction of the service and imposed availability requirements. To meet those requirements carriers must upgrade the switches, deploy SS7 technology and equip all new switches to provide the service.

Commissions may impose availability requirements on carriers that do not have carrier of last resort responsibilities if filed tariffs are required and the commission has the authority to reject proposed tariffs. Commissions are guided in their decisions by the degree to which the services offered by these carriers are competitive. If the carrier offers a unique service, particularly a service that is not available from the LEC, the commission is more likely to be attentive to the availability provisions of the proposed tariff.

Commissions can use their authority in certificate proceedings to influence the availability of services from new entrants. In some jurisdictions, certification is a requirement placed upon new carriers. When required, the carrier must obtain a certificate of convenience and necessity from the commission before commencing operations as a public utility. The laws of the state will define what kind of companies are required to obtain certificates. Essentially the effect of these laws is to require a company needing the right of eminent domain to obtain a certificate from the commission. The commission must find that the company's proposed operations serve the public and that the service is necessary for the public welfare. The degree to which the company commits or is required to serve the public at large, as opposed to offering services only to selected customers, is a consideration in certification proceedings. Underlying the procompetitive public policy agenda is a presumption that new entrants that will compete with incumbents effectively serve the public interest by increasing the variety of available services and by price competition. Even with that presumption, however, commissions will prefer competition to occur over as broad a segment of the markets as possible. Hence they are inclined to look more favorably on entrants who intend to offer their services with few restrictions.

Companies subject to the jurisdiction of a commission must consider the objectives of the commission in their operations. This influence may be effective in achieving commission objectives even in situations where formal regulatory rules are not restrictive or demanding. For

example, a commission may relax its processes for approving the prices that a utility charges, even to the extent of deregulating prices. The utility may still be constrained in its pricing freedom by the potential that strict pricing rules might be reimposed if its pricing policies substantially conflict with public policy. Even in circumstances where the legislative authority has removed commission jurisdiction over companies providing telecommunications services, the potential for legislative reassertion of regulation may influence provider actions. In the arena of market theory it is averred that the threat of competition is sufficient to constrain the actions of incumbent suppliers. The observation here is that even in a procompetitive, deregulation environment the threat of government intervention may constrain the actions of service providers in ways that promote universal service.

Government influences the service providers most directly through enforceable minimum service requirements imposed on carriers charged with the obligation to serve. Less direct influence is imposed through tariff review. Certification proceedings are somewhat less direct and effective because they are single events, as opposed to continuing oversight methods. Regulated companies are influenced indirectly by the potential of regulatory intervention in areas where company performance does not harmonize with the public policy agenda of the commissions. Finally, most indirect, but none the less influential, is the potential that legislatures will intervene on the public's behalf if industry performance is perceived as contrary to the public good.

CHAPTER III

FEDERAL PROGRAMS

In addition to the universal service policies and actions described, federal programs have been designed and implemented that support universal service. These programs include geographical averaging, provisioning for the disabled, and lifeline-type activities. Each of these efforts are described below in terms of the universal service objectives achieved.

A. The NECA CCL Rate

1. Geographical Averaging Through a Pooled National CCL Charge

Before divestiture and the advent of toll competition, AT&T, for the most part, provided all interstate toll and set uniform toll rates. Although there were underlying cost differences among local telephone operations, these underlying differences were obscured by the national pooling process. In effect, AT&T ran a national toll pool. AT&T, in formulating interstate toll rates, took into consideration the interstate allocation of its local operations (the Bell companies) and also the settlement payments it made to the independent telephone companies. AT&T provided the service and collected the revenues from subscribers. These revenues went into a large "toll pot" out of which settlement payments to independent telephone companies were made, and the interstate allocation of the Bell company investment and expenses were covered. The rates which AT&T charged were geographically averaged. A call covering five hundred miles was charged the same if it traversed a high traffic route or a low traffic route. A five hundred-mile call which originated in Wyoming would cost the same as a five hundred-mile call originating in California, even if the underlying cost of the local connection to the network was higher in Wyoming than it was in California. Geographically averaged toll rates were an underpinning of universal service, assuring that customers would receive affordable service regardless of their location.

Despite the advent of competition, the FCC and state regulators, wanted to preserve geographically averaged toll rates. In an effort to do so, the FCC established, as part of its access charge plan, the National Exchange Carrier Association (NECA). A major function of NECA was to run an access charge pool, especially a carrier common line (CCL) pool. The FCC recognized that some of the newly created LECs (the Bell companies) and some of the independent telephone companies would want to have some control over their own access charges and would want them to reflect their own particular cost structure. As a result, LECs were allowed to file their own access charges for traffic sensitive rates and for billing and collection charges (i.e., rates for dedicated lines, rates for switching services and for interexchange trunks, and rates for billing and collection). However, the FCC mandated that all LECs participate in the CCL pool because CCL charges represented the lion's share of access rates. As noted elsewhere in this report, the first CCL charges levied were \$.0433 per minute at both the originating and the terminating ends of a call.

The initial CCL rates were high because they did not yet reflect the phase down of SPF to a uniform 25 percent for each LEC. Nor did the early CCL rates reflect the phase out of CPE investment and inside wire investment from the LEC ratebase. The initial CCL rates were levied before the creation of SLCs, which shifted a significant portion of the interstate allocation of local loop costs from the interexchange carrier to the subscriber. The \$.0433 CCL charge was the result of pooling all of the LECs' interstate NTS revenue requirements. If there were no pooled CCL rates, some LECs would have appreciably higher CCL charges, while others would have appreciably lower charges. Because the CCL was such a large portion of total access charges, unpooled CCL rates, it was feared, could lead quickly to toll deaveraging.

With the phase-down of SPF, the phase-out of CPE investment, and inside wire investment from the CCL ratebase, and with the imposition of SLC charges, the CCL rate has fallen considerably. In its 1993 access filing, NECA filed a \$.0081 CCL rate. Despite significant changes in the NECA CCL pool (which will be explained shortly), the \$.0081 CCL charge is a nationally averaged rate.

Access charges are about one half of the inter exchange carriers' costs. The other one half are the operating and overhead costs of the carrier. It would be expected that there would be some route specific variations in the carriers' costs suggesting that there should be route specific variation in prices. The inter exchange carriers use average pricing without route specific variation. This is not a federally mandated policy in that there is no federal rule prohibiting route specific pricing. The FCC has consistently in its orders providing pricing flexibility to AT&T lauded the continued choice on that carrier's part of price averaging. As was mentioned earlier in this report, carriers value reduced regulation and pricing freedom. Abandonment of average pricing would risk reimposition of stricter price controls by either the FCC or possibly the

Congress. Further, deaveraging would be administratively difficult. Advertising might need to be regionalized. Customer service and sales personnel would need to be trained to explain rates to customers. There may be additional costs and operating difficulties associated with more complex pricing schemes. Which of these considerations, or others, has led to the retention of average pricing AT&T is not known. Other carriers have not introduced route specific pricing. In addition to the considerations mentioned above, the other carriers may be essentially "price takers" in the market with pricing strategies based upon AT&T.

2. Threats of Bypass, Depooling, and the Creation of Unity 1A

Not all LECs were comfortable with the pooled CCL rate. Many LECs feared that the pooled rate was high enough to encourage interexchange carriers to look for ways to bypass LEC facilities. Those LECs serving highly concentrated markets, notably big cities, were at greatest risk of bypass. High concentrations of traffic provided an attractive opportunity for alternative providers to emerge, ready to accumulate traffic from large business subscribers and deliver it to the interexchange carrier's switch, as they indeed did in New York City, with the creation of Teleport. Unlike the predivestiture days, there was no one unified system, nor was there a requirement that interexchange carriers purchase access services from the LECs. Even LECs whose own individual CCL rate might be higher than the pooled CCL rate found the flexibility of filing their own rates an attractive prospect.

To understand this desire on the part of the LECs to de-pool, one must understand the pooling process. NECA accumulated information from each LEC regarding each LEC's forecasted interstate CCL revenue requirement, at the allowed interstate rate of return, and each LEC's projected minutes of use for the prospective tariff period. NECA then divided the revenue requirement by projected minutes of use and filed the resulting CCL rate. Each LEC billed that rate and reported to NECA the dollars billed. At the end of the tariff year, NECA gathered actual results from each LEC, including actual interstate CCL investment and expense and actual minutes of use. NECA then calculated the actual earned return, which might be higher or lower than the allowed return. (If it were higher, a refund to the interexchange carriers was in order; if it were lower, there was no recourse.) Those LECs whose interstate costs were lower than the average, had been billing a CCL rate higher than they needed to cover their own costs. These LECs would in effect keep enough of the CCL revenues to cover their costs and send the rest to NECA. For many LECs, this was not a pleasant prospect.

Those LECs whose costs were higher than the average were billing CCL rates insufficient to cover their own costs. They would in effect receive more money from NECA at year end. However, these LECs wouldn't know how much more to expect; that would depend upon how

accurately NECA had forecasted investment, expense, and demand in filing the pooled CCL rate. If NECA had filed a rate which was too low to cover the projected revenue requirement and to earn the allowed return, these LECs would receive less than expected. It was this lack of control, and this uncertainty, which made de-pooling an attractive option, even to many LECs which received money from the NECA pool in excess of the CCL amounts they had billed.

The industry worked to formulate an agreement, called Unity 1A, which would make it possible to depool the CCL rate. A Joint Board in March 1987 recommended that depooling of the CCL pool be allowed; the FCC adopted this recommendation in May 1987. With the imposition of the SLCs and with the various phase-downs taking place in the CCL pool, the amount of money to be recovered through the CCL charges would be decreasing, making depooling a less threatening prospect. There was a concern that the only LECs left in the NECA pool would be extremely high cost companies, resulting in a NECA CCL rate which would be so high that geographical toll averaging would be in jeopardy. There was also a concern that some mechanism be developed to cushion the effects of depooling on those high cost LECs who wanted to leave the pool and file their own CCL rates. The mechanisms which resulted from industry consultations, and FCC agreement, were the Long Term Support (LTS) and Transitional Support (TS) programs, which are now outlined in Part 69 of the FCC Rule.

3. Transitional and Long-Term Support Mechanisms

The Transitional Support program was designed to phase-in the effects of depooling on LECs choosing to leave the NECA CCL pool. Those choosing to leave the pool were categorized as contributors or receivers, and were categorized as being Level I or Level II, depending upon the date on which they left the NECA pool

Level I Contributors:

Those LECs who left the NECA CCL pool on April 1, 1989, to file their own tariffs and who had, in 1988, had a lower than average CCL revenue requirement per minute of use. They were thus net contributors to the NECA CCL pool. In other words, they had billed more CCL revenues than they had kept. Their participation in the pool had tended to drive the CCL rate down.

Level II Contributors:

These LECs were just like Level I Contributors; however, they had opted to depool and file their own CCL tariffs on July 1, 1993. The Level II Contributors were taking advantage of the FCC's decision to give LECs a second chance to exit the NECA CCL pool. Those exiting the pool in 1990, however, had to have fewer than 300,000 access lines and to bill less than \$150,000 a year in operating revenues. The FCC was, in effect, giving smaller LECs, who had been hesitant to exit the pools at first, a second chance to do so.

Level I Receivers:

Those LECs who left the NECA CCL pool on April 1, 1989, to file their own tariffs and who had, in 1988, had a higher than average CCL revenue requirement per minute of use. They were thus net receivers from the NECA CCL pool. In other words, they had billed fewer CCL revenues than they needed to cover their costs. Their participation in the pool had tended to drive the CCL rate up.

Level II Receivers:

These LECs were just like Level I Receivers; however, they had opted to depool and file their own CCL tariffs on July 1, 1993. The Level II Receivers were taking advantage of the FCC's decision to give LECs a second chance to exit the NECA CCL pool. Those exiting the pool in 1990, however, had to have fewer than 300,000 access lines and to bill less than \$150,000 a year in operating revenues. The FCC was, in effect, giving smaller LECs, who had been hesitant to exit the pools at first, a second chance to do so.

To phase-in the effects of depooling on both contributors and receivers, a transitional support mechanism was put into place in which net contributors in 1988 continued to help support those who had been net receivers in 1988. Based on 1988 figures, the net contributors provided the net receivers with a declining portion of the amount of subsidy they had received by being part of the NECA pool. The subsidy amount was computed as being the difference between revenues billed and revenue requirement amounts during 1988. This amount was frozen and phased down as follows:

Year 1: 80 percent of adjusted 1988 frozen amount (adjusted for effects of SLC increases)

Year 2: 60% of adjusted 1988 frozen amount

Year 3: 40% of adjusted 1988 frozen amount

Year 4: 20% of adjusted 1988 frozen amount

Level I receivers would receive support for the four-year period from 1989 until 1993. Level II receivers would receive support for the four year period from 1990 until 1994. On July 1, 1994, transitional support would be ended.

Unlike transitional support, Long Term Support is an ongoing program. The Long Term Support process makes it possible for NECA to file a CCL rate which is equivalent to the rate which would be filed if there were still a CCL pool including all LECs. In the Long Term Support process, all LECs provide NECA with the information necessary for NECA to arrive at a total industry pooled CCL rate. This is the rate which NECA files with the FCC.

NECA then calculates a CCL rate based on pool members and also determines the shortfall in revenues which will result from billing the filed CCL rate and the revenues needed to cover the interstate NTS revenue requirement for the NECA CCL pool members. This shortfall is made up by nonpooling LECs through their Long Term Support obligation. Long Term Support thus makes it possible for NECA to file CCL rates which are not excessively high, while at the same time, generating enough revenue to cover pool members' costs. Since most of the LECs which remain in the NECA CCL pool are small, and many of them are rural, the LTS program is seen as a method of assuring that high cost and rural areas are still served by interexchange carriers.

The LTS and TS programs that were part of the depooling of the CCL rate was designed to preserve geographical toll averaging by making sure that a huge diversity of CCL rates would

not develop. It is interesting to note, however, the wide range of CCL rates which were filed in 1993. The following are examples of CCL rates:

NECA CCL rate:	\$.0081
AMERITECH rate:	.00597
Bell Atlantic:	.00717
GTE rate:	.02368 Terminating .01000 Originating
NYNEX rate:	.00658
Pacific Bell:	.00413
Centel of Texas:	.01518 Terminating .01000 Originating
Lincoln Tel:	.00144
Virgin Islands:	.01634 Terminating .01000 Originating

According to the FCC's Part 69 Rules, LECs whose calculated CCL rate is over \$.01000, should freeze their originating CCL rate at that amount and should calculate an actual terminating CCL rate from remaining revenue requirement. LECs whose calculated CCL rate is under \$.01000 should apply the same CCL rate for terminating and originating traffic.

B. Universal Service Fund

As part of the initial access charge arrangement, the FCC recognized that some LECs had such high local loop costs that their intrastate rates, notably their local rates, might as a result be unaffordably high for subscribers. Such "high cost" LECs had been taken care of in the predivestiture days through the national AT&T managed interstate pool and through the calculation of a company-specific SPF. With the phase-down of SPF to a uniform 25 percent,

these companies would be shifting a large amount of investment and expense back to the state jurisdiction. The FCC determined that such high cost companies should be able to allocate additional local loop costs to the interstate jurisdiction, in the interests of preserving universal service in those high cost areas. In March of 1987, a Joint Board recommended that a majority of such high cost assistance be targeted toward small and medium LECs and that this high cost assistance be charged explicitly to interexchange carriers through a separate rate, rather than being included in the CCL rates. At the depooling of the NECA CCL pool in April of 1989, such a USF rate began to be levied upon interexchange carriers, based on the number of their presubscribed lines.

1. Mechanics of the USF

Establishing the size of the USF rate is a multistep process. The first step is to establish an average local loop cost. NECA establishes this average local loop cost by gathering relevant information from all LECs, for each LEC study area. A study area basically includes a LEC's operating territory within a state. Study areas were frozen in November of 1984 and have not been redefined since that date. The information NECA gathers includes:

Total net investment in Exchange Line Cable & Wire Facilities Separations Category 1.3 Investment (local loop plant);

total net investment in Exchange Line Central Office Circuit Equipment Separations Category 4.13;

return on both categories of investment;

total depreciation expense associated with both Exchange Line Cable & Wire Facilities and Exchange Line Central Office Circuit Equipment;

maintenance expense associated with both categories of equipment;

overhead expenses associated with both categories of equipment (including corporate operating expenses, taxes, etc.); and

number of working loops.

With this information, NECA determines an average total loop cost. In 1993 that average was \$234.26 per line per year.

The next step is for each LEC to determine its own total loop cost and to compare it to the national average. Those companies with higher than average costs may allocate more of that cost to the interstate jurisdiction according to the following formula:

LECs with fewer than 200,000 lines in a study area recover:

0% of the amount that is less than 115% of the national average, and

65% of the amount between 115%-150% of the national average, and

75% of the amount over 150% of the national average.

LECs with more than 200,000 in a study area recover:

0% of the amount that is less than 115% of the national average, and

10% of the amount between 115%-160% of the national average, and

30% of the amount between 160%-200% of the national average, and

60% of the amount between 200%-250% of the national average, and

75% of the amount over 250% of the national average.

The differentiation between LECs with fewer than 200,000 lines and those with more than 200,000 lines in a study area is meant to target a greater amount of support to smaller companies. NECA personnel sum the amounts calculated according to the above formula. The summarized amount represents the amount of support to be billed to interexchange carriers.

The next step is to determine the number of presubscribed lines each interexchange carrier has. Presubscribed lines are the result of customers selecting a specific carrier as their provider of choice for interstate service. Unless the customer signifies otherwise by dialing the access code of another interexchange carrier, the customer will automatically be routed to his or her presubscribed carrier by the LEC switch. Those interexchange carriers with more than .05 percent of the total presubscribed lines in the nation are subject to the USF rate.

NECA personnel divide the amount of support by the number of total presubscribed lines. The result is the USF rate, which is expressed as a monthly charge to be billed to each interexchange carrier per presubscribed line. In 1993, NECA filed to decrease its USF rate from \$.4604 to \$.4561 per line per month.

C. Size of the USF

High-cost support was phased in during an eight year period beginning in 1986. The phase-in was completed by the end of 1992, making 1993 the first year in which the full USF is being charged to interexchange carriers. Twenty-eight interexchange carriers paid USF rates to 822 study areas in forty-seven states. The total USF fund in 1993 was estimated to be \$698 million. While there were 139.4 million working loops in the U.S., only 36.8 million of them received USF support. The amount of support per loop per month averaged \$1.58 for all USF receivers.¹ However, it is interesting to note that those receivers with fewer than 200,000 lines received an average per loop per month amount of \$6.74. About 85 percent of the USF is paid to study areas with fewer than 200,000 working loops. It is assumed that without the USF support, rate payers in the receiving LECs' territories would be paying those amounts through increased local service rates.

D. Problems and Reactions to the USF

As is expected, those LECs receiving USF support are in favor of continuing the process; the interexchange carriers paying for USF support are voicing concerns with the process. Proponents of the USF point to the amount of support provided to high cost companies and to the amount of money subscribers in those high cost areas would be paying without the USF. Proponents also note that USF represents only 2 percent of the nontraffic sensitive costs which interexchange carriers pay through access charges, and that "the effect on interstate rates is nearly negligible while the benefits to local ratepayers in high cost areas is substantial."² Considering that the total interexchange toll service revenues for 1992 were \$59.4 billion, a fund of \$698 million does not seem unduly large to those who benefit from its existence.

¹ Jim Macher, "Universal Service Programs Trends and Issues." All of these figures come from presentation to the Summer 1993 NARUC Communications Subcommittee (July 23, 1993).

² National Telephone Cooperative Association, "Universal Service Fund Discussion of Issues, July 1993," prepared for the Summer 1993 NARUC Communications Subcommittee Meeting, San Francisco (July 23, 1993), iii.

Those who are opposed to the USF in its current format point to several issues. One issue is that half of the LECs receiving USF support are subject to price cap regulation.³ These LECs are able to keep a portion of the return they earn over the allowed rate of return, if they exceed the allowed rate of return through increased efficiencies. However, these same LECs are receiving USF support because they are high cost. To some of the interexchange carriers paying into the USF system, this seems to be a contradiction.

Interexchange carriers have also taken exception with USF support going to study areas that are part of large holding companies, such as the regional Bell Operating Companies (RBOCs) or GTE. A company need only qualify by study area within a state; no consideration is given to the larger company of which that study area is a part. Indeed, in 1990, Bell Companies in Wyoming, West Virginia, and South Carolina were among the largest recipients of USF revenues; they received per line subsidies of \$6.39, \$5.15, and \$4.55.⁴ If one company acquires the assets of another company within the same state, for purposes of USF calculations, these still remain separate study areas (because study area boundaries were frozen in 1984) and so capable of qualifying for higher USF support levels if they are each under 200,000 loops.⁵

There are companies, however, who see the 200,000 loop distinction as too restrictive. Recently, the Vermont Department of Public Service and Vermont Public Service Board petitioned the FCC to grant a waiver of the USF disbursement rules. According to the petitioners, the 200,000 line cutoff discriminates against telephone users in the high-cost areas of Vermont; their request is that the FCC allow New England Telephone (a part of NYNEX) to receive the higher levels of USF support available to companies under 200,000 access lines. New England Telephone serves 270,000 lines in Vermont.⁶

Each NECA filing to change the USF rate has drawn opposition and complaints from the interexchange carriers. This level of controversy has caused the FCC to institute an investigation into the method used to calculate the USF. In Docket 93-123, the FCC seeks to determine whether the USF rate is excessive because NECA constantly adjusts the rate to reflect corrections

³ Roger Riggert, Regulatory Director, AT&T, "Support Mechanisms," a presentation to the NARUC Staff Subcommittee Issues Workshop (July 23, 1993), 3.

⁴ J. Cale Case and Mark G. Ciolek, "Federal Telecommunications Subsidies in the USA," paper presented at the Eastern Economic Association, March 1993, 24.

⁵ The USF has been further criticized as creating a disincentive for efficiency. Higher costs are rewarded with higher payments from the fund.

⁶ *Telecommunications Reports*, "Crisis May Loom for Universal Service, Experts Warn," *Telecommunications Reports* 43 (October 25, 1993): 28.

to LECs' historical data.⁷ The USF mechanism remains a controversial method for targeting subsidies to high cost areas.

E. Lifeline Assistance

The FCC, in an effort to preserve and encourage universal service has instituted two Lifeline Assistance programs. Unlike the USF, which targets assistance to telephone companies in an effort to keep their local and state costs, and rates, low, the Lifeline Assistance programs target assistance to individual subscribers. One program is designed to subsidize needy subscribers' SLC charges; the other program is designed to assist subscribers in hooking up to the network. Both programs are now charged directly to interexchange carriers through one Lifeline Assistance rate, based on the interexchange carrier's percentage of presubscribed lines. NECA administers the Lifeline Assistance programs, collecting information from the LECs, establishing charges, assessing those charges on the interexchange carriers, and distributing the funds to the LECs. In 1993, NECA filed to increase the Lifeline Assistance rate from \$.0777 to \$.0809 per prescribed line per month.

1. Waiver of SLC

The imposition of what started out as a \$1.00 charge, and which eventually became in April of 1989 a \$3.50 per month SLC for all residential subscribers to the public switched network, led some to fear that subscribers would not be able to afford the SLC and would be forced off the network. In an effort to prevent such harm to universal service, the FCC instituted the SLC waiver. In December of 1984, the FCC established a plan which specified that half of the SLC charge would be waived for a qualified subscriber if that subscriber also received a reduction, equal to the SLC waiver, in his or her local service charges. Qualified subscribers would have to meet a state specified means test. The reduction in the subscriber's local service bill would be absorbed at the state level. States would have to apply to participate in the SLC waiver program. The amount of the SLC waived was recovered through the pooled interstate NECA CCL rate until April of 1989. At that time, mandatory CCL pooling was ended. Thereafter, the SLC waiver amount was recovered through a charge billed directly to interexchange carriers by NECA.

⁷ See, "In the Matter of National Exchange Carrier Association Revisions to Tariff F.C.C. No. 5, Universal Service Fund and Lifeline Assistance Rates," Order Designating Issues for Investigation, 8 FCC Rcd No. 9 (1993).

In late 1985, the FCC expanded the SLC waiver plan, by allowing the waiver of the full SLC charge, provided the subscriber also received an equal reduction at the state level. The reduction at the state level could be a reduction in local service rates, or a reduction in connection charges, or a reduction in deposit requirements. This expansion of the SLC waiver plan also specified that subscribers would have to meet a means test, and that some verification procedures would have to be put in place to assure that those receiving the SLC waiver were indeed eligible to do so.

By 1993, the SLC waiver program, according to NECA, had been adopted by thirty-five states, the District of Columbia and the Virgin Islands. Over 3.6 million subscribers participated, receiving an average of \$2.41 per month in assistance per subscriber. The total fund in 1993 was over \$104 million.

F. Link-Up America

For some subscribers, recognizing that the cost of connecting to the network might be as large a barrier as monthly charges are, the FCC in April of 1987 instituted a program called Link-Up America. The Link-Up program consists of two parts. The first part involves the payment of half the cost of telephone installation and connection charges, up to \$30. The Link-Up plan did not require that the other half of the connection and installation charges be covered at the state level. The second part of the program covered the interest charges for any deferred payment plan which a telephone company might offer a customer for the cost of starting up service. The deferred payment plan could not exceed twelve months and the interest costs covered were only for costs up to \$200. As with the SLC waiver program, qualified subscribers have to meet a state-specified means test.

Initially, the Link-Up America plan required the following: (1) a subscriber must meet a state-mandated means test, (2) the subscriber must not be a dependent (unless the subscriber was sixty years of age or older), (3) the subscriber must have lived at an address for at least three months before requesting assistance, and (4) the subscriber must not have received Link-Up America assistance within the past two years. In early 1989, the FCC eliminated the residency requirement and the requirement regarding no previous Link-Up assistance.

In 1993, according to NECA, the Link-Up program covered 875,000 subscribers and included a total fund of over \$18.4 million. The Link-Up program was adopted by forty-eight states, the District of Columbia, Puerto Rico, and the Virgin Islands. Because of the Link-Up plan, approximately 2.2 million subscribers were added to the network.⁸

⁸ Macher, "Universal Service Programs Trends and Issues."

G. Effectiveness of Programs

Despite the shift of NTS to the subscriber, through the imposition of the SLC charge, universal service in the U.S. has not, in the aggregate, seemed to be adversely affected, indeed telephone penetration has increased. In July of 1984, telephone penetration was 91.6 percent; in July of 1992, penetration had reached 93.8 percent.⁹

It is difficult to prove that the strong level of telephone subscribership has been caused, or aided, by the FCC's Lifeline Assistance programs. A recent Bellcore study, however, suggests that the FCC's programs have indeed been beneficial.¹⁰ According to the Bellcore study, states without either the SLC Waiver or the Link-Up programs showed a decline in total subscribership levels, showed a very small gain in subscribership for the elderly, and showed a large decline (over 12 percent) in subscribership levels for households on public assistance. (Bellcore study, page 15)

Conversely, states with either the SLC waiver or the Link-Up program did better than those without either program. States with only the Link-Up program, showed a decline in subscribership for households on public assistance, but that decline was only 1.5 percent, rather than the 12 percent for states without Lifeline Programs. In states with a Link-Up program, gains were made in total subscribership, including low income households and the elderly. Those states with both a SLC waiver and a Link-Up program showed larger increases for low income households and for the elderly, and, perhaps even more importantly, showed an increase in subscribership levels for households on public assistance.

The results of the Bellcore study suggest that the FCC's programs, while not achieving 100 percent telephone penetration, have had some positive effects in getting subscribers onto the network and in keeping them connected. A study conducted by Southwestern Bell of its own Lifeline and Link-Up programs also suggests that those programs have been effective in furthering universal service.¹¹

Each NECA filing to change the USF rate has drawn opposition and complaints from the interexchange carriers. This level of controversy has caused the FCC to institute several investigations into the method used to calculate the USF, and into reasons for what seems to be

⁹ Federal Communications Commission, *Statistics of Communications Common Carriers*, 1991/1992 edition, Table 8.1, 305.

¹⁰ Jan L. Walter, "Assessing the Effectiveness of Residential Rate Assistance Programs in Furthering the Goal of Universal Service," in *Proceedings of the Eighth Biennial Regulatory Information Conference* (Columbus, OH: The National Regulatory Research Institute, 1992).

¹¹ Thomas Makarewicz, "The Effectiveness of Low-Income Telephone Assistance Programs: Southwestern Bell's Experience," *Telecommunications Policy* (June 1991): 223-240.

significant growth in the fund. In Docket 93-123, the FCC sought to determine whether the USF rate is excessive because NECA constantly adjusts the rate to reflect corrections to LECs' historical data.¹²

The FCC has recently gone even further in investigating the USF funding mechanism. As part of CC Docket No. 80-286, the FCC has instituted a rulemaking in which the Commission proposes to adopt interim modifications to the USF mechanism while a full investigation of USF takes place.¹³ The FCC's action results from its concern about the amount the fund has increased since its inception and about the erratic rate at which this growth has taken place.

According to the *Notice of Proposed Rulemaking*, the fund has grown 60 percent since 1986 and that growth has not occurred steadily over the years; instead annual rates of growth have ranged from one percent to more than 19 percent. Although the FCC examines the USF, it seeks to slow down its rate of growth through one of two indexing mechanisms. One indexing method under consideration is capping the total amount of the fund (which in 1993 is about \$700 million) and indexing future increases in the USF fund to increases in the rate of growth in national total working loops. Another mechanism under consideration is indexing the threshold for USF assistance. The threshold is the nationwide average cost per loop; this method would index the increase in nationwide average cost per loop to the rate of growth in the average cost per loop for nonprice cap LECs. Either of these methods would be in effect for two years, beginning January 1, 1994, with the assumption that a full review of the USF mechanism would result in permanent changes.

In its *Notice of Proposed Rulemaking*, the FCC delineates very clearly the underlying conflict involved in the whole concept of the USF. On the one hand, the FCC is disturbed about "the substantial increase in the burden upon interstate telecommunications attributable to growth in the USF."¹⁴ On the other hand, the Commission wants to "avoid substantial decreases in the assistance provided to extremely high cost study areas."¹⁵ The USF is meant to preserve universal service by assisting high cost areas; however, it is supposed to do that at a level which does not interfere with toll competition. These FCC investigations and industry complaints make it clear

¹² Order Designating Issues for Investigation.

¹³ "In the Matter of Amendment of Part 36 of The Commission's Rules and Establishment of a Joint Board," Notice of Proposed Rulemaking, CC Docket No. 80-286, FCC 93-435, 8 FCC Rcd No. 20, 7114.

¹⁴ Notice of Proposed Rulemaking, 7115.

¹⁵ Notice of Proposed Rulemaking, 7116.

that the USF mechanism has been, and remains, a controversial method for targeting subsidies to high cost areas.

H. Rural Electrification Administration

Small telephone companies serving rural areas are able to participate in federal programs intended to assure the availability of affordable, high-quality service. The programs are administered by the Rural Electrification Administration of the United States Department of Agriculture. Direct loans are one of the programs. The loans are made as directed by the Rural Electrification Administration from the Rural Electrification and Telephone Revolving Fund in the U.S. Treasury. The interest rates on these loans is below the market rate and even below the cost of money to the government. In 1990, the average rate that the government paid for marketable treasury issues was approximately 9.5 percent. The average rate borrowers paid for new loans was 5 percent.¹⁶ They borrowed approximately \$230 million in 1990. Another \$180 million was provided to qualified borrowers through the Rural Telephone Bank. Loans through the bank are made at the cost of money of a participating private bank with the Rural Telephone Bank providing repayment surety that the individual borrower could not achieve.

In 1950 borrowers served 29,000 telephone subscribers. Over 5 million are now served.¹⁷ The percentage of U.S. farms with telephone service exceeds 96 percent. Beyond the impressive success implied by these statistics, the programs have also assured quality in the services provided by participants. The individual company projects funded by the programs are subject to the design and construction standards of the Rural Electrification Administration. Those standards are comprehensive in that they include size and technology of switching and outside plant facilities. Standardization attracts suppliers who can depend on a market for quality products designed specifically for the needs of the rural areas. Personnel of the companies can be trained in groups to install and maintain the standard equipment. Finally, the customers have available the modern technology that the standards require.

These programs allow qualifying telephone companies to rely on borrowed funds instead of equity to a much greater extent than do other private telephone companies. Many of the small companies are cooperatives. The customers of the cooperative are its owners, buying a small share of the company as a part of their initial connection fee. Without access to subsidized loan

¹⁶ Case and Ciolek, *Federal Telecommunications Subsidies in the USA*.

¹⁷ The United States Department of Agriculture, *A Brief History of the Rural Electric and Telephone Programs* (Washington, DC: 1986).

programs, this form of ownership would probably not be able to raise sufficient capital to initially build or later modernize rural telephone systems.

Rural service is also provided by more typically organized corporations. Many of the cooperatives and smaller independent companies have been purchased by larger telephone companies in recent years. Under the terms of the Rural Electrification Administration's programs most of the areas served by the original qualified borrowers still qualify for the Administration's programs. As a result, some larger telephone companies receive subsidized capital to modernize these rural areas. Further, the growth of cities and towns has resulted in areas which were once clearly rural and in need of government aid, no longer differing significantly from developed urban areas. None the less, many of these areas still qualify for capitalization assistance. Since funding for these programs comes indirectly from the general tax base and is a very small percentage of the Federal budget while the objective of providing needed services to rural areas is a potent policy argument, the imperfections that may result from changing circumstances have not been sufficient to cause any basic program restructuring. However, the program is vulnerable to change or elimination by the Congress.

I. Universal Service For The Disabled

Universal service is also defined by the physical characteristics of the users. Until the late 1980s it was assumed that the presence of a standard telephone was all that was needed in a household or business to achieve universal service. This approach did not recognize that a significant portion of the population had hearing and visual impairments that made it difficult and sometimes impossible for them to use the public switched telecommunications network. This means, in part, that measuring universal telephone service by the number of houses with telephones overstated the number of citizens that can easily make the receive telephone calls.

At the state and federal level, commissions and the U.S. Congress have acted to redefine universal service and to institute new rules that address the needs of the hearing or visually impaired. In 1990 the U.S. Congress passed the Americans with Disabilities Act (ADA), which contained a chapter exclusively dealing with the provisioning of telecommunications services.¹⁸ The FCC and the state commissions have acted to implement the provisions of ADA. State commissions have also independently developed policies and programs of their own to improve the delivery of telecommunications services.

¹⁸ Public Law 101-336 of the 101st Congress was enacted July 26, 1990 and is cited as the "Americans with Disabilities Act of 1990."

1. Americans with Disabilities Act

The ADA requires interstate and intrastate telecommunications relay services be available, to the extent possible, and in the most efficient manner to individuals in the United States with hearing and speech disabilities by July 26, 1993.¹⁹

The FCC began a rule-making process November 1990 in order to implement the provisions of the ADA, and after consideration of public comments adopted a *Report and Order* which set forth definitions and operational, technical, and functional minimum standards for Telecommunications Relay Service (TRS) providers, and delineated a state certification process.²⁰

Telecommunications relay service allows people with hearing and/or speech disabilities to use the telephone. TRS facilities are equipped with specialized equipment and staffed by communications assistants who relay conversation between people who use text telephones and people who use traditional telephones. Hearing impaired customers may also have their needs met by the use of telex-text terminals.

In Docket No. 90-571, the FCC established rules to have interstate telecommunications relay services (TRS) costs be recovered by a Telecommunications Relay Services Fund.²¹ Every interstate carrier must contribute to the TRS fund on the basis of its relative share of gross interstate revenues.²² Each affected carrier is required to complete a work sheet that identifies its required contribution. The 1992 interstate revenue requirement is calculated in an eighteen-step process where an adjusted interstate revenue amount is multiplied by a contribution rate of 0.00047 for the 1993 filing year. The carrier payment can be made in either one payment or seven equal monthly payments. Payments are due in whole or in part by September 26, 1993. After 1994 payments may be made in twelve equal payments.

¹⁹ Federal Communications Commission Docket No. 90-571, 1.

²⁰ Federal Communications Commission Telecommunications Services for Individuals with Hearing and Speech Disabilities, and the Americans with Disabilities Act of 1990, Order on Reconsideration, Second Report and Order, and Further Notice of Proposed rulemaking, 8 FCC Rcd. 1802 (February 25, 1993).

²¹ Federal Communications Commission Telecommunications Relay Services and the Americans with Disabilities Act of 1990 (CC Docket No. 90-571) Washington, DC: Federal Communications Commission Adopted July 15, 1993.

²² This includes interstate cellular, paging, mobile radio, operator services, personal communications services, access, alternate access and special access, packet-switched, WATS, 800, 900, message telephone service, private line, telex, telegraph, video, satellite, intraLATA, international, and relay services. Carriers that provide only intrastate service do not have to file the work sheet, however, all local exchange carriers providing interstate access must file.

Because of its extensive experience in administering pooling arrangements, such as the USF and the Lifeline Assistance programs, the FCC selected the National Exchange Carrier Association, Incorporated (NECA) to act as the interim administrator for two years. During the two year period, NECA is to file monthly reports, file a cost allocation manual, and have its books audited by an independent firm. NECA is required to keep the TRS fund separate from all of its other funds. The performance of NECA will be evaluated by the FCC after two years.

An unpaid voluntary advisory committee to NECA was also established. Committee representatives are to be from the speech and hearing disability community, TRS users (voice and text telephone), interstate service providers, state representatives, and TRS providers. The committee must meet at least semiannually.

The FCC considered and rejected exempting resellers because of the double-counting that could occur.²³ The FCC also ruled that all carriers subject to Part 32 of the FCC rules must record their TRS contribution in their books of accounts in the manner prescribed by the Uniform System of Accounts. Federal SLCs may accordingly increase.

The 0.00047 contribution factor is based on an estimate of the ratio of expected costs for providing interstate TRS for one year and the interstate revenue base. A first year TRS estimate of \$30 million for 14 to 17 million minutes of interstate TRS was used. This assumed a payment of about \$1.705 per interstate TRS minute, administrative expenses of \$312,000, and other costs of \$1,367,000. An interstate revenue base of \$64,464 million was used in the calculation. The contribution factor for subsequent years will be adjusted as appropriate if projected costs change.

Other important administrative details include determining the following:

- (1) Minutes of use is the appropriate measure.
- (2) Payments shall only be available for interstate TRS.
- (3) Only TRS providers in compliance with FCC minimum TRS standards can be paid.
- (4) TRS providers will report required information to the NECA fund administrator. This information will be used to calculate a national average TRS minutes of use rate in order to distribute payments to TRS providers. This rate is subject to FCC approval and is subject to FCC audit.

²³ Double counting occurs when the interstate carrier records a sale to (or revenues gained from) the reseller and when the reseller records a sale to an end user.

The FCC ruled that interstate TRS must be provided by July 26, 1993. In September 1993 the FCC approved NECA's estimate of a \$1.705 rate of payment to TRS providers per interstate minute of use.²⁴

2. State Disabilities Assistance Actions

State regulatory commissions have taken a number of actions to implement the provisions of the Americans With Disabilities Act. These include certifying service providers, establishing funding mechanisms, and oversight regarding the distribution of equipment.

Two sources of information about state regulatory commission actions have been identified and each is discussed below.

a. 1992 NARUC Survey

Each year the National Association of Utility Regulatory Commissions (NARUC) surveys its member state commissions on a variety of issues. Its most recent issue covers 1992 and had data on the status of state programs to help the disabled. Questions were asked about the availability of telephone equipment for the hearing impaired and revealed that in eleven states the Bell company LEC provided equipment and in ten states this was also done by nonBell LECs. In fourteen instances the provisioning was described as unregulated. Twenty-three states said that the Bell LEC did not provide equipment. Some states provide this equipment free of charge to the user, or by a tariff surcharge, and three states have some form of a tariff. State commissions were not the lead state agency and most equipment provisioning was done by state disabilities agencies.

Forty-two states report having a statewide program funding statewide dual-party relay (DPRS). All but seven states have the DPRS operated by a local or interexchange carrier. Only two states reports using tax revenues. Most states use a surcharge and some implicitly fund it out of existing rates. Nearly all states offer reduced rates and reduced directory assistance charges to handicapped individuals.

b. TACIP 1992 Survey of Equipment Distribution

²⁴ A number of implementation issues have arisen where affected parties have asked the FCC for clarification or relief. The general thrust is that specialized carriers have asked that they not be required to make adjustments in their current mode of operations. A number of these relief petitions are under consideration.

A state survey conducted by the Telecommunications Access for Communications Impaired persons (TACIP) revealed that the states with the most comprehensive programs are California, Minnesota, Massachusetts, and Montana.²⁵ In its survey of the twenty-three states with equipment distribution programs, thirteen are funded by a surcharge on telephone bills, six are supported by state tax dollars, and others are funded through an assortment of mechanisms. One interesting point observed in the data is that a relatively small amount of equipment has actually been distributed.²⁶

Because the TACIP survey took place later than the NARUC survey it shows slightly different totals as states acted to meet the ADA deadline. The NARUC survey is more comprehensive, however. The big picture is that surveys and inventories show the states have implemented programs to provide assistance to individuals with disabilities. Each state has had considerable latitude in selecting service providers, distributing equipment, designating a lead state agency, and in determining how to pay for the assistance.

c. Outreach and Consensus Building

Some state telecommunications assistance programs have been accompanied by well organized outreach and training programs. Outreach efforts are designed to educate the affected impaired sectors of the population about the availability of services. These efforts have generally involved a number of governmental and nongovernmental agencies. A recent outreach program in Minnesota was comprised of several disabled groups (such as, Self Help For Hard of Hearing People) along with representatives from the state department of education, the Governor's Advisory Council, the state public utility commission, the state department of human services, vendors, and telecommunications carriers. Unlike some other telecommunications programs that also explicitly advance social goals, the effort to help the disabled is a new area where all parties have deliberately taken extra steps to communicate and mutually explore each party's role. In this

²⁵ The Telecommunications Access for Communications Impaired Persons Board is a board established by the governor of the state of Minnesota. It is an interdepartmental group assigned by the Minnesota governor the responsibility for message relay and the equipment distribution program.

²⁶ Data in the survey are not easily comparable, but the magnitude suggests that no more than a small fraction of one percent of the residential customer base is a recipient of these assistance devices. Whether this means that individuals already have these devices, or do not know how to request or use them is not able to be determined. From a public policy view point if the population is now well served, then future costs should remain stable. If the disabled population is still under served, then these assistance costs should be expected to increase. Disability advocates generally use population estimates far in excess of the numbers reported in the survey.

sensitive arena, the consensus-building that has occurred has been visible and very helpful to regulators and policymakers.

This consensus building has been very useful and state regulatory commissions have been able to avoid having to design disability assistance programs from scratch and in a substantive area where they typically had no established expertise. Carriers have benefitted from this consensus-building approach as the services desired are thought to be better defined and the funding mechanisms more easily established. This level of consensus may decline somewhat as harder and more costly choices need to be made.

One illustrative example of outreach and consensus building can be seen in a recent conference²⁷ where participants were asked (among other things) to identify the barriers they felt impeded with their ability to make better use of the public switched telecommunications network. Barriers identified included

- * difficulty in using a computer keyboard,
- * availability of amplified and TTY-equipped public telephones,
- * lack of access to voice mail or other voice processing services for a person using TTY or the relay,
- * lack of in-home training, and
- * need for adequate information and referral services about equipment that is available.

J. Other Related Implementation Issues

1. Recent Developments

a. Federal Equipment Purchases

Section 508 of the Rehabilitation Act of 1973 was amended to specify that electronic equipment purchased or leased by the federal government must be useable by individuals with disabilities. Given the federal government's huge purchasing power and its de facto ability to

²⁷ World Institute on Disability, 'Minnesota STAR Program Co-Sponsors October Training Session,' *WID Blue Ribbon Panel News 2* (January 1993): 1.

influence industry standards, amended Section 508 will affect the design of electronic data bases, information services, and e-mail.²⁸

b. Personal Communications Systems

The FCC has also initiated Personal Communications Systems (PCS) proceedings. Comments received from several groups commented on the need for the PCS to be classified as common carriers so as to ensure that PCS providers would be included under the accessibility requirements of the Americans with Disabilities Act. In Order 90-314, the FCC concurred with the argument and designated PCS license holders as common carriers.²⁹

c. Aging Population

The original vision of the ADA was clearly directed to meeting the specialized telecommunications needs of a relatively small but important sector of society. With the growing percentage of older Americans, it is thought that the need for enhanced services will also grow in the future. The number of hard of hearing, physically disabled, and visually impaired are expected to increase as the average age of the U.S. population increases. The implication here is that the cost of guaranteeing that visual and hearing impairments will not interfere with access to the public switched telecommunications network will increase. The implications is also that these services will be more universally expected and accepted.

A public policy dilemma arises because these costs may rise just as telecommunications markets become more competitive. It may become more difficult to ensure that all telecommunications carriers (or their customers) proportionately contribute to the cost of service to the handicapped. This is likely to be a cost recovery problem rather than a standards enforcement issue. The ADA funding mechanism looks like it would have sufficient flexibility to

²⁸ The amended act says that the federal government, industry, and ...the Interagency Council on Accessible Technology, shall develop and establish guidelines for federal agencies for electronic and information technology accessibility designed to insure, regardless of the type of medium, that individuals with disabilities can produce information and data, and have access to information and data, comparable to the information and data, and access, respectively, of individuals who are not individuals with disabilities. WID, "Section 508 of the Rehabilitation Act is Amended," *WID Blue Ribbon Panel Newsletter* 2 (January 1993): 2.

²⁹ Amendment of the Commission's Rules to Establish New Personal Communications Services (GEN Docket No. 90-314) Adopted September 13, 1993.

deal with an increase in the disabled population. It is unclear, however, if consensus will continue if the current \$30 million figure becomes much higher.

d. Multimedia Responsibilities of LECs and IXC

It is not clear if the ADA deals with the full range of telecommunications services, beyond voice. The network of the future will use voice, text, video data, and multimedia modes of communications. The enhanced services now available are ways of ensuring that voice communications can be achieved and are not able to assist regarding other communications media. It is not clear what procedures, software, or technology would be required to assure full multimedia access. It seems reasonable to assume that costs would increase significantly if a full multimedia standard were used.

CHAPTER IV

TWO STATE PROGRAMS

State commissions pursue universal service objectives in the various proceedings that come before them. The previous discussion has identified many avenues of contribution to universal service. It is the states that craft the detailed implementation for most of them. The two federal subsidy programs, Life Line and Link Up America, the REA loan program and the NECA pool are the principal contributions from the federal side. The FCC supervises interstate rates and encourages rate averaging to help assure that interstate toll is affordable and available to all. Federal programs such as open network architecture encourage the availability of the public network for the delivery of services from all potential providers. Under the division of authority between the states and the federal government, once the FCC has established regulation over a subject, the states are preempted from establishing rules or requirements which are contrary to the federal mandates. However, the federal regulators are limited in the degree to which they can exercise jurisdiction. The Communications Act of 1934 established the national policy of dual regulation. The principle of primary state governmental authority with federal preemption when the interests of the nation make individual state prerogatives contrary to the public interest is a basic tenet of the United States Constitution and is not unique to regulation. A formally recognized federal preference for a shared role for states and federal agencies, such as that found in the provisions of the Communications Act, is not so common. The FCC is held to a high standard by the federal courts and needs to show that their regulations both serve the national interests and that there is a necessity of preemption of contrary state regulations. If it is possible for contrary regulations to coexist without harm to the national interest, then conflicts are permitted.

In addition to the legal framework that assures a role for the states, there is a tradition for state regulation to serve as a laboratory of regulatory innovation. Each state is unique. Individual issues may become critical in one state long before it is of importance in other states or nationally. The state can use its regulatory authority to design a solution for the issue. Over time several states may examine an issue within the context of their circumstances and develop their own, possibly unique, solution. The experience gained in the states can help in the formulation of a federal policy should the issue ultimately escalate to national significance. If the issue can be dealt

with at the state level, the experience of the early states is valuable for other states taking up the issue later.

The experiences of two states that have been traditional leaders in issue development are reported in this chapter. These states are not necessarily the most advanced in dealing with each of the discussed issues but they have dealt with a wider variety of the issues than most other states. Some states have not substantially evaluated the discussed issues, however, every state has imbedded universal service considerations in many of its policies.

State regulators participate directly in federal regulatory forums in addition to their roles as direct regulators of intrastate telecommunications carriers and as laboratories for the development of regulatory methods. Individual states file comments in FCC proceedings. They advise their Congressional delegation on utility matters. States challenge FCC orders in the courts. They serve on committees and boards set up by the FCC to advise it on certain matters. The states pursue these activities individually and through the Nation Association of Regulatory Utility Commissions (NARUC). Universal service is an active topic with the NARUC. A resolution was recently passed (Appendix A) setting out NARUC's views on universal service. A committee of staff experts from various states are analyzing universal service issues for use by the NARUC and its members, as indicated by the preparation of the current report.

Direct use of their authority to regulate state services is the main work of the state commissions. California and New York are among the most active commissions in addressing universal service topics. The following descriptions of their activities is indicative of the scope of the activities that other states may address.

A. California

The California Public Utilities Commission (CPUC) has undertaken several actions to define and extend universal service by efforts directed at the disabled, the size of the local calling area, lifeline services, outreach to the under served, elimination of tone dialing, and intraLATA competition. These efforts are not in response to federal mandates and nicely illustrate the range of independent activities state regulatory commissions may undertake.

1. Disabilities

In 1990 the CPUC established a \$31.6 million budget to provide telecommunications equipment and services to the deaf, hearing impaired, speech impaired, and disabled. The funds are provided by a .3 percent surcharge on all telephone calls made within California.¹ In 1990 the CPUC announced its intent to design a Request For Proposal in order to receive bids to provide deaf relay service, the operated by AT&T. In October 1991, the CPUC announced that relay service would be taken over by Sprint under a contract that may provide \$18.1 million in additional revenues to Sprint.²

2. Lifeline Telephone Service

The CPUC has ordered telephone companies in the state to use, by July 1, 1990, a 3.4 per cent surcharge on long distance calls to fund the Universal Lifeline Telephone Service (ULTS) fund. The goal of ULTS is to provide funding to ensure that every household can have basic telephone service.³ The surcharge is based upon a need for \$165.6 million in order to operate the program and is an increase in the surcharge from 2.5 per cent. In 1993 it was estimated that annual operating costs for ULTS was \$240 million. By mid-1993 2.3 million customers were served.⁴ This represents an increase from March 1990 when there were 1.5 million ULTS lifeline subscribers. The program had 0.2 million subscribers in February 1989.

¹ "California PUC Sets 1990 Budget For Deaf And Disabled Telecommunications," *NARUC Bulletin* no. 18-1990 (April 30, 1993): 9.

² "California PUC Announces Sprint Will Operate Phone Service For Deaf, Disabled," *NARUC Bulletin* no. 42-1991 (October 21, 1993): 15-16.

³ "California PUC Increases Lifeline Telephone Service Surcharge," *NARUC Bulletin* no. 23-1990 (June 4, 1990): 11.

⁴ "California PUC Orders Study of Lifeline Telephone Service," *NARUC Bulletin* no. 25-1993 (June 21, 1993): 25-26.

ULTS program participants must meet the following income requirements

Household Size	Income Limitation
1-2	\$13,000
3	\$16,000

For each additional member of the household add \$3,200.

3. Expanded Local Calling Areas

The CPUC ordered rate decreases in a four-county area around Los Angeles by expanding the zone for reduced rates for long distance calls from 8 to 16 miles. A Zone Usage Measurement (ZUM) rate is in effect in this zone that is lower than toll rates. It is estimated that this change will save consumers \$43 million per year.

First Minute

Calling Distance	ZUM	Non-ZUM
ZUM Zone 2 (8.1 - 12.0 miles)	\$0.08	\$0.17
ZUM Zone 3	\$0.10	\$0.20

Each Additional Minute

Calling Distance	ZUM	Non-ZUM
ZUM Zone 2 (8.1 - 12.0 miles)	\$0.02	\$0.07
ZUM Zone 3 (12.1 - 16 miles)	\$0.04	\$0.10

The ZUM rates were initiated in 1980. The lowered toll revenues to the two affected utilities are to be recovered through a surcharge of 1.749 percent of local base rates for General Telephone customers Except access) and 0.4 per cent for Pacific Bell customers. The change in rates was based upon the rapid growth since 1980 and the cost efficiencies possible from change overs in central office equipment.⁵

4. Outreach Efforts

The CPUC has used funds from a \$16.5 million Telecommunications Education Trust (TET) fund to develop innovative programs that address universal service and other needs. The TET fund was established from penalties levied by the CPUC against Pacific Bell for marketing abuses in 1985-1986 that directly affected limited English speakers, low income or inexperienced consumers, other residential customers and small business owners. Programs funded have helped Latino students, farm workers, American Indians, Korean youths, schools, and consumer groups. The TET fund is administered by the California Community Foundation of Los Angeles, a nonprofit organization.⁶

5. Elimination Of Tone Dialing Charges

Effective February 1, 1991 a CPUC order eliminated separate tone dialing charges for residential and business customers. This is intended to open up to more customers the time-saving and cost-effective telecommunications services which can be accessed through tone dialing. Revenue shortfalls for the twenty mid-size and small telephone companies, as well as for Pacific Bell and General Telephone will be recovered through increased rates for other telecommunications services.⁷

⁵ "California PUC Expands Zones Offering Reduced Rates For Toll Calls From 8 to 16 Miles Long," *NARUC Bulletin* no. 26-1990 (June 25, 1990): 17-18.

⁶ "California PUC Telecommunications Trust Funds 21 Projects," *NARUC Bulletin* no. 28-1990 (July 9, 1993): 23-24. See also, "California PUC Telecommunications Trust Funds 10 Projects," *NARUC Bulletin* no. 39-1990 (September 24, 1993): 14-15.

⁷ "California PUC Eliminates Touch Tone Charges For Residential And Business Phone Customers And Expands Local Calling Area To 12 Miles," *NARUC Bulletin* no. 51-1990 (December 17, 1993): 16-17.

6. Expansion of Local Calling Areas

The CPUC ordered all local telephone companies to expand their local calling areas from eight miles to twelve miles, effective June 1, 1991. Customers can look at their local calling patterns and decide whether a flat rate or a measured rate service would save them money. Residential customers were allowed to change back and forth between flat and measured service, up to two times, between June and August 1991 in order to see which service is least costly to them.⁸

7. IntraLATA Competition

The CPUC voted September 17, 1993 to allow local or intraLATA toll calls using whatever company offers the best price by dialing 1-0 and the company's three-digit code. A 1994 hearing will be held to decide if LECs must give customers the same presubscription rights they had with interLATA toll calling. More than ninety companies have signed up for certification. Basic rates will go up, and Pacific Bell's flat monthly rate will go up from \$8.50 to \$13 a month. Pacific Bell President Quigley says the rise in basic rates will bring the rates closer to cost and lower toll rates.⁹ The CPUC projects that the average customer's total monthly bill will be lower.

B. New York

New York has its own lifeline program funded from rates charged by LECs. The state's fund contributes approximately \$30 million per year to assist low income customers receive telephone service. Of the approximately \$110 million dollar FCC supervised fund, New York receives about \$25 million. Qualifying customer discounts for basic service from the state fund are nearly \$6 per month¹⁰. This makes basic service available for as little as one dollar per month plus usage charges. Installation charges are as little as \$10. Of the approximately two million

⁸ Ibid.

⁹ Charles Mason, "California IntraLATA Competition Gets Green Light," *Telephony* (September 27, 1993): 7.

¹⁰ The Honorable Lisa Rosenblum, Commissioner New York Public Service Commission, Remarks at the Symposium on Universal Service, Columbia University, October 15, 1993, unpublished.

households eligible for assistance only 490,000 subscribe to the state lifeline program. The \$30 million dollar cost of the program is .6 percent of the \$5.5 billion local exchange intrastate revenues.

The lifeline program is small in comparison to the general support of basic residential service. Company estimates of the costs of residential general support at nearly 20 percent of the intrastate revenues. These estimates are based upon company defined "total" costs and are not endorsed by the commission, but they do indicate that targeted programs may be substantially more sustainable than general price reduction methods.

On the funding side of the universal service equation, the New York commission has instituted a system that requires all carriers who use the public switched network to contribute to the USF.¹¹

Privacy protection was added to the basic service requirements in New York. With the approval of calling number identification services the commission required both per line and per call blocking. These protections are unlikely to surface without regulatory (or legislative) intervention because blocking decreases the value of the number identification service to its subscribers.

One New York commissioner¹² suggested that the availability of terminal equipment, such as computers and modems, deserves attention within the universal service concept. She recognizes that the funding constrains the options for pursuing the necessary elements for access to information services. Possible distribution through schools and libraries is suggested as an alternative.

The Governor of New York has established a thirty one member committee to make recommendations for a communications strategy for the state. The committee is preparing a report and has written a draft. The principal thrust of the recommendations¹³ is directed toward creating an environment of effective competition. Interconnection issues, carriers who maintain market power in particular service markets, and universal service are all issues that must be considered in devising the state's telecommunication strategy. These issues contribute to the recommendations which would strengthen the role of the public service commission by bringing cable TV operators under its auspices. The draft report stresses the need to equalize the regulatory and tax policies among competitors in telecommunications markets. Carrier of last

¹¹ NYPSC, Case no. 91-C-1174, Order, December 18, 1992.

¹² Rosenblum, op. cit.

¹³ As reported in *Telecommunications Reports* (November 15, 1993).

resort responsibilities would be placed on cable and telephone carriers maintaining monopoly power in particular service markets or regions.

Funding for universal service should come from "all providers in the `network of networks'... including those) e.g. cable television) that provide both transport and content services." The funds collected for furtherance of universal service would be used "by individuals to obtain basic services from any provider."

Perhaps the most innovative recommendation in the draft is the definition of what comprises universal service. Presuming that competition would arise in at least some sectors of the state, the universal access and service fund should be established to foster access "reasonably similar to the level of access being provided to like market segments) e.g. residences, schools, hospitals) in areas where competition is effectively driving infrastructure deployment." Within this context, infrastructure deployment apparently includes not only physical facilities but the services that those facilities support.

Finally, in regard to infrastructure, the report suggests that the state regulatory commission, in conjunction with the Governor's Office of Telecommunications Policy, should develop a set of criteria or benchmarks to measure New York's progress toward advanced telecommunications networks. The benchmarks might target particular services and establish timeframes for their deployment. The purpose of those targets would be to detect failures in the markets or the regulatory processes to provide sufficient deployment of needed services. This recommendation, if adopted, may provide an interesting test of the effectiveness of oversight without prespecified consequence on the providers operating in competitive and mixed markets. It is not known if the performance of providers will be influenced by the specifications of telecommunications goals in a framework of periodic review. Given the potential of imposition or reimposition of regulatory requirements on the providers if the targets are not met, the carriers may have significant incentives to meet the targets.

New York is a state that has traditionally been at the forefront of regulatory innovation. The initiatives recommended in the report may be adopted in whole or in part there. To the extent that they are, and are successful, they may be models for other states.

Appendix B has a sampling of reported activities in some other states. Many state proceedings have universal service ramifications as most states imbed their universal service policies in other decisions and initiatives.

It would be nearly impossible to report all of the universal service activities of the fifty states and the District of Columbia. In part this is true because state regulators include universal service considerations in almost every action taken, or rule and policy developed. It is difficult to conclusively document this integrated and intrinsic universal service perspective because state regulators consider it so self-evident that it often is not explicitly stated. Partial proof of the

pervasiveness of regulators' universal service concerns can be seen by asking, "What commission policies, actions, and rules would have taken place without universal service goals?" The answer is, few.

CHAPTER V

OVERVIEW OF CURRENT ISSUES

A. Universal Service

As indicated throughout this report, for many years, universal service has been a guiding principle of the telephone industry and its regulators. The degree to which the objective of universal service has been met is measured by the use of basic services by households, quantified by penetration. The technical advancement of telephone service has been incorporated in the universal service objective by minimum service standards promulgated by regulators. This concept of universal service is not sufficient to address the universal service objective as telephone service becomes technically more complex and the markets for telecommunications services shift from monopoly to competitive.

The technical capability of the telecommunication network provides an increasing array of services. Capabilities that add value to service, such as call waiting services and tone dialing, have differing value to different customers. Simply adding such capabilities to the minimum service standards and bundling their provision with other services fails to recognize that not all customers value these services. Enhancements to the transmission capacity of the services also have differing value to different customers. Some customers would value and could use data transmission enhancements, or video dial tone, or other levels of transmission capability, but not all customers would find those enhancements useful. Basic service definitions within minimum service requirements are not likely to be expanded to include mandatory provisioning of services or enhancements that many or most customers would not find useful. A more likely alternative is the establishment of minimum availability standards identifying requirements for network capabilities to be extended, so that individual customers can choose the services they need.

The establishment of minimum standards, be they a definition of basic service or a definition of service availability, is a primary vehicle for regulators to delineate the public interest and impose the public interest requirement on service providers. If the regulator chooses to consider universal service only as a matter of defining basic service, then the availability of other services is determined by the self interest of the service providers, the LECs. If there is a public interest in availability differing from the self interest of the LECs, the regulator should impose availability requirements on the companies.

B. Federal

1. Revising the Definition of Universal Service to Universal Access

In an era of such rapid change in telecommunications services and capabilities, and such quick introduction of new industry players, it is imperative to decide what universal service should be and who will deliver it. In an age of interactive video, cellular telephony, and electronic databases, universal service is bound to become more than the assurance that, for a reasonable price, subscribers will receive dialtone and the ability to access any telephone number of their choosing. In its *Infrastructure Report*, the NTIA lists the components of a "current, reasonable" definition of universal service as including "one-party, voice-grade service with rotary dialing, the ability to receive and place calls, and access to and direct dialing of local and toll calls."¹ However, the authors of the *Infrastructure Report* urge regulators to go beyond a universal service concept which merely includes a package of very basic services. For the future, the NTIA authors offer a concept called advanced universal service access (Advanced USA). This idea involves access for all users to an advanced telecommunications infrastructure. What is significant about this concept of Advanced USA is that services will be available from a host of providers, and not just from the traditional public switched network. As the authors put it, "an important component of Advanced USA is the recognition that services or capabilities need not be available only through a traditional common carrier, such as a LEC or IXC."²

The concept of universal access is an interesting one because it actually makes competition a component of universal service. Instead of focusing on the public switched network provision of basic services, this new concept places a premium on the public switched network's ability to provide access to other services. This change in focus means that the regulatory emphasis is on issues of interconnection and nondiscriminatory access, rather than on issues of affordable pricing and provision of basic services. This change in focus is evident at the federal level. The emphasis of the FCC has been on opening the network to competitors, through such proceedings as open network architecture (ONA) and expanded interconnection. The preservation of universal service is mentioned in these proceedings but not emphasized and discussed.

2. A Network of Networks

¹ *The NTIA Infrastructure Report: Telecommunications in the Age of Information* (Washington, DC: U.S. Department of Commerce, October 1991), 304.

² *Ibid.*, 305-306.

The changing focus to a universal access model in effect changes the topology of the public switched network. In prior years, when there was one network provider (the AT&T system and a series of independent telephone companies), the emphasis was on preserving a seamless network topology. No part of the network was open to competition. The network itself was a seamless whole. Within this seamless whole, a system of pricing subsidies was put into effect, with the overt purpose of keeping local rates affordable.

With the advent of competition, the network was no longer seamless. The first inroads of competition were at the edges of the network. CPE and inside wire were deregulated and opened to competition. Thus, CPE and inside wire investment were taken out of the LEC ratebase. Long distance competition opened the "long lines" portion of the network to competitors. To accommodate this change, as we have seen, access charges replaced separations and settlements procedures. Some semblance of former subsidies were retained in the access charge structure through Long Term Support, USF funds and Lifeline Assistance, all efforts made to keep subscribers on the network and to preserve geographic toll averaging.

Competition is now moving into the rest of the network, into portions of the LEC network. In recent proceedings, the FCC has determined that competitors can bring their own circuit equipment into the LEC central office to compete with the LEC by offering an alternative transmission route from LEC switches to interexchange facilities and between LEC switches.³ The expanded interconnection proceeding at first allowed competition for transmission of dedicated facilities (special access) and then moved on to competition in the transmission of switched access facilities, including competition in signalling and routing. The FCC in this proceeding has explicitly stated that interconnection charges levied on the LECs' competitors will not contain subsidy payments.

The introduction of competition into all parts of the network has created a topology which encourages a "network of networks." In this topology, service providers, and customers, can connect to the public switched network at any point and can leave the network at any point. Such a topology is in keeping with the concept of universal access. Competitors and customers can choose to use some portion of the LEC network for some services and to seek alternatives for others. Customers can use parts of the LEC network to reach other service providers. What happens to the complex subsidies built into the LECs' service pricing structure, as a result of this change in topology to a network of networks, is not clear. It is possible that LECs may experience shortfalls in revenues and may have to increase local rates in order to generate enough revenues to cover costs and attract investors.

³ See, "In the Matter of Expanded Interconnection with Local Telephone Company Facilities," CC Docket 91-141, 7 FCC Rcd, No. 23 (1992).

Certainly the introduction of competition into the LEC network promises to have some potential effect on geographical toll averaging. In order to compete with alternative providers, LECs are restructuring their rate structures for transmission facilities to include zone density schemes.⁴ These zone density pricing plans change former access charging structures, which charged interexchange carriers the same rate for all routes of similar mileage, into pricing structures which charge differently for high density routes and for lower density routes. High density routes are charged a lower rate. The potential impact on toll averaging may be significant.

The last portion of the LEC network which will experience competition is the local loop. One can assume that the other portions of the LEC network have drawn competitors because they offer the promise of profit. In other words, they have been priced above cost and so offer the competitor a profit margin. If the local loop has been the target of years of subsidization, then it is priced under cost and so offers no such profit margin. Indeed, it should offer the prospect of a loss. Given such a situation, is it possible to have viable local loop competition?

In New York State, which is seeking to implement local loop competition, this question has led the New York State Public Service Commission to suggest that the LECs provide a subsidy to subscribers who seek to purchase local loop service from a competitor. The subsidy is designed to make the competitive loop affordable to the subscriber. The prospect of the LEC, which has been the recipient of local loop subsidies, in effect providing a subsidy to its competitors is innovative. However, there are service providers who are anxious to use this and other mechanisms that will allow them to compete for the local loop.

3. Balancing Competition with Universal Service

There are a growing number of contenders willing to provide alternatives to all LEC services, including the local loop. Cable companies are anxious to provide voice and data services over their facilities. The emerging PCN/PCS industry will provide what may become a very attractive competitor for the local loop, a competitor which offers something the wireline loop cannot: portability. Competitive access providers (CAPs), which have been in competition with LEC exchange facilities, stand poised in time to compete for the loop, as well. And there are combinations of these service providers; cable companies seeking to merge with PCS providers and with CAPs to form networks which can eventually totally bypass LEC facilities.

⁴ See, "In the Matter of BellSouth Telecommunications, Inc, GTE Service Corporation, Lincoln Telephone and Telegraph Co., NYNEX Telephone Companies, Pacific Bell, Rochester Telephone Corporation Zone Density Pricing Plans," Order, DA 93-726, June 18, 1993.

In this dizzying array of potential services and service providers, the question still emerges: Who will be responsible for providing universal service? As long as there is a universal service mandate in the Communications Act, this is a question that cannot be ignored. It is a question that will be difficult to answer, however; and it is a question that legislators and regulators have not yet fully addressed.

Congress, in seeking to provide an advanced infrastructure for the U.S., is considering legislation which will encourage a wide variety of players to invest in telecommunications facilities. The legislation, Senate Bill 1086, hopes to encourage investment by allowing telephone companies into the cable business and by opening the local service arena to competition from all comers.⁵ Senate Bill 1086 assumes that competition will drive prices down and so enhance universal service. The Senate Bill also notes, however, that regulators should take all steps necessary to preserve universal service for rural areas and for all subscribers. The Bill is silent about what these steps should be.

In this new competitive environment, should the LEC be the only carrier of last resort? Who should be subsidized? Should subsidies be targeted to subscribers, so that they can buy services from their provider of choice? Should specific providers be subsidized so that they can provide service in less-than-profitable areas? At the present time, only the LECs and AT&T are carriers of last resort. Subsidies, except for Lifeline Assistance, are targeted at LECs through long term support and USF mechanisms.

In an environment in which only the LECs receive subsidies, alternative providers may find themselves at a disadvantage. A recent proposal to the FCC made by MFS Communications suggests that this environment be changed to reflect the new competitive environment. In its proposal, MFS recommends that a new fund, a "Universal Service Assurance Fund" be established and administered by a neutral third party chosen by competitive bid.⁶ This new fund would be targeted to subscribers, not to companies. Eligible subscribers would include those with low incomes, those with special needs, and those living in rural areas. All telecommunication service providers would pay into the fund at a level which would be determined on a consistent and competitively neutral basis.⁷

⁵ See, Senate Bill 1086, Telecommunications Infrastructure Act of 1993, Congressional Record-Senate, S 7023-7028, June 9, 1993.

⁶ MFS Communications Company, Inc., Petition of MFS Communications Company, Inc. for a Notice of Inquiry and En Banc Hearing, a Petition to the FCC, November 1, 1993.

⁷ See, Charles Mason, "MFS Seeks Overhaul of Universal Service," *Telephony* (November 8, 1993): 9-10.

The reaction to the MFS proposal has been mixed. However, the proposal does point to the need for regulators to review the subsidy systems now in place, and to review systems based on a now outmoded vision of the public switched network, and to arrive at alternative approaches which recognize the increasingly competitive environment.

C. State

1. A Survey of State Commissions

In October of 1993 a survey of state commissions was conducted by the NRRI to collect information on their current universal service practices, the costs of their programs and attitudes concerning the future of universal service. The responses from this survey were combined with state responses to a contemporaneous survey, where appropriate, that was conducted by a National Association of Regulatory Commissions staff team, formed results in an information base of thirty-three states.

The first part of the survey deals with policies and programs currently in effect.

2. Universal Service

Only 22 percent of the respondents reported having a written definition of universal service and only 6 percent reported having a recognized measure for it. Eleven percent of the respondents reported having actually established universal service as a specific objective. The conclusion is that universal service, while clearly an integral part of the telecommunications programs of the United States, is not necessarily explicitly pursued as an independent goal, but rather is included pervasively in the relevant considerations framed as other undertakings. For example, the ratemaking policies which contribute to affordable rates are not flagged as universal service policies but rather as ratemaking policies.

3. Basic Telephone Service

Twice as many states, 44 percent, reported having a written definition of basic telephone service as have a universal service definition and 81 percent have minimum service standards. In examining the responses, the authors conclude that the remainder of the states probably rely on their oversight of individual company tariffs to assure that LECs are required to supply adequate basic service. Extended area service is a specific basic service requirement in only 45 percent of the responding states. Again, company tariff requirements may be the vehicle for definition of the minimum local calling area in the remainder of the states. All responding states indicated that the carrier has an obligation to serve throughout a defined service territory. Just under one half (48 percent) reported that there are geographic areas within the state that are not assigned to any LEC. The conclusions are that the states have approached the universal basic service definition from the perspective of defining carrier requirements, i.e. minimum service standards. This is to be expected because, after all, it is the carriers that are regulated, not the markets nor the customers.

4. Intrastate Toll

Ninety-five percent of the states reported that interexchange carriers provide intrastate service with all carriers paying access rates, and 47 percent of those involved in some sort of sharing mechanism among LECs. A greater percentage (61 percent) reported that LEC toll revenues are subject to sharing among the LECs within the state. Not all of the 61 percent reported sharing is necessarily toll revenue pooling. Some respondents may have considered compensation mechanisms for shared facilities or billing services as sharing mechanisms. The responses were not sufficiently specific to determine the nature of the sharing.

5. Network Modernization

Only twenty-one states responded to the questions concerning network modernization. Of those 62 percent reported monitoring network facilities deployment plans of regulated LECs. Approximately one half of those monitoring the plans reported actually approving them. Fifty-five percent of the responding states said they monitor the service deployment plans of companies, 30 percent indicated that they did establish specific service deployment plans. The lower response rate to these questions may indicate that nonrespondents are not active in monitoring the LECs plans so care should be exercised in gauging the degree to which commissions use planning intervention as a universal service methodology.

6. Affordability

The next series of questions dealt with the mechanisms currently in use to provide funding support for universal service objectives. The following five mechanisms can be considered pervasive from the responses:

- (1) price averaging,
- (2) rate preferences by customer class,
- (3) premium pricing of discretionary services,
- (4) targeted end user subsidy, and
- (5) surcharges to support specific services.

Eighty five to one hundred percent of the respondents said that these five mechanisms are used in their jurisdiction to support universal service objectives.

Fifty-two percent reported that they felt that protection of LEC markets from competitors currently contributes to universal service funding. Thirty-three percent recognized contributions from other carriers. These two mechanisms can be considered a second tier of recognized support.

Only a few states recognize capital subsidization, state government traffic dedicated to the public switched network, and special tax treatments as funding sources. Positive responses to these mechanisms ranged from 10 to 14 percent.

One state, New York, reported charges on bypassers as a funding source for universal service. New York's program to charge alternative loop providers a fee for universal service support at the point of connection to the public network is the mechanism they have implemented for this purpose.

No state offered quantification of the level of support generated by any of the identified mechanisms nor did they have any studies that measured the price elasticity of demand for basic service.

7. Current Proceedings and Programs

Sixteen states responded to the question about current or recently completed proceedings. Seven (44 percent of respondents) indicated that they have active proceedings addressing some aspect of universal service. Specific information about the content of the reported proceedings was very limited. To the extent such information was provided it was used as a background for the balance of this report.

Ninety-five percent of those responding reported that they are a part of the Link-Up America program and eighty percent are part of the FCC Lifeline program. Those programs are more fully discussed earlier in this report, under the heading of Federal programs. Forty two percent of the respondents have programs specifically targeted to increasing the number of households with telephone service. The information describing the specific programs was not provided.

No state reported any program directed to promoting availability of either cellular or personal communications services.

8. Basic Telephone Service Definition

In the next section of the survey questions were posed to determine the services now included as basic services and those that respondents felt would be included in the future. The question, as asked, specified that in order for a service to be included, it would have to be actually required by a regulatory commission either as a part of basic service or as universally available.⁸

Single party service is required part of basic service in 50 percent of the states with an expectation that it will become basic by another 35 percent. Availability is now required by the remainder of the respondents.

Local usage was reported as a basic service requirement in 70 percent of the responses, with required availability bringing the total to 89 percent. Fifteen percent expect to see single party service become a part of basic.

⁸ Inexplicably only 64% of the respondents indicated that network access is a required basic service. In the following analysis the percentages of positive responses are normalized to the 64% figure. The reported results should be interpreted as the degree of inclusion of a service in the responses as compared to basic network access.

Local directories are a current requirement in 75 percent of the states, with the balance requiring availability. Extended area service met the required test for 56 percent of the respondents with availability requirements bringing the total to 75 percent. A 15 percent increase in both basic and availability requirements are expected.

IntraLATA equal access is required in 28 percent of the responding states and is an availability requirement for an additional 33 percent of those responding. Respondents reported a 50 percent increase expectation for each basic requirements and availability.

Tone dialing is a required service in 47 percent of the states reporting. One hundred percent of respondents require that tone dialing be an available service. Respondents reported an expectation of a 38 percent increase in tone dialing as a required part of basic service.

Call forwarding was used in the survey of the respondents as an indicator for requirements for advanced digital switching services. None reported call forwarding as a current basic requirement. However, 66 percent reported that universal availability is required.

No state identified Caller ID as a requirement of basic service. Universal availability was reported by 9 percent. None of the respondents expected Caller ID to become a basic service.

Five percent of the respondents reported that narrow band ISDN is required to be available. None include it in basic. Four percent expect it to become basic and 38 percent expect its availability to become a requirement.

Eighty-six percent of the respondents said that enhanced 911 must now be available. Twenty-three percent indicated that the service will be required as part of basic service in the future and 35 percent thought it would an availability requirement.

Operator service, directory assistance, twenty-four hour repair service, and optional budget plans are not viewed as universal service requirements by respondents. Each received positive responses in the four categories. There is no doubt that these services are currently offered but not, in the view of a few respondents, under the universal service concept. It is probably improper to conclude that current offerings could be withdrawn, changed, or charged for differently without raising the universal service issues in the various states.

Dual party relay, Lifeline and Link Up, which are discussed in other parts of this report, each were considered a part of the universal service set by approximately 70 percent of respondents.

Disconnection protection, published rates, and privacy protection are reported either basic or available in nearly every response.

Access to information providers is currently required according to 23 percent of the respondents and must be available by 95 percent. Few reported that this service will become part of the basic requirements in the future; this apparently indicates that availability is all that will be required. Perhaps the interpretation of the question was from the perspective of the information

services provider rather than the end user. In that case, availability is all that is required. Transmission to the end user is presumed.

Video dial tone, 64 kilobits-per-second data and packet switched services are not a current part of basic universal service. Twenty-eight percent reported that 64 kbs data is currently required to be available. Seventy-three percent reported that the data service would become part of universal availability, 27 percent said that video dial tone would be required to be available and thirty-five percent felt that packet switching would be required. Very few respondents thought that any of these services would become part of basic universal service.

9. Future Funding

The questionnaire sought opinions regarding the funding of universal service in the future with the specified presumption that additional funding would be required. Most respondents identified multiple funding sources. Of the nine potential sources listed, one respondent believed eight would contribute, eight said that five or six would be used, eight choose three or four sources. Only one felt that a single source would be used for funding. There were twenty-three states responded to this part of the survey.

Funding through charges to other service providers was the most commonly identified source with fourteen affirmative responses. Increases in basic services and business service were identified by twelve and thirteen respondents respectively. Increases in SLCs, greater contributions from discretionary services, increases in CCL charges and excise taxes each were identified by either nine or ten respondents. Only two respondents thought that increases in general corporate taxes or personal income taxes would be used to fund universal service.

10. Survey Conclusions

The responses to the survey are enlightening in regard to the status of universal service thinking at the state level. The states have established requirements and methods to pursue universal service given existing circumstances. Less well developed are considerations of how universal service will be affected by changing markets and changing regulatory relations with service providers. Generally regulators expect current universal service requirements to remain in force and to be expanded to include more services in the future, although many fewer regulators were willing to reply to the speculative questions. Those that responded to the funding questions show a clear expectation for continued contribution from traditional sources with expansion in the levels of contribution from those sources. From the survey responses one cannot conclude that

regulators expect a lessening of regulatory involvement in universal service. Rather, the consensus appears to be a larger role.

CHAPTER VI

UNIVERSAL SERVICE CONSIDERATIONS REGARDING PARTICULAR SERVICES

A. Tone Dialing Service

One important aspect of universal service is the notion that the definition of universal service changes over time in response to changes in rate structure, technology, and customer demands.¹ Tone dialing is a service that is often singled out as an example of how a service can migrate from being a premium or nonbasic service to being one widely considered to be part of basic universal service. To the extent that the development and evolution of tone dialing service can serve as an exemplar, it is thought that important lessons may be able to be derived that can help policymakers better define universal service.

Tone dialing had its first field trials in 1964 and was originally intended as a new revenue-generating opportunity because of the premium price customers would be willing to pay for the convenience and multifunctionality of tone dialing. Telephone tariffs provided for per-line and per-telephone surcharges for tone dialing service, reflecting both central office and CPE revenue requirements. Tone dialing increased the ability of customers to choose long distance carriers, charge calls to credit cards, use home banking and use voice mail. By 1992, over 95 percent of access lines for most carriers supported tone dialing, although state penetration rates range from 40 percent to 100 percent, with an average around 70 percent. A 1991 survey revealed twenty-one states priced tone dialing as a premium service and fourteen priced it as part of basic service. Since the survey, some additional states have begun to include tone dialing as a part of their basic service tariff.

Rates charged in the 1960s varied somewhat but the average monthly charge was \$1.50 to \$2.00 for residential tone dialing. In 1991, the average reported price was \$1.90. Cost studies at state commissions showed that the marginal cost per line in Massachusetts average \$0.07 per

¹ The discussion on tone dialing is adapted from Kravtin, Selwyn, and Keller, *A Public Good/Private Good Framework For Identifying POTS Objectives*, 90-105.

month per line.² These cost estimates support the contention that tone dialing is over priced relative to cost. It also suggests that for all practical purposes the forward-looking avoidable cost of tone dialing is effectively zero, since virtually all new installed switching comes already equipped to handle tone dialing, as a part of their standard operating software.

Lessons to be learned from tone dialing:

- (1) Digital switching contains very sophisticated features, thus almost any service currently imagined can be provided. Unlike the evolution of tone dialing that spanned the transformation of electronic and digital switching, services of the future may benefit from an all digital network where premium pricing may be difficult to rationalize or sustain.
- (2) Although some historical factors may partially explain the twenty-five-year gap between tone dialing deployment and its significant penetration of the residential market, it should not be assumed that all new services will achieve instant residential penetration.
- (3) The tone dialing success story may be more a digital success story, so the lessons to be drawn may be somewhat limited.
- (4) Modernization studies invariably focus on successful deployments. But there have been failures such as, the picture telephone touted by AT&T in predivestiture days. Analysts have difficulty predicting which service will succeed. In a digital environment more new services may survive simply because they are embedded in the basic digital functionality. The new picture telephones may have a better success rate due to the wide spread availability of digital switching.
- (5) Economists say that sunk costs do not matter, but regulators and policymakers also know that equity problems arise when some users are allowed to have forward-looking incremental costs and others are not.

² A Michigan study revealed a fully embedded cost of \$0.0533 and a long-run incremental cost of \$0.0484. In Connecticut the long-run incremental cost was \$0.05. A study in Utah showed an average embedded per line cost of \$0.17. Kravtin, 100.

B. ISDN

ISDN provides digital connectivity by the network to the customer. It requires specialized equipment at the customers' premises that encodes information in a digital format, as opposed to the analog format of traditional services. Information processing by computers is digital. CDs record music digitally and CD players are digital devices. While video processing in the home is analog, the information content of the programming can be digitally encoded for efficient transmission. Within the telephone network, digital transmission, signalling, and switching is the state of the art. Analog information is digitally encoded for transmission and then decoded to analog for delivery to the analog capable end user. The amount of information that can be transmitted digitally over the customer loop is greater than the loop's analog capability. ISDN exploits this advantage and provides a more powerful communication link for its subscribers. The loops must be conditioned for ISDN service. Each line must be terminated in an appropriate line card at the switch and the network switches must be digital with appropriate software to handle ISDN customers. The resulting service provides the customer with high quality voice and simultaneous data communications capability. Two way video can be supported on ISDN. ISDN is expected to make work at home, distance learning, and remote health care monitoring practical. Small business applications for ISDN are expected to exploit its bandwidth by allowing activities such as credit card validation or data transfers to occur simultaneously with voice connections. Since ISDN is a new service capability, applications have not been fully identified, much less demonstrated. None the less, the concept of a much enhanced telecommunications capability operating over the installed customer loop is thought to have substantial positive impact on the small business community.

The state of Tennessee has undertaken an innovative regulatory program to support the deployment of ISDN. The Tennessee Public Service Commission believes that the economy of the state will be advantaged by universal availability of the service and has sought to place the state at the forefront of deployment.

In 1990 the Commission received a report they had sponsored entitled "Telecommunications Technology Deployment Analysis and Master Plan Development." This report analyzed the then current status of the public switched network in Tennessee and the then current plans for its further development. The report also assessed the communications needs of Tennesseans. The consultants who prepared the report gathered their information from the telephone companies in the state and through extensive interviews with customers of those companies, including customers of interexchange carriers. The report recommended deployment objectives for signalling system 7 (SS7), ISDN and broadband. It included cost projections for

various scenarios of deployment and concluded that acceleration relative to the plans of the telephone companies was achievable and desirable.

The Tennessee Commission gathered comments from the companies and customers, ultimately endorsing a plan they called "Tennessee 2000." The endorsed plan included the accelerated deployment recommended by the consultants. In subsequent rate proceedings, the Commission included in the operating companies' cost of service the capital costs of their construction programs, including the acceleration. Within the context of a total company rate setting proceeding, by using projected revenue and cost data a commission can evaluate rather specifically the costs of alternative deployment strategies at the individual customer rate level. Most states do not use projected costs to set rates, so Tennessee is not typical. However, if the rate setting authority can include prospective network development costs into rates, utility cooperation in accelerated programs is more likely to occur.

In 1993 the Bell operating company proposed to begin offering ISDN on a tariffed basis. Centrex ISDN had been tariffed earlier and the company had some success marketing that service to large users. The company had also undertaken some modest trial offerings of single line ISDN to residential customers. While there had been considerable initial interest by customers, few actual connections were made. The company had little experience with the service, customer equipment is costly (equipping a personal computer to utilize ISDN costs \$1000 to \$2000), and there was no established base of services for the customer to use with ISDN. The Commission remained convinced that the public interest was well served by early (relative to other states) adoption of ISDN by customers. They used their authority to approve tariffs as the vehicle to adjust the offering in ways that they felt would promote its adoption. Among the actions taken were reduction in the residential ISDN rate to a level approximately twice the rate for single line service, special treatment of schools (residential rates apply to schools), and they indicated an intention to monitor the company's efforts to market the service if certain levels of usage did not occur. In establishing an expectation or standard for penetration rates on a new service offering the Tennessee Commission has been innovative in extending regulatory practices beyond what have been used in the past. Other states have not established penetration standards for new services.

C. Mobile Services

The general plan for cellular service is two licensed suppliers per area. The traditional wire line telephone company received one of the licenses. In all cases the Regional Bell Holding Companies transferred their licenses from the corporate entity providing local service to a separate affiliate. The second license in any locality was awarded to another provider with demonstrated capability to provide service. The plan was for competition between the two cellular suppliers to drive service quality up and prices down. There has been substantial consolidation in the ownership of the nonwire line franchises. Most have been purchased by the BOCs. The cellular market certainly does not meet many tests of a true competitive market, however, it does appear to be serving a universal service objective in that the number of subscribers is increasing rapidly.

As with cellular, in order for the personal communications services (PCS) suppliers to operate effectively, they must receive interconnection from the LECs. In anticipation of very substantial penetration it has been proposed that PCS providers be assigned a previously unused service access code (SAC), 5XX. The proposal is that each service provider receive a unique 5XX code. PCS end users would then be assigned telephone numbers by their PCS provider. This plan requires that the local switches be able to identify a dialed number as a call to a PCS line by recognition of the 5XX code. The switch would then route the call to the appropriate PCS providers network. Routing instructions would need to be available to each local switch to implement this program.

States have also acted to increase the penetration and competition of cellular technology. In California, for example, the commission decided that regulated facilities-based carriers would be required to unbundle their wholesale tariff and that the affiliates of facilities-based carriers would continue to be prohibited from reselling in markets where the facilities-based carrier provides retail service.³ This was done to increase competition, which could lead to lower prices and increased penetration.

³ "California Commission Concludes its Investigation into the Regulation of Cellular Radiotelephone Utilities in Decision 92-10-026, October 6, 1992" as reported in *The NRRI Quarterly Bulletin* 14, no. 1 (March 1993): 88-90.

CHAPTER VII

CONCLUSIONS

The evolution of the universal service concept has been driven by changes in technology, social goals, consumer preferences, and an increasingly competitive telecommunications market. In the predivestiture era a stable long-lived technology was used to provide a standard voice-grade telephone service in a noncompetitive market. Consumer preferences were not well developed and were based around rotary dial voice local service.

As shown throughout this overview, technical changes have allowed competition to develop in all areas of the market. Competition may now exist line-side, trunk-side, at customer premises, for intraLATA Toll or interLATA Toll, and for many custom calling features. Technological changes and regulatory changes have provided the opportunity for competition to develop. One net effect of all these changes is to introduce uncertainty into the definition of universal service and the validity of various universal service funding methods.

Definitions of universal basic service are difficult to develop because the future structure of the telecommunications market is not known with certainty. To the extent that a truly competitive market develops, the need for a government-established definition may be somewhat lessened. Even in a competitive market, however, some minimum level of service may need to be required. If the future market is partially competitive and mostly noncompetitive, then the definition and funding of universal source may become even more important.

Funding mechanisms that have worked in the past may not work in the future as competition changes the prices, calling patterns, and demand for services. In the abstract, this is not a problem as new and equitable funding approaches can be fashioned. Mechanisms like that used to fund services for the disabled show promise. General purpose tax revenues can also be used.

It is, however, the social value of the telecommunications services that serves as the cornerstone for universal service. Society, through its legislative and regulatory agents, decides which services are required so that all members of society can effectively and affordably communicate with all other members. Once the set of services is known, funding mechanisms can be designed.

The goal of this overview is to objectively identify and analyze the factors affecting the definition of universal service. The notion of a basic service and service availability are intrinsic to

the definition. Policymakers should encourage LECs to provide a broad array of available services. Exchange companies should be required, however, to have affordable basic services as defined by regulators. The listings of basic services in chapter two of this report may provide a starting point for any such effort.

APPENDIX A
NARUC RESOLUTION ON UNIVERSAL SERVICE

**Resolution on Recent Initiatives to Consider
Universal Service Policies**

WHEREAS, MFS Communications Company, Inc. (MFS) on November 1, 1993 filed a petition with the Federal Communications Commission (FCC) for a Notice of Inquiry (NOI) and en banc hearing on an accelerated basis to determine future policies for continuing to promote universal telephone service in a competitive market environment; and

WHEREAS, Issues relating to universal service have been raised in other proceedings pending before the FCC including the FCC staff paper on access charge reform, the National Association of Regulatory Utility Commissioners (NARUC) petition for a NOI concerning access issues, the United States Telephone Association (USTA) petition for a rulemaking on access charge reform, Ameritech's petition for a declaratory ruling regarding its Customers First Plan, and revisions to the Universal Service Fund (USF) before the Joint Board; and

WHEREAS, The Administration through the National Telecommunications and Information Administration (NTIA) has stated principles for telecommunications and information policy in "The National Information Infrastructure; The Administration's Agenda for Action" (NII); and

WHEREAS, The NII encompasses the goal of continuing and expanding the concept of universal service for the next generation and NTIA has initiated forums to explore the issues relating to universal service; and

WHEREAS, The NARUC has initiated a project to examine the evolving definition of universal service through a collaborative process among representatives of interested parties; and

WHEREAS, State policymakers are considering and investigating issues related to universal service within their individual States; and

WHEREAS, MFS' position statement included in its petition articulates its views as to how universal service should be defined, what specific type of subsidy mechanisms should be adopted to promote those goals, and how the subsidy programs should be funded and administered; and

WHEREAS, MFS indicates its position statement is intended as a framework to begin discussion of these issues and fully anticipates other parties will offer divergent views on some issues and identify other issues not addressed in MFS' statement; and

WHEREAS, The NARUC has identified several issues related to universal service which MFS has not addressed, including, but not limited to, the following:

- Whether universal service policies should promote universal affordability of some services and universal availability of other services;
- What measures of universality (e.g., percent of subscribers) should be used to determine whether universal service policies have been met;
- How privacy issues may affect universal service policies;
- How universal service policies should balance costs against economic and social benefits of services; and
- How the various policymakers can best coordinate their efforts in developing and implementing universal service policies, to ensure nationwide implementation while minimizing overlap or duplication of subsidies; now, therefore be it

RESOLVED, That the National Association of Regulatory Utility Commissioners, convened at its 105th Annual Convention in New York, New York, supports a comprehensive review of the concept of universal service and issues related to the continuation and expansion of universal service; **AND BE IT FURTHER**

RESOLVED, That, should the FCC issue a NOI in response to the MFS petition, the NOI should address all universal service and related issues in lieu of a more limited NOI that would focus primarily on those issues raised by MFS; **AND BE IT FURTHER**

RESOLVED, That the NARUC endorses the use of a collaborative process with the FCC, NTIA, and all interested parties in order to address and refine the concept of and issues relating to universal service; **AND BE IT FURTHER**

RESOLVED, That the NARUC General Counsel and staff shall take appropriate actions in all applicable forums that are necessary to carry out the objectives of this resolution.

Sponsored by the Committee on Communications
Adopted November 17, 1993

APPENDIX B

**SOME REPORTED EXAMPLES OF STATE ACTIVITIES
AFFECTING UNIVERSAL SERVICE**

Examples of State Activities Affecting Universal Service

- * On August 20, 1992, the Connecticut DPUC reconsiders previously approved per-line blocking for Caller ID.
- * On August 6, 1992, the Ohio PUC approved privacy and blocking.
- * On August 3, 1992, the Rhode Island PUC settled on infrastructure deployment.
- * On September 18, 1992, the Idaho PUC permitted the establishment of credit worthiness of applicants for new service.
- * On July 16, 1992, the Vermont PSB investigated Lifeline telephone rates adoption and implementation.
- * On May 29, 1992, the New York PSC studied access rate design.
- * On July 23, 1992, the New York PSC proceeded on motions to review telecommunications industry interconnection arrangements, open network architecture, and comparably efficient interconnection and to review Intellipath II Digital Centrex Service pricing and rate design.
- * On August 26, 1992, the Oklahoma Corporation Commission reviewed a general rate case.
- * On August 12, 1992, the Texas PUC denied restructuring of directory and assistance rates.
- * On July 22, 1992, the California PUC approved intrastate rate increases.
- * On September 25, 1992, the Idaho PUC began to seek penalties and/or consent agreements relating to Universal Service fund reporting.

- * On November 25, 1992, the Ohio PUC approved Caller ID Calling Party Number Blocking.
- * On October 1, 1992, the Idaho PUC denied providing extended area service.
- * On October 6, 1992, the Wisconsin PSC approved extended community calling.
- * On December 30, 1992, the Montana PSC reviewed a general rate case with two primary rate changes: (1) elimination of touchtone charges; and (2) elimination of two-party service.
- * On December 8, 1992, the Michigan PSC discontinued basic local exchange service.
- * On October 6, 1992, the California PUC concluded its investigation into the regulation of cellular radiotelephone utilities.
- * On November 13, 1992, the Idaho PUC approved the adjustment of intrastate access charges for all companies that had currently participated in the Idaho Universal Service Fund.
- * On February 23, 1993, the Michigan PSC dismissed a complaint regarding InterLATA equal access.
- * On January 12, 1993, the Indiana URC approved free per-call blocking pertaining the Caller ID.
- * On January 25, 1993, the Vermont PSB approved certificates of public good to operate as a reseller of telecommunications services within the state.
- * On February 11, 1993, the Arkansas PSC determined that LECs mandated to implement an expanded interconnection plan for special access shall have the choice of providing either physical or virtual colocation.

- * On February 11, 1993, the Pennsylvania PUC adopted intrastate special access.
- * On January 20, 1993, the Ohio PUC approved ISDN Direct Service.
- * On February 23, 1993, the Michigan PSC approved optional toll calling plans.
- * On January 21, 1993, the Florida PSC denied general rate increases.
- * On January 29, 1993, the Idaho PUC denied increases in rates and charges.
- * On January 12, 1993, the Michigan PSC approved directory assistance rates.
- * On March 23, 1993, the Wisconsin PSC reduced intrastate access charges.
- * On December 30, 1992, the Colorado PUC adopted improved standards for basic telephone service.
- * On October 7, 1992, the Idaho PUC adopted rules concerning the Americans With Disabilities Act of 1990.
- * On November 10, 1992, the Illinois CC adopted new rules for low-income telephone assistance programs.
- * On January 13, 1993, the Colorado PUC found that rural telephone service was inadequate.
- * On November 6, 1992, the Michigan PSC required LECs to distribute text-telecommunications devices for the deaf.
- * On December 30, 1992, the Arkansas PSC approved optional calling plan.

- * On April 22, 1993, the Missouri PSC approved an implementation schedule for outstate calling area service, metropolitan calling area service, and modified community optional service.
- * On April 23, 1993, the Alabama PSC granted a certificate of public convenience and necessity to provide customer owned telephone service.
- * On March 12 and April 12, 1993, the Vermont PSB granted certificates of public good.
- * On February 9, 1993, the Wisconsin PSC issued an interim order directing LECs to implement extended community calling.
- * On August 20, 1993, the New Hampshire PUC ordered the implementation of 1+ ten digit dialing pattern
- * On July 14, 1993, the Rhode Island PUC directed the implementation of 1+ ten digit dialing for all calls other than local calls.
- * On July 9, 1993, the Idaho PUC reduced funding levels for telecommunications relay services program.
- * On August 26, 1993, the Vermont PSB approved a new funding mechanism for the Lifeline program.
- * On July 7, 1993, the Connecticut DPUC authorized rate design changes including a substantial reduction in toll rates, several toll discount plans, and rate increases including rates for local exchange services.
- * On April 7, 1993, the California PUC instituted a rulemaking and investigation regarding open access and network architecture development of dominant carrier networks.
- * On June 18, 1993, the Oregon PUC adopted rules for open network architecture.

- * Between June and August 1993, the Alabama PSC, the Georgia PSC, the New York PSC, the Vermont PSB, and the Virginia SCC all granted certificates of public convenience and necessity.

APPENDIX C
UNIVERSAL SERVICE STATISTICS

TABLE C-1

**PERCENT FAMILIES WITH TELEPHONE BY RACE AND INCOME,
1990 AVERAGE**

Annual Income	Total	White	Black	Hispanic
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>\$5,000	75.4	79.1	66.1	61.9
5,000- 7,499	82.6	84.9	74.9	66.7
7,500- 9,999	86.9	89.0	77.3	74.8
10,000-	88.9	90.2	81.9	82.0
12,499	91.7	92.7	85.9	85.1
12,500-	93.3	94.2	87.7	89.4
14,999	95.6	96.1	91.9	94.2
15,000-	97.0	97.7	90.9	96.0
19,999	97.0	98.4	93.3	94.1
20,000-	98.7	98.8	97.0	96.0
24,999	99.1	99.1	98.5	94.1
25,000-	99.4	99.4	98.7	97.8
29,999	99.5	99.5	98.3	98.8
30,000-	99.5	99.5	98.6	97.7
34,999				
35,000-				
39,999				
40,000-				
49,999				
50,000-				
59,999				
60,000-				
74,999				
75,000+				
U.S. Total	93.3	94.6	83.5	82.7

Source: Alexander Belinfante, "Telephone Subscribership in the U.S." (Washington, DC: Federal Communications Commission, Industry Analysis Division, Common Carrier Bureau, February 1991), Table 4, 30.

TABLE C-2**TELEPHONE PENETRATION IN THE UNITED STATES**

	Households (Millions)	Households With Telephones (Millions)	Percentage With Telephones	Households Without Telephones (Millions)	Percentage Without Telephones
1983 NOVEMBER	85.8	78.4	91.4%	7.4	8.6%
1984 MARCH	86.0	78.9	91.8	7.1	8.2
JULY	86.6	79.3	91.8	7.3	8.4
NOVEMBER	87.4	79.9	91.4	7.5	8.6
1985 MARCH	87.4	80.2	91.8	7.2	8.2
JULY	88.2	81.0	91.8	7.2	8.2
NOVEMBER	88.8	81.6	91.9	7.2	8.1
1986 MARCH	89.0	82.1	92.2	6.9	7.8
JULY	89.5	82.5	92.2	7.0	7.8
NOVEMBER	89.9	83.1	92.4	6.8	7.6
1987 MARCH	90.2	83.4	92.5	6.8	7.5
JULY	90.7	83.7	92.3	7.0	7.7
NOVEMBER	91.3	84.3	92.3	7.0	7.7
1988 MARCH	91.8	85.3	92.9	6.6	7.1
JULY	92.4	85.7	92.8	6.7	7.2
NOVEMBER	92.6	85.7	92.5	6.9	7.5
1989 MARCH	93.6	87.0	93.0	6.6	7.0
JULY	93.8	87.5	93.3	6.3	6.7
NOVEMBER	93.9	87.3	93.0	6.6	7.0
1990 MARCH	94.2	87.9	93.3	6.3	6.7
JULY	94.8	88.4	93.3	6.4	6.7
NOVEMBER	94.7	88.4	93.3	6.3	6.7
1991 MARCH	95.3	89.2	93.6	6.1	6.4
JULY	95.5	89.1	93.3	6.4	6.7
NOVEMBER	95.7	89.4	93.4	6.3	6.6
1992 MARCH	96.6	90.7	93.0	5.9	6.1
JULY	96.6	90.6	93.8	6.0	6.2

Source: Federal Communications Commission, *Statistics of Communications Common Carriers*, 1991/1992 Edition, (Washington, DC: U.S. Government Printing Office).

TABLE C-3
AVERAGE MONTHLY RESIDENTIAL RATES
(IN OCTOBER OF EACH YEAR)

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
Residential Rates*									
Unlimited Local Calling	\$10.50	\$12.10	\$12.17	\$12.58	\$12.44	\$12.32	\$12.30	\$12.39	\$13.05
Subscriber Line Charges	0.00	0.00	1.01	2.04	2.66	2.67	3.53	3.55	3.56
Taxes	1.08	1.25	1.36	1.51	1.56	1.58	1.70	1.85	2.03
TOTAL	\$11.58	\$13.35	\$14.54	\$16.13	\$16.66	\$16.57	\$17.53	\$17.79	\$18.84
Lowest Generally Available Rate	\$5.37	\$5.62	\$5.75	\$5.96	\$5.81	\$5.67	\$5.66	\$5.68	\$6.24
Subscriber Line Charges	0.00	0.00	1.01	2.04	2.66	2.87	3.53	3.55	3.56
Taxes Including 911 Charges	0.56	0.58	0.70	0.84	0.94	0.91	1.03	1.15	1.31
TOTAL	\$5.93	\$6.20	\$7.46	\$8.84	\$9.41	\$9.25	\$10.23	\$10.38	\$11.11
Minimum Connection Charge**	\$35.01	\$43.71	\$44.32	\$45.63	\$44.04	\$42.94	\$42.71	\$43.06	\$41.88
Taxes	1.75	2.19	2.22	2.28	2.20	2.11	2.24	2.32	2.29
TOTAL	\$36.76	\$45.90	\$46.54	\$47.91	\$46.24	\$45.05	\$44.95	\$45.38	\$44.17

Source: Federal Communications Commission, *Statistics of Communications Common Carriers*, 1991/1992 Edition, (Washington, DC: U.S. Government Printing Office).

Note: Average Monthly Local Rates are based on surveys by FCC Staff using the same sampling areas and weights used by the Bureau of Labor Statistics in constructing the Consumer Index.

* The residential rates do not include additional charges for tone dialing service.

** Connection charges do not include drop line and block charges. Residential connection charges do not include additional charges for tone dialing service.

TABLE C-4
AVERAGE MONTHLY SINGLE-LINE BUSINESS RATES
(IN OCTOBER OF EACH YEAR)

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
Representative Rate*	\$29.16	\$32.74	\$33.42	\$34.26	\$33.71	\$31.03	\$31.06	\$30.97	\$32.18
Tone Dialing Service	**	**	**	**	**	2.45	2.43	2.35	2.04
Subscriber Line Charges	0.00	0.00	1.01	2.04	2.68	2.69	3.55	3.55	3.57
Taxes Including 911 Charges	3.35	3.77	3.96	4.17	4.18	3.95	4.21	4.32	4.63
TOTAL	\$32.51	\$36.51	\$38.39	\$40.47	\$40.57	\$40.12	\$41.25	\$41.21	\$42.42
Average Charge for 5 Minute Same Zone Daytime Business Call	0.085	0.090	0.090	0.092	0.092	0.091	0.093	0.093	0.091
Minimum Connection Charge**	\$56.04	\$68.84	\$70.82	\$72.94	\$72.15	\$70.48	\$71.05	\$71.36	\$72.76
Tone Dialing Service	**	**	**	**	**	1.70	1.89	1.89	1.13
Taxes	3.06	3.79	3.90	4.01	3.97	4.06	4.15	4.15	4.43
TOTAL	\$59.12	\$72.63	\$74.72	\$76.95	\$76.12	\$76.43	\$76.81	\$77.40	\$78.32
5 Minute Payphone Call	0.168	0.212	0.222	0.223	0.226	0.228	0.228	0.228	0.228

Source: Federal Communications Commission, *Statistics of Communications Common Carriers*, 1991/1992 Edition, (Washington, DC: U.S. Government Printing Office).

Note: Average Monthly Local Rates are based on surveys by FCC Staff using the same sampling areas and weights used by the Bureau of Labor Statistics in constructing the Consumer Index.

* The representative rate is the monthly single-line rate for tone dialing service with unlimited local calls (where offered) or the measured service rate plus additional charges for the first 200 messages in other cities. The representative business rate includes the additional monthly cost for tone dialing service for 1983 through 1987. The additional charges is shown separately thereafter.

** Connection charges do not include drop line and block charges. Business connection charges for 1983 through 1987 include the additional connection charge for installing tone dialing service. The charges is shown separately thereafter.

TABLE C-5

**EQUAL ACCESS CONVERSION SCHEDULE
(PERCENTAGE OF LINES CONVERTED)**

	BELL OPERATING COMPANIES	OTHER LARGE COMPANIES*	SMALL COMPANIES	TOTAL INDUSTRY
1984 THIRD QUARTER	1.1%	0.0%	0.0%	0.9%
FOURTH QUARTER	3.8	1.5	0.0	3.2
1985 FIRST QUARTER	12.1	2.4	0.0	9.8
SECOND QUARTER	26.9	3.7	0.0	21.4
THIRD QUARTER	43.0	4.0	0.0	34.0
FOURTH QUARTER	50.9	4.9	0.5	40.2
1986 FIRST QUARTER	56.8	11.9	2.7	46.0
SECOND QUARTER	61.9	18.4	4.0	51.0
THIRD QUARTER	71.5	27.4	5.9	59.9
FOURTH QUARTER	74.3	38.3	7.1	63.8
1987 FIRST QUARTER	76.4	45.3	9.1	66.6
SECOND QUARTER	77.7	50.9	10.9	68.7
THIRD QUARTER	80.4	57.9	12.7	72.0
FOURTH QUARTER	84.7	64.0	14.9	76.3
1988 FIRST QUARTER	86.5	66.2	15.8	78.1
SECOND QUARTER	87.4	68.5	17.3	79.3
THIRD QUARTER	88.5	71.3	18.6	80.6
FOURTH QUARTER	91.3	74.1	20.3	83.4
1989 FIRST QUARTER	92.6	76.5	22.0	84.8
SECOND QUARTER	93.4	77.6	23.1	85.7
THIRD QUARTER	94.1	79.1	24.3	86.5
FOURTH QUARTER	95.2	80.9	25.5	87.7
1990 FIRST QUARTER	95.7	81.9	26.5	88.4
SECOND QUARTER	96.0	83.3	29.0	89.0
THIRD QUARTER	96.4	83.8	30.3	89.5
FOURTH QUARTER	96.9	85.6	33.1	90.4
1991 FIRST QUARTER	97.1	85.9	33.8	90.6
SECOND QUARTER	97.2	86.5	35.3	90.9

Source: Federal Communications Commission, *Statistics of Communications Common Carriers*, 1991/1992 Edition, (Washington, DC: U.S. Government Printing Office, Date). Original data taken from Tariff Review Plans filed November 12, 1987; December 30, 1988; and April 2, 1990. Small Company and total industry data based on industry analysis division estimates.

**TABLE C-6
NATIONAL SUBSCRIBERSHIP BY STATE**

	Telephone Subscribership			Telephone Subscribership Under \$15,000 Per Year			Telephone Subscribership Age 65 and Over			Telephone Subscribership HHs on Public Assistance		
	3/84	3/91	% Chg.	3/84	3/91	% Chg.	3/84	3/91	% Chg.	3/84	3/91	% Chg.
AL	89.05	90.86	1.81	81.87	83.77	1.9	92.02	94.47	2.45	75.99	76.32	.33
AZ	89.78	93.52	3.74	78.92	83.79	4.87	94.10	97.78	3.68	71.07	76.96	5.89
AR	87.17	88.23	1.06	82.06	77.90	-4.16	89.76	95.59	5.83	75.52	77.50	1.98
CA	92.52	95.13	2.61	85.44	87.86	2.42	96.97	97.61	0.64	84.77	85.47	0.70
CO	94.60	94.02	-0.58	87.47	80.50	-6.97	97.39	98.42	1.03	87.76	78.77	-8.99
CT	94.65	97.15	2.50	85.06	87.39	2.33	94.85	100.00	5.15	87.55	83.38	-4.17
DE	95.45	96.82	1.37	88.13	95.28	7.15	100.00	98.99	-1.01	92.73	81.39	-11.34
DC	95.86	92.19	-3.67	93.70	86.21	-7.49	99.48	95.45	-4.03	92.67	85.83	-6.84
FL	89.92	92.23	3.31	82.41	85.01	2.60	94.19	97.32	3.13	77.14	78.58	1.44
GA	85.88	91.33	5.45	73.32	78.31	4.99	89.20	95.22	6.02	65.72	75.21	9.49
ID	90.43	92.69	2.26	81.77	86.39	4.62	95.01	98.81	3.80	78.50	83.20	4.70
IL	95.54	93.92	-1.62	89.94	83.19	-6.75	97.00	98.21	1.21	89.65	76.82	-12.83
IN	92.05	92.78	0.73	83.44	83.45	0.01	96.92	97.68	0.76	83.02	80.01	-3.01
IA	95.79	95.64	-0.15	91.61	89.24	-2.37	98.23	99.56	1.33	90.60	86.82	-3.78
KS	94.46	94.31	-0.15	88.67	87.33	-1.34	99.19	98.77	-0.42	84.42	83.49	-0.93
KY	87.15	89.19	2.04	75.10	78.92	3.82	96.68	98.04	1.36	75.16	73.38	-1.78
LA	89.62	93.04	3.42	83.34	86.08	2.74	92.55	94.82	2.27	80.68	81.67	0.99

**TABLE C-6
NATIONAL SUBSCRIBERSHIP BY STATE**

	Telephone Subscribership			Telephone Subscribership Under \$15,000 Per Year			Telephone Subscribership Age 65 and Over			Telephone Subscribership HHs on Public Assistance		
	3/84	3/91	% Chg.	3/84	3/91	% Chg.	3/84	3/91	% Chg.	3/84	3/91	% Chg.
ME	94.34	95.80	1.46	87.42	88.21	0.79	95.70	100.00	4.30	86.95	81.75	-5.20
MD	96.19	97.27	1.08	89.97	92.81	2.84	97.14	96.89	-0.25	88.73	87.53	-1.20
MA	95.62	96.77	1.15	89.79	91.29	1.50	97.81	98.84	1.03	88.93	89.89	0.96
MI	93.32	94.98	1.66	85.79	86.78	0.99	99.08	97.56	-1.52	83.53	82.58	-0.95
MN	95.91	97.23	1.32	87.84	93.70	5.86	98.50	98.52	0.02	86.58	94.13	7.55
MS	81.85	86.39	4.54	74.53	74.73	0.20	86.39	92.21	5.82	68.53	73.86	5.33
MO	92.14	94.42	2.28	84.92	86.62	1.70	96.44	99.44	3.00	82.23	80.48	-1.75
MT	90.09	91.48	1.39	81.71	79.42	-2.29	88.47	95.87	7.40	79.55	78.68	-0.87
NE	96.54	95.91	-0.63	91.97	90.36	-1.61	97.71	98.17	0.46	87.34	91.13	3.79
NV	92.99	92.86	-0.13	79.96	79.52	-0.44	94.56	95.48	0.92	82.08	81.71	-0.91
NH	94.76	96.69	1.93	85.99	85.94	-0.05	96.02	97.87	1.85	84.22	78.39	-5.83
NJ	93.52	94.77	1.25	84.87	83.78	-1.09	96.12	95.96	-0.16	87.70	81.85	-5.85
NM	81.73	87.33	5.60	68.30	73.13	4.83	89.40	92.75	3.35	61.96	63.41	1.45
NY	91.16	91.96	0.80	81.48	82.85	1.37	94.39	96.52	2.13	77.97	73.49	-4.48
NC	88.84	92.76	3.92	76.91	85.28	8.37	95.92	97.74	1.82	75.73	79.91	4.18
ND	93.76	96.79	3.03	86.76	91.64	4.88	91.61	98.38	6.77	88.87	90.69	1.82
OH	93.00	94.79	1.79	85.26	86.38	1.12	96.52	98.44	1.92	85.41	80.23	-5.18

**TABLE C-6
NATIONAL SUBSCRIBERSHIP BY STATE**

	Telephone Subscribership			Telephone Subscribership Under \$15,000 Per Year			Telephone Subscribership Age 65 and Over			Telephone Subscribership HHs on Public Assistance		
	3/84	3/91	% Chg.	3/84	3/91	% Chg.	3/84	3/91	% Chg.	3/84	3/91	% Chg.
OK	91.00	89.94	-1.06	83.19	77.49	-5.69	92.58	97.12	4.54	75.41	71.61	-3.80
OR	91.37	96.17	4.80	81.39	89.65	8.26	99.70	98.07	-1.63	74.86	81.38	6.52
PA	94.38	97.15	2.77	88.20	92.54	4.34	96.45	98.13	1.68	88.27	89.26	0.99
RI	93.95	94.56	0.61	87.56	86.15	-1.41	98.82	100.00	1.18	90.27	79.09	-11.18
SC	84.64	89.73	5.09	72.29	76.95	4.66	94.40	92.92	-1.48	69.51	71.31	1.80
SD	92.69	93.79	1.10	86.67	86.62	-0.05	98.03	98.39	0.36	77.85	85.30	7.45
TN	87.03	90.79	3.76	77.86	77.49	-0.37	95.24	95.34	0.10	77.35	74.82	-2.53
TX	88.11	91.26	3.15	75.64	79.94	4.30	95.16	96.85	1.69	75.41	74.82	-0.59
UT	92.05	97.51	5.46	82.70	97.61	14.91	97.09	99.02	1.93	80.71	92.61	11.90
VT	91.23	94.76	3.53	82.64	83.58	0.92	94.15	97.03	2.88	78.64	88.42	9.78
VA	93.19	92.29	-0.90	84.49	72.96	-11.53	96.65	96.40	-0.25	81.86	67.52	-14.34
WA	92.89	97.41	4.52	86.10	92.11	6.01	95.73	99.24	3.51	86.93	90.72	3.79
WV	87.33	89.02	1.69	81.15	79.54	-1.61	91.80	95.54	3.74	74.97	66.93	-8.04
WI	96.02	96.78	0.76	90.42	88.90	-1.52	98.04	95.10	-2.94	90.53	91.86	1.33
WY	89.02	95.46	6.44	79.32	84.19	4.87	98.23	97.04	-1.19	73.43	89.46	16.03

Source: J.L. Walter, "Assessing the Effectiveness of Residential Rate Assistance Programs in Furthering the Goal of Universal Service," *Proceedings of the Eighth NARUC Biennial Regulatory Information Conference*, Volume III (Columbus, OH: NRRI, September 1992).

GLOSSARY

CLASS is a set of services including selective call forwarding, caller ID, and selective call forwarding that require electronic switches and advanced software. For full, interswitch, implementation CLASS requires deployment of SS7 technology.

Common Carriage (telephone) is the transmission of telephonic messages for the public. The service is offered to anyone without regard to the character of the messages nor the nature of the business of the originator. Land line common carriers are normally expected to provide facilities to handle all offered traffic. Spectrum constrained carriers may limit the availability of their facilities but limitations are based upon the technical requirements of their operations, not the character of originators nor content.

Enhanced 911 (E-911) is a service which provides call routing to an emergency response answering point based upon the calling telephone number and provides for the display of the physical location of the calling telephone at the answering point. E-911 requires calling number forwarding to a data base containing the routing and location data.

Extended Area Service is the provision of telephone service at local rates to exchanges beyond the local exchange of the customers.

LATA is the local access and transport area. LATAs were created as a part of the divestiture of AT&T in 1984. Essentially each LATA is a separate metropolitan area with the spaces between metropolitan areas filled by extension of the adjacent LATAs. The local exchange companies that were once part of AT&T are not permitted to carry interLATA traffic.

Lifeline Service is a utility service that is targeted to economically disadvantaged customers. Lifeline service is always less expensive than standard service. Lifeline recipients normally must meet some qualification standard.

NARUC, the National Association of Regulatory Utility Commissions is an organization of member regulatory commissions, primarily state commissions.

NECA, the National Exchange Carriers Association, administers the collection and distribution of FCC created universal service funds.

NRRI, the National Regulatory Research Institute is the research arm of the NARUC.

Optional Extended Area Service is a rate offered to local service customers that expands their local calling area in exchange for a higher monthly rate.

Optional Toll Plans provide discounts from standard toll rates. Typically the plan will require a monthly payment in exchange for a percentage reduction in all toll charges within a LATA.

Subscriber Line Charge is a rate element authorized and required by the FCC, collected by the local exchange carrier on each customer line. Revenues from the subscriber line charge contribute to the interstate revenue requirement of the local exchange company.

SS7 is System Signalling 7, a technical standard for network control. Signalling and control of the network occurs "out of band" with SS7. That is the signalling and control functions are handled over circuits that are separate from the circuits that carry the voice or data traffic of the customer.

Vertical Services are those services that a customer may obtain from the carrier to enhance the usefulness of the telephone connections but which are not required for basic communications. Tone dialing, call forwarding, and off premise extensions are all vertical services.

ZUM, zone message measurement is a rate that is used in California. It provides for measured (charges per minute) service within mileage limits at rates less than would otherwise be charged under toll tariffs.

BIBLIOGRAPHY

Bernt, Phyllis, Hans Kruse, and David Landsbergen. *The Impact of Alternative Technologies on Universal Service and Competition in the Local Loop*. Columbus, OH: The National Regulatory Research Institute, October, 1992.

Bolter, Walter G. *Telecommunications Policy for the 1990's and Beyond*. Amonk, NY: M.E. Sharpe Inc., 1990.

Borrows, John and Robert F. Graniere. *An Open Network Architecture Primer for State Regulators*. Columbus, OH: The National Regulatory Research Institute, November 1991.

Case, J. Cale and Mark G. Ciolek. "Federal Telecommunications Subsidies in the USA: A Working Paper." Eastern Economic Association, March 1993.

Choura, Ron, Sam Loudenslager, and Joel Shifman. "Universal Service Fund High Cost Works hop." Paper presented at the NARU C Summer Meeting, San Francisco, California, July 1993.

Colton, Roger D. "Consumer Information and Workable Competition in Telecommunications Markets," *Journal of Economic Issues* Vol XXVII no. 3, September 1993.

Federal Communications Commission. "Rules and Regulations, Parts 36 and 69," F.C.C., Washington D.C.

_____. Order, DA-1599, "In the Matter of National Exchange Carriers Association

- Revisions to Tariff F.C.C. No. 5, Transmittal No. 475," F.C.C., Washington D.C., December 31, 1991.
- _____. Memorandum Opinion and Order, AAD 92-19, "In the Matter of National Exchange Carrier Association, Inc., Petition for Waiver of Sections 36.611(a) and 36.613(a) of the Commission's Rules," F.C.C., Washington D.C., June 4, 1992.
- _____. Memorandum Opinion and Order, DA 92-841, "In the Matter of 1992 Annual Access Tariff Filings, National Exchange Carrier Association, Universal Service Fund and Lifeline Assistance Rates," CC Docket No. 92-141, F.C.C., Washington D.C., June 22, 1992.
- _____. *Statistics of Communications Common Carriers*, 1991/1992 edition, Table 8.1, 305.
- _____. Order "In the Matter of National Exchange Carriers Association Revisions to Tariff F.C.C. No. 5, Universal Service Fund and Lifeline Assistance Rates," FCC DA 93-136, F.C.C., Washington D.C., February 5, 1993.
- Fuhr, Joseph Jr.. "Telephone Subsidization of Rural Areas in the USA," *Telecommunications Policy* (June, 1990).
- Fenster, Larry and Bruce Weston. "Comments of the American Association of Retired Persons," Illinois Commerce Commission Investigation 93-NOI-1, filed September 3, 1993.
- Gabel, David and Mark Kennet. *Estimating the Cost Structure of the Local Exchange Network*. Columbus, OH: The National Regulatory Research Institute, October 1991.
- Graniere, Robert J. and Roger Musgrave. *Interstate Basic Service Elements: Effects on the Prices of Message Toll Service and Plain Old Telephone Service*. Columbus, OH: The National Regulatory Research Institute, December 1991.
- Hart, Paul. "Opening the 500 Service Access Code: Implications for the Future," *USTATeletimes*. Fall 1993.
- Hocker, Arland. "The Rural Telecommunications Challenge." Presentation to the NARUC Staff Subcommittees on Communications. San Francisco, CA, July 23, 1993.
- Hunt, Carl E. *Defining and Costing POTS: A Common Carrier Approach Using the Joint Products Method*. Columbus, OH: The National Regulatory Research Institute, April 1992.
- Jacobson, Robert. *An 'Open' Approach to Information Policy Making: A Case Study of the Moore Universal Telephone Service Act*. San Francisco, CA: Ablex, 1989.
- Johnson, Leland L. *Telephone Assistance Programs for Low-Income Households, A*

- Preliminary Assessment.* Santa Monica, California: Rand Corp., February, 1988.
- Kravtin, Patricia, Lee Selwyn and Paul S. Keller. *A Public Good/Private Good Framework for Identifying POTS Objectives for the Public Switched Network.* Columbus, OH: The National Regulatory Research Institute, October 1991.
- Lawton, Raymond and John Borrows. *Factors Affecting the Definition of the Local Calling Area: An Assessment of Trends.* Columbus, OH: The National Regulatory Research Institute, February 1990.
- Macher, Jim. "Universal Service Programs, Trends and Issues." Presented to NARUC Staff Subcommittee on Communications. San Francisco, CA, July 23, 1993.
- Makarewicz, Thomas. "The Effectiveness of Low-Income Telephone Assistance Programs: Southwestern Bell's Experience." *Telecommunications Policy* (June 1991).
- Mason, Charles. "California IntraLATA Competition Gets Green Light." *Telephony* (September 27, 1993): 7.
- _____. "MFS Seeks Overhaul of Universal Service." *Telephony* (November 8, 1993): 9-10.
- MCI Inc. "Universal Service Fund: An Examination of the Fund and a Prescription for Future Policy." Paper prepared for the NARUC Staff Subcommittee on Communications. San Francisco, CA, July 1993.
- MFS Communications Company, Inc.. Petition of MFS Communications Company, Inc. for a Notice of Inquiry and En Banc Hearing. A Petition to the FCC. November 1, 1993.
- Monson, Calvin S. and Jeffrey H. Rohlf. "The \$20 Billion Impact of Local Competition in Telecommunications." Bethesda, Maryland: Strategic Policy Research, Inc., July 16, 1993.
- Mosbacher, Robert A., et al. "The NTIA Infra Structure Report, Telecommunications in the Age of Information." U.S. Department of Commerce, Special Publication 91-26. Washington DC: Government Printing Office, 1991.
- National Telecommunications Information Administration Information Infrastructure Task Force. "The National Information Infrastructure: Agenda for Action." NTIA NII Office. Washington DC:, National Telecommunications Information Administration, September, 1993.
- The National Telephone Cooperative Association. "Universal Service Fund Discussion of Issues." Paper prepared for the NARUC Communications Subcommittee. San Francisco, CA, July 23, 1993.

Pressler, Larry and Kevin V. Schieffer. "A Proposal for Universal Telecommunications Service." *Federal Communications Law Journal* 40, no. 3.

- Quinn, Adrienne E. and Roger D. Colton. *The Impact on Low-Income People of the Increased Cost for Basic Telephone Service: A Study of Low-Income Massachusetts Resident's Telephone Usage Patterns and Their Perceptions of Telephone Service Quality*. Prepared for the Massachusetts Attorney General's Office, Boston, Massachusetts, July 24, 1992.
- Rao, John. "Brief of the Low Income Consumer Intervenors." Rhode Island Public Utilities Commission Docket 2089, Dialing Pattern Proposal Made by the New England Telephone Company. Filed June 11, 1993.
- RCG/Hagler, Bailey, Inc. *Final Report of the Telecommunications Technology Development and Master Plan Development for the Tennessee Public Service Commission*. Nashville, TN: The Tennessee Public Service Commission, 1990.
- Riggert, Roger L. "Support Mechanisms" Presentation to the NARUC Staff Subcommittee Issues Workshop. San Francisco, CA, July 23, 1993.
- Rural Electrification Administration. "A Brief History of the Rural Electric and Telephone Programs." Report to the Committee on Appropriations, House of Representatives. Washington DC, January 15, 1993.
- Telecommunications Reports*. "Crisis May Loom for Universal Service, Experts Warn." *Telecommunications Reports* 43 (October 25, 1993).
- Teleport Communications Group. "What \$20 Billion Impact?, A Reply to USTA." A letter analysis of a USTA report. New York, NY, Teleport Communications Group, September, 1993.
- The United States Department of Agriculture. *A Brief History of the Rural Electric and Telephone Programs*. Washington, DC: 1986.
- Unknown. Data package, pages 71-130, "High Cost Assistance."
- Walter, Jan L. "Assessing the Effectiveness of Residential Rate Assistance Programs in Furthering the Goal of Universal Service." *Proceedings of the Eighth Biennial Regulatory Information Conference*. Columbus, OH: The National Regulatory Research Institute, 1992.
- Weinhaus, Carol, et al. "Support Mechanisms: Issues and an Example of Potential Problems in the Future." Presentation at the NARUC Meeting. Seattle, WA, July 27, 1992.
- _____. "Breaking the Mold: Changing Policies to Meet Customer Needs." Presentation at the NARUC Meeting. San Francisco, CA, July 26, 1993.
- _____. "What is the Price of Universal Service? Impact of Deaveraging Nationwide

Urban/Rural Rates." Presentation to NARUC. San Francisco, CA, July 26, 1993.

Weinhaus, Carol and Anthony G. Oettinger. *Behind the Telephone Debates*. Norwood, NJ: Ablex Publishers Corporation, 1988.

World Institute on Disability. "Minnesota STAR Program Co-Sponsors October Training Session." *WID Blue Ribbon Panel News 2* (January 1993): 1.