New Directions in Maine's Telecommunications Policy

Report of Governor Joseph E. Brennan's Task Force on Telecommunications

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Task Force on Telecommunications

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Richard E. Barringer, Chairman
The Hon. John Baldacci
The Hon. Harry Vose
The Hon. Eugene Paradis
Paul Fritzsche
Stanley Provus
Leslie Stevens
Stewart Smith

Staff:
Charles S. Colgan
Harold Payson

Maine State Planning Office
Augusta, Maine

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INTRODUCTION

A revolution is underway in the nation's telecommunications system.

The most visible signs are the breakup of the Bell system into eight separate companies, and the emergence of new companies to compete with the remnants of "Ma Bell".

The very word -- telecommunications -- denotes the change from the telephone to the communication of voice, data, images, text and other information. Telephone rate hearings, once relatively straightforward affairs, are now as complex and controversial as electric rate hearings.

While most of the changes so far have occurred at the national level, signs of the revolution are beginning to be seen in Maine. Vigorous debates have arisen about the role of telecommunications in economic development, and how to best meet the needs of low income citizens for phone service.

To help sort out the opportunities and problems that the telecommunications revolution is bringing to Maine, Governor Joseph E. Brennan created a special Task Force on Telecommunications in March, 1984, and asked it to address a

number of specific questions concerning the role of telecommunications in Maine.

The Task Force and its Technical Advisory Group of 60 interested members met a number of times during 1984.* Three subcommittees of the Technical Advisory Group worked through the Spring and Summer to describe the current telecommunications system in Maine; the emerging telecommunications technologies of interest to Maine; and the various means of assuring the continuing availability and improvement of telephone service in Maine. A number of groups and individuals volunteered significant time and resources to assist these efforts.

This report points to the need for new directions in State telecommunications policy. Section 1 contains a summary of these new directions; Section 2 provides answers to the questions posed by Governor Brennan in his charge to the Task Force; and Sections 3 through 7 provide a more detailed discussion of the changes in Maine's telecommunications, and suggested policy directions.

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* Appendix III lists the members of the Technical Advisory Group

1. SUMMARY

The technology of telecommunications used to be fairly simple: wires connecting each phone to central switching stations, allowing voice communication with virtually anywhere in the world, but the technology has changed rapidly and dramatically of late. Wires are replaced by microwaves, satellites, radio, and fiber optics. Switches are transformed from a series of electro-mechanical relays to computers with dramatically increased speed, reliability, and versatility.

As a result of these new technologies, competitive markets are forming, where before only a regulated monopoly existed. Companies have been created to provide long distance service in competition with AT&T. Other companies compete with AT&T's manufacturing subsidiary (formerly Western Electric, now AT&T Information Systems), which once produced most of the telephone switching equipment used in the United States. Practically every company in the consumer electronics industry now makes and sells telephones.

There are significant benefits for Maine from the telecommunications revolution. Maine's scattered population and location at the end of many transportation routes, have sometimes impeded our economic and social growth. Modern

telecommunications offers Maine people and business the opportunity to eliminate the distance barriers between ourselves and the world.

A number of observers of the economy have noted its evolution towards information-based industries such as banking, publishing, insurance, real estate, and health care. These industries have been the fastest growing both nationally and in Maine, for the past 25 years. One of their major features is that they rely on telecommunications and data processing to make significant growth possible.

The potential impact of the telecommunications revolution on Maine is enormous. Telecommunications can improve the quality and availability of education throughout Maine. The need to provide advanced engineering education to the growing population of Greater Portland has been recognized for some time; but the engineering educators are in Orono, over 100 miles away, so teachers must travel to Portland to offer the needed classes. The technology for two-way video teleconferencing already exists, and will allow classes to be conducted with the teacher in Orono and the class in Portland.

The development of competitive markets in long distance service offers the opportunity for Maine households to significantly lower their costs for long distance service.

Two-thirds of the average Maine household's phone bill is long distance charges, an especially high percentage because Maine is so large, and population densities so low *.

It is also clear that the benefits of lower long distance rates will be accompanied by costs that, for some, may be significant. Methods of pricing telephone services that were appropriate for the old monopoly system are likely to change significantly, due to the development of the new technologies and competitive markets. But the old methods had important advantages for certain segments of the population. The prices for basic local service were kept low enough so that almost everyone (93% of Maine households) has a phone. The maintenance of universal service has long been an accepted goal, recently reaffirmed by the Maine Legislature.

The debate over telecommunications policy in Maine has recently been couched in terms of "modernization" vs. "universal service". The implication is that Maine must choose a telecommunications policy that will allow businesses to enjoy state of the art telecommunications facilites, while severe

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* Maine's population density (excluding the unorganized territory) is 64 persons/square mile. The population densities of other New England states are: New Hampshire 102, Vermont 55, Massachusetts 733, Rhode Island 898, Connecticut 638.

hardship is placed on the poor; or alternatively, one that helps the poor while making economic growth more difficult, if not impossible.

This is a distorted and misleading view of the choices before Maine in telecommunications policy. The problem is not one of choosing between necessary modernization of the phone system and the real needs of low income citizens; but of how to design and implement a policy that addresses both needs at the same time. Maine can neither afford a telecommunications system in which phones are available only to the rich, nor one that discourages the introduction of new technologies and services that can benefit all users of telecommunications and all Maine citizens through improved job opportunities.

A number of issues have been identified as central to the development of an effective telecommunications policy for Maine.

First, how to respond to the emergence of competition in the telephone industry?

The Federal government has already established a goal of greatly increased competition and taken significant steps towards this goal, particularly in interstate long distance services. But the State still has fundamental decisions about competition which it must address.

Competition to provide intrastate long distance services has already come to Maine with resellers of WATS service and a limited intrastate long distance service offered by Hampden Phone Company. It is also becoming increasingly possible for large long distance users to set up their own phone systems. The pricing of telephone services has become a major concern because of new rate concepts, such as "access charges" and "local measured service."

Competition also raises questions about the regulatory process. The State regulates the telephone industry because it has been provided only by near-monopoly companies; but now that competition in some phone services is emerging, decisions must be made about whether changes in regulation are now appropriate and needed.

Second, how should Maine respond to the increasingly important role played by telecommunications as the economy becomes more and more of an "information economy"?

A vigorous debate has emerged in Maine about how quickly newer switching and transmission technologies should be acquired, and whether there is a need for a public role in investing in telecommunications as infrastructure.

Third, what are the effects of changes within the telecommunications industry on the maintenance of universal telephone service?

A phone system with affordable rates for basic local service has been a key goal of both the regulators and the industry throughout most of this century; but many now see this goal as unattainable if local rates rise significantly as a result of industry restructuring. The federal government has already decided to raise phone rates for all households and businesses beginning this year.

Fourth, what are the effects of these changes on the public telecommunications network?

Together, Maine State government and the University of Maine constitute the largest single purchaser of telecommunications services in Maine. As such, decisions concerning the public communications network will have significant effects on the telecommunications system as a whole. As heavy long distance users, State Government and the University could find it economical to establish their own long distance communications network. There is concern that this could have adverse effects on all other ratepayers.

At the same time State Government and the University could

play an important role in stimulating the development of competition by purchasing communications services from a number of suppliers, and in taking advantage of new technologies to lower the costs of communications to taxpayers.

Fifth, what should be the future State involvement with telecommunications issues?

The telecommunications revolution is more than changes in the telephone industry. Technology is making communication of information cheaper and easier at the same time that information is becoming a driving force in the economy. The combination of rapidly evolving technologies and changing industry structure is likely to present Maine with both opportunities and challenges that can not yet be seen. A continuing commitment to make the best use of telecommunications for the social and economic development of Maine will be needed.

To deal with these issues, State telecommunications policy should consist of actions in several directions.

1. Maine State Government should support the creation of a competitive telecommunications industry in Maine.

A competitive industry will be better capable of meeting most of Maine's needs for investment in telecommunications and a

diversity of services than a regulated monopoly or near-monopoly.*

Encouraging competition will mean accepting some changes in the way phone rates are set. Different approaches to local and long distance rates and to fixed and variable rates are already being proposed by regulators. Competition will not come quickly, or easily, and the continued evolution towards a competitive phone industry in Maine will require careful monitoring to avoid unnecessary disruptions.

Regulation will continue to be necessary, but the regulatory process will also undergo changes. As competition develops, the extent of regulatory oversight can be relaxed. Rather than having all rates set by the PUC, the PUC might simply review rates and services established by companies.

2. Maine State Government should support continued development of a modern, efficient telecommunications network in Maine.

Three steps are needed for Maine to continue developing a modern telecommunications system. First is the encouragement of competition, as discussed above. Second, ways should be sought to measure the benefits of the increased speed, reliability, and

* Minority views are expressed in Appendix II.

flexibility of modern communications technologies, in order to provide better information to regulators.*

Third, public investment or investment assistance should be considered in those cases where high priority public needs exist, but are not being adequately met otherwise. Examples include services to some rural areas that might not be fully served, or where specific economic development opportunities exist.

3. Means to assure universal service must be developed.

This means that a definition of universal service must be agreed upon, a class of phone customer eligible for assistance identified, means of providing the assistance developed and funding sources identified.

4. State Government and the University must work together in planning investments in the public telecommunications network.

The decisions concerning State and University communications investments should be made in the context of overall public policies. Large investment decisions should be considered in the context of policies concerning competition, maintenance of

* Minority views are expressed in Appendix II.

universal service, and the need to provide service to public institutions at the lowest cost to the taxpayer.

5. Maine must make a continuing commitment to finding ways to adapt changes in telecommunications technology and economics to Maine's needs.

This will mean following developments in federal policy with the assistance of national and regional organizations such as the Council of State Planning Agencies and the New England Association of Public Utility Commissioners. The State and University of Maine should also make efforts to assure that Maine can take full advantage of the opportunities offered by new telecommunications technologies. The State should also comprehensively review and reassess telecommunications policy at three year intervals.

2. ANSWERS TO THE GOVERNOR'S QUESTIONS

In his Executive Order creating the Telecommunications Task Force on Telecommunications Policy, Governor Joseph E. Brennan posed 11 questions about Maine's telecommunications network.

1. How may basic telephone costs best be structured to ensure universal voice service in Maine?

The cost of basic telephone service (a phone, plus the ability to call locally) has been kept low in order to make phone service available as widely as possible. This was done primarily by allowing a large percentage of the costs of connecting customers to the telephone system to be paid in the prices charged for inter- and intrastate long distance calls and other telephone services. This rate structure was possible when only one company provided both local and long distance services.

The development of technologies such as microwave and satellite transmission makes it possible for many different companies to provide long distance telecommunications, either as a common carrier or for their own use. When it is possible for a number of different long distance providers to exist, the old concepts of telephone pricing become unworkable, and new concepts have to be developed.

Two major issues have arisen in setting rates in the new telephone industry. One is how to set rates for local and long distance services. This is primarily a problem of deciding how much of the common costs (the wires, poles, switches, etc. common to any kind of call) are to be paid for by local, and how much by long distance.

Several theories have been proposed on how to set rates. The theories adopted by the Maine Public Utilities Commission (PUC) and by the Federal Communications Commission (FCC) will probably mean that local costs will rise over time and long distance rates will be lowered -- although this has not yet happened to any significant degree.

The second issue to be addressed is how to set rates to reflect the fixed and variable costs of the telephone system. The Maine PUC decided in its controversial "local measured service" order that local rates should no longer be a single flat rate, covering both fixed and variable costs, but should be combined fixed and variable charges to more accurately reflect the costs of service as determined by the PUC.* The result is lower fixed rates plus new variable charge based on usage which,

* This new rate would apply only to electronically switched exchanges which have the capability to measure local calling patterns.

according to the PUC will avoid having people pay for calls they do not make.

On the other hand, the Maine Public Advocate and others question whether there is, in fact, any difference betwen fixed and variable costs in local exchange service, and so question the benefit of local measured service. They also argue that local measured service provides a degraded form of telephone service, since costs must now be monitored closely by low income citizens, thus placing an additional burden on those least able to afford phone service and often those most in need of it.

At the same time as these arguments are occuring in Maine, the FCC has also addressed the question of fixed and variable costs, by replacing what have been variable interstate long distance rates into a combination of fixed and variable rates. The fixed rates are now called access, or subscriber line charges, and became effective June 1 of this year. The FCC argues that lower variable rates are needed to prevent large long distance users from bypassing the network, which would only further increase rates for those left on the network. Access charges, because they will raise the basic monthly cost of phone service, are also seen as a threat to low income phone users.

From the debates that have arisen, it is not yet apparent what will be the best way to assure universal voice service. But

the current uncertainty about the optimum structure of basic exchange service should not delay efforts to prepare a program to directly assist those who may adversely affected by rising phone rates.

State government should work with phone companies and others to develop an appropriate universal service assitance program for consideration by the second session of the 112th Legislature. In order to avoid unnecessary distortions in rates, it is preferable that universal service assistance be funded from taxes rather than rates.

Implementation of local measured service has been delayed by the Public Utilities Commission until February 16, 1985. The PUC will conduct further hearings and a detailed examination of the issues raised by those concerned with local measured service. The Commission will prepare a report on its findings for the Legislature's Joint Standing Committee on Public Utilities this fall.

In addition to the structure of local and long distance rates, there may also be effects on the rates of remote areas within Maine. Very rural areas may see rates increase faster than more urban areas because of the higher costs of serving low density areas, although it should be noted that in some rural areas with fully depreciated equipment, costs may be lower than

in more densely populated areas with newer equipment. Means may have to be developed to keep phone service prices from rising significantly faster in rural areas, such as requiring all customers to pay a portion of the costs of maintaining the phone system as a whole.

2. What specific economic development opportunities do advanced telecommunications services present to Maine, in expansion of existing businesses and attraction of new businesses? How may State development activities be directed to realize these oppportunities?

The influence of telecommunications on economic life has become so pervasive that a complete catalog of the opportunities made possible by better communications services is impossible. However, certain kinds of businesses are known to be telecommunications-intensive. These include:

Direct marketing. The use of the telephone for marketing retail goods has grown enormously. The number of companies using 800 numbers to provide sales and service on products is now so large that AT&T publishes phone books just for 800 numbers. L.L. Bean is the leading example in Maine of this kind of business, with two million customer service calls last year. Other Maine companies will make increased use of direct marketing by phone.

Engineering and Consulting Services. Engineering and management consulting services are growing in Maine, particularly in southern Maine. Most of the growth for these companies is the

result of marketing their services out of state. The ability to serve clients outside of Maine can be enhanced by use of telecommunications for transmitting data, drawings, and other information rapidly to clients in any location.

Data base and software development and maintenance. The widespread distribution of computers has made the development of data bases and software one of the fastest growing fields in the economy. For the most part, their development can take place anywhere, but adequate communications services can be a critical location factor.

Printing and Publishing. The printing and publishing industries are now almost completely reliant on electronic means of editing, storing, and transmitting information, and technologies such as laser printing make printing completely electronic. Telecommunications is now the key link between authors and publishers and between publishers and printers, allowing the publishing and printing industries to be located anywhere. This makes possible the development of new publishing centers. Camden, with several magazine and book publishers, is a excellent example of this kind of development.

In addition to these specific examples, telecommunications will have an increasing impact on many existing businesses. The

development of automatic teller machines (ATM's) at banks has been very rapid over the last few years in Maine, and "shared" networks which link the ATM's of many banks are becoming increasingly common; the number of such networks in the U.S. increased by more than 50% in 1984. The largest shared network in the northeast, the MONEC network, links banks in Maine with 160 other banks in New England, New York, and Maryland.

Shared ATM networks will also become the basis for "point of sale" terminals, which permit stores to be paid directly from a customer's bank account for a purchase. These "debit cards" (as opposed to credit cards) are expected to come into very widespread use, and should have the effect of lowering prices since stores will not have to await payments.

The State Planning Office and State Development Office should work with the communications industry to identify the advantages that Maine's current telecommunications system provide, and to assist in understanding what Maine's needs may be in the future.

3. Are Maine businesses constrained by existing or anticipated levels of telecommunication services?

Telecommunications is becoming an increasingly important part of business operations, and there is evidence that the

adequacy of Maine's telecommunications network is a source of concern to some Maine businesses. However, the evidence is incomplete; there is also evidence that, except for cost, most Maine businesses are not significantly concerned with the telecommunications network.

Two efforts have addressed the question of the adequacy of the Maine telecommunications network in the past year. The Maine Development Foundation's Technology Strategy for Maine reviewed telecommunications issues, and concluded that "a quality telecommunications capability is a competitive necessity for long-term development of technologically innovative enterprises in an information-oriented society. The current status of Maine's telecommunications infrastructure is seen by the [Technology Strategy] Task Force as an impediment to the development and expansion of many export-oriented industries."

Following the Technology Strategy Task Force's report, the Public Utilities Commission approved an agreement between the Public Advocate and New England Telephone under which investment in electronic switching in ten Maine exchanges will be made over the next three years.

The second effort was a survey of Maine businesses conducted for the Greater Portland Chamber of Commerce. The Portland Chamber has been concerned about the telecommunications network,

and commissioned the survey in order to assist the Governor's Task Force in its consideration of telecommunications policy.

The survey consisted of a questionnaire mailed to about 2200 businesses and institutions throughout the State and an interview with about 25 selected businesses. About 15% of the mailed questionnaires were returned. The responses, though fewer than needed for a scientifically valid sample, were from a wide diversity of businesses, including both large and small companies. The survey response group was roughly characteristic of Maine businesses in terms of size, and contained a slightly greater share of manufacturing companies than in the State as a whole.

Responses to the survey indicate that certain kinds of business are concerned about the adequacy of the telecommunications network for meeting their needs. These tend to be larger companies which are already heavy users of the network. Those concerned also tend to be "transaction intensive" operations , such as banks and hospitals. Companies stating a concern about telecommunications are also those that indicate they expected to grow rapidly in the next year.

Companies that were dissatisfied with some aspects of the phone network indicated that they have, or may consider, some form of bypass of the network if their concerns are not met.

However, the form of bypass was not indicated, and most companies indicated they would prefer to remain on the public network if it meets their needs.

The most commonly expressed concern by all respondents was about the costs paid for the telecommunications services provided. This concern was evident among all sizes of businesses, and was evident whether or not they were heavy users of the phone network.

Concern about the adequacy of the telecommunications network was not, however, apparent among the majority of respondents to the survey; overall satisfaction with the quality of the network was expressed by most respondents. Since the majority of the respondents were small firms who were not heavily dependent on telecommunications, these results suggest that concern about telecommunications is directly related to intensity of use.

It is apparent, therefore, that Maine business as a whole is not currently constrained by the telecommunications network. However, there are businesses in Maine concerned about the state of the network, implying that the issue of modernization of the phone network is an important one. The expressed concern about the costs of telecommunications indicates, however, that the cost implications of modernization investments must be considered.

4. Does private market demand provide sufficient stimulus for the modernization of Maine's telecommunications network? Is it in the public interest for State government to establish incentives for investment in advanced telecommunication facilities?

Market demand for telecommunications should serve as an adequate stimulus for most modernization investments in Maine, if the pricing of telecommunications services is allowed to provide clear signals about where the best opportunities for investment are. This will mean that prices must generally reflect the marginal costs of providing service.

As competition to provide telecommunications services increases, there should be little need for the State to view telecommunications as an infrastructure investment which the public must provide. Telecommunications is one of the fastest growing industries in the United States, and is generally a very attractive one for investments.

However, there may be some kinds of investments, such as those in rural areas where competition may not develop quickly, that the State may wish to assist in financing as it does with other kinds of businesses through FAME or other mechanisms.

There may also be a limited number of opportunities where carefully targeted public assistance would provide significant development benefits. For example, a satellite link at the proposed Orono Research Park might be an important stimulus to

the development of that facility.

5. How do current rate regulation and corporate capital investment policies affect modernization of Maine's telecommunications services?

Investment in the Maine telephone system is determined by the Phone Companies and reviewed by the PUC as part of its rate setting responsibilities. The PUC reviews investments made by the utilities during rate hearings, and determines if the investment is related to the purposes of the utility. Those investments that are determined to provide reasonable and adequate service and are cost-effective are approved by the Commission for inclusion in the rate base.

The Commission approves those investments that will provide service at the lowest cost. Modern forms of equipment are permitted in the rate base when their cost can be shown to be lower than the equipment it replaces. In this way, the overall costs of the system are kept as low as possible.

The effect of these policies on the pace of modernization is that new investments generally come first in areas of high population density, where the cost per customer is the lowest. This, according to the PUC, is similar to the pattern of investment in other states.

The focus on cost-effectiveness may mean that some of the

benefits of modern technology are not fully considered in investment or regulatory decisions. Newer switching and carrier technologies are not only cost-effective in the sense of providing service at low cost, but are also capable of greater speed, reliability, and versatility in carrying information. The benefits of these improvements are not easily measured, and their full potential may not even be perceived immediately by phone customers.

A cooperative effort of the phone industry, PUC, the University of Maine, and others to identify and measure these benefits could develop techniques for better understanding the effects of modern telecommunications technologies, and lead to a more informed regulatory process.

6. Will by-passing the public telephone network by large system users have significant effects on rates for remaining users?

In Maine, 9% of the customers provide almost 50% of the toll revenues for New England Telephone. Most of these revenues are from long distance service. It is technologically possible for many of these customers to construct their own systems, allowing them to bypass the existing network. It is also possible for large long distance users to connect themselves directly by private line to long distance switching centers, thus avoiding the costs of having their calls routed first through local networks. This latter form is called service bypass.

Both of these forms of bypass will result in lower long distance rates for those large users who take advantage of them. However, if many major long distance users move off the network the expense of the system will rest upon those who are left, which could lead to substantially higher local rates.

The immediacy of the bypass threat is uncertain. The costs of technology for bypassing are steadily declining, but no large users in Maine have taken steps to significantly bypass the network. Many of the respondents in the Portland Chamber of Commerce Survey indicated they did not want to become a phone company.

However, there are examples of bypass elsewhere, and there is growing concern about service bypass which is very inexpensive, requiring no capital investments. Significant increases in the need to transmit data by digital transmission may lead to bypass since voice transmission can often be added to these data channels at relatively low cost.

State Government and the University of Maine are potential bypassers because of their large demand for telecommunications services, although the large number of facilities which each operates in various parts of the State means that complete bypass

is impossible. The effects of any bypassing which may be done are also uncertain. State Government and the University should consider the impacts of their decisions to be sure that their actions benefit the people of Maine, as both ratepayers and taxpayers.

The potential effects of bypass have been of great concern to the Federal Communications Commission. The FCC's recent "access charge" decision was justified on the grounds that lower long distance rates are needed to prevent bypass by large users.

A distinction should be made between bypass -- where large phone customers leave the system with substantial effects on the rates of those who remain -- and competition -- where each customer can seek the lowest cost service without significant effects on other customers. Bypass is a phenomenon of the transitional period between monopoly and competition that will require careful monitoring by regulators and prudent investments by those responsible for the publicly-owned network to minimize adverse effects.*

7. Will current investment in parallel telecommunication systems impede or enhance the establishment of the most efficient and advanced telecommunications network in Maine?

Much of the technology of modern telecommunications is still

* Minority views are expressed in Appendix II.

in its infancy. Experimentation with different technologies will take place over the next decade. For example, the full potential of computer-based switching equipment has not yet been revealed. Investments in parallel technologies (satellites and microwaves, for example) will be a part of this experimentation, and will be needed to discover which technologies are, in fact, the best.

The kind of experimentation needed will best be done in a competitive market environment; parallel investments in technology will be beneficial under these circumstances.

However, there is a possibility that parallel investments in communications may represent an impediment to development of the most efficient system in some circumstances. It is possible that a town may have a cable TV company setting up wires to deliver its service, while the telephone company is rewiring as part of a modernization investment. It might be economical for one investment to provide both services, but there are fairly strict regulatory impediments to cable services and phone services being provided by the same company.

There are a number of reasons why these services are separated, but providing telecommunications services at the lowest overall cost requires closer attention to the question of whether services can be provided by integrated companies.

8. To what extent need technologies not now regulated by the State (cable TV, microwave radio transmission, satellite communications services, and paging services) be brought within the purview of the Public Utilities Commission?

Regulation of telephone service was essential while the service was provided by a monopoly, but regulation will become less necessary as competitive markets develop. It is important that regulatory procedures be continually re-assessed, as has already begun with certain types of service, in order that procedures not form a barrier to entry of new firms or new services.

The test of which services should be regulated must be: how competitive is the industry? Determining the extent of competition in the industry will involve examining the number of firms providing services, the market shares held by each, an examination of market power of the larger firms, and an examination of pricing policies to be sure that pricing is efficient (that is, prices reflect marginal costs).

Any regulated telecommunications service that is provided exclusively, or even predominantly, by one company, will require regulation of prices by the Public Utilities Commission. Services that are provided by many companies need not be regulated; and companies with very small shares of regulated markets may not need the same degree of regulation as those with very large shares. Such companies might simply file their rates

periodically with the PUC, which would review the rates and respond to consumer complaints, but would not actually set the rates.

Competitive markets will not develop instantly, so the regulatory process should encourage new entry into markets where technically and economically feasible*. This means assessing the regulatory requirements of new entrants and markets, to avoid having the process itself be a barrier to entry.

9. How will the availability of advanced telecommunication services affect the demand for public facilities such as schools, roads, hospitals, and government buildings?

State government is currently one of the largest telecommunications users in Maine. With offices and data processing needs throughout Maine, State government should be one of the leaders in finding imaginative and useful ways to use telecommunications.

Demand for public facilities and services which primarily involve information transfer -- such as education, some forms of health care, and assistance in receiving government services -- is likely to increase as information becomes cheaper and easier to disseminate.

* Minority views are expressed in Appendix II.

Personal computers might be used to check on the status of bills in the Legislature, and video teleconferencing could permit State government to hold meetings with people in Augusta, Presque Isle, and Portland.

Telecommunications can also assist the University. Teleconferencing facilities at University campuses would allow course offerings now available at only some locations to become more widely available throughout the State. A recent survey found that as many as 38,000 Maine households would be interested in using their home computers to access University-sponsored educational information.

10. How may State government best coordinate the efforts of those public agencies involved in telecommunciations policy?

State Government must take three steps to assure coordinated development of telecommunications policy in Maine. First, the State must assume an active role in understanding the implications for the future of the rapid changes in telecommunications. It is clear that these changes require an informed and knowledgeable public policy. Telecommunciations issues should continue to be followed by the State Planning Office and other state agencies.

Second, State government and the University must act together in planning and purchasing facilities for the State's

together in planning and purchasing facilities for the State's own telecommunications network. Many of the facilites that State government and the University may use, particularly those for such services as teleconferencing, could be purchased and operated jointly at significant savings.

Third, the University should provide technical and socioeconomic research into a great many issues concerning telecommunications about which we know very little.

11. In what manner and to what effect should State government involve itself in federal regulatory and legislative activity dealing with telecommunications policy?

Federal regulatory policy will play a key role in shaping the choices available to Maine. As part of the planning effort, the State should monitor developments in federal regulation and communicate the state's concerns either through the Congressional Delegation or, where appropriate, through direct intervention before the Federal Communications Commission.

Several multi-state groups, including the National Association of Regulatory Utility Commissioners, the New England Association of Public Utility Commissioners, the National Association of State Utility Consumer Advocates, and the Council of State Planning Agencies, are all involved in following telecommunications issues. Maine should actively participate in

these groups, and the PUC, Public Advocate, and State Planning Office should share the information gathered from those groups in which each participates.

3. COMPETITION

The breakup of AT&T, which took place on January 1, 1984, is seen as the point when the telecommunications industry changed from a monopoly to a competitive industry. In fact, however the industry had been steadily evolving towards increasing competition over 25 years; and even now, more than a year after divestiture took effect, the transition towards competition is still very incomplete.

This transition is occurring for a number of reasons. The technology of telecommunications has evolved beyond the transmission of information solely by wire, to networks consisting of satellites, microwaves, fiber optics cables, or radio transmissions. While the phone utilities use all these technologies in their network, the flexibility and costs of these technologies have now reached the point where their use is not limited to the utilities.

Alternative networks for transmitting long distance calls have been developed around microwave and satellite transimitting systems. Companies like MCI, GTE Sprint, Allnet, and others now compete directly with AT&T in providing long distance services. The emergence of these "other common carriers" was a major reason for the Court-ordered divestiture of AT&T.

Alternative networks have not been confined to new common carrier services. Companies with widespread facilities that need to keep in relatively constant contact have established their own communications networks. These are often based on microwave systems, that now can cost as little as $25,000 to set up.

Technological change has been a key to the emergence of alternatives to the "wired monopoly"; but changes in regulatory policy have also been very important. It was not until the Federal Communications Commission decided that certain microwave frequencies should be available to non-utilities, that the way was clear for private microwave systems, and for the new common carriers to offer services. Similarly, the purchase of non-Western Electric telephones by households depended on an FCC decision.

Competition, therefore, is something that has come to telecommunications both from within the industry, as changing technologies and costs make new services and companies possible; and from outside the industry, as the result of regulatory decisions, particularly at the federal level.

The emergence of competition has brought more than new names to telecommunications. Long distance calling prices have been reduced for many, particularly those with access to more than one interstate service provider. Competition for intrastate long

distance service is also beginning to emerge in some states including Maine, on a limited basis.

At the same time that long distance rates are being reduced, other rates are increasing. The FCC has already ordered that most phone customers will pay a $1.00/month charge beginning July 1, 1985. A number of proposals have been made to raise basic local service rates, and there is great fear that low income phone users will be forced to give up their phone service.

The question is being asked whether competition is desirable at all in the telecommunications industry. For several reasons, competition should be actively encouraged in Maine*. Competition has several benefits that will be to the long term advantage of Maine.

The most immediate prospects for competition in Maine will probably be in the intrastate, long distance markets where technology is making alternatives to the "wired monopoly" possible. Competition already exists in this market on a very limited basis. The Hampden Phone Company has established an alternative long distance system for a few areas, and there are four companies which have been established to buy large capacity

* Minority views are expressed in Appendix II.

long distance lines and resell these lines on a shared basis to smaller users.

Competition to provide intrastate long distance service has not reached the point where the larger non-AT&T carriers such as MCI or GTE-Sprint are seeking to provide service, as they have in other larger states. Nor is it clear when, or even if, they would do so. However, as these companies seek to expand to new markets, Maine, lying just outside the major metropolitan centers of the Northeast, will probably be considered by one of these companies within the next few years.

Lower intrastate long distance rates would be a major benefit to Maine, where intrastate long distance rates make up as much as one-third of the average phone customer's bill.

Another form of competition that may come some time in the future is for the right to provide basic local service. Telephone utilities, cable TV companies, or others might compete for the right to be the exclusive provider of local service to an area, as Cable TV companies now compete for franchise rights. Although there are both economic and regulatory barriers to such competition at this time, the rapidly evolving nature of the telecommunications industry may permit such competition, which could help hold down the costs of local service.

Competition is also important because opens up an industry to try new ideas and new technologies. A major drawback to monopolies, even regulated ones, is that a single company cannot be nearly as effective at trying out new technologies as a number of companies. It is unlikely, for example, that microcomputers could have developed as quickly or in such variety as they have if only one company had been responsible for designing, manufacturing, and selling them.

Given the rapid pace of technological change, competition is the only real means of assuring that new technologies and services are given real tests in the marketplace.

It is important to understand that competition, and its benefits, is still some time in the future for most of Maine. Only Portland is today served by one of the non-AT&T long distance carriers (GTE-Sprint). Telecommunications investments are most likely to occur first in areas of greatest population density, which means it may be even longer before rural areas of the State see significant competition in phone services. But the lack of immediacy is not an excuse for a lack of action by Maine to make possible the development of competition where it will provide better services at lower costs.

There are also drawbacks to competition which must be

addressed so that the benefits may be enjoyed with a minimum of disruption. This means assisting low income phone users threatened with the loss of service. It may also mean assisting areas of the State where low population density could lead to higher phone rates. (These are discussed in Section 5)

Finally, it should be emphasized that there is little the State can do to hold back the transition to competition. The basic decisions about the structure of the telecommunications industry have already been made by the federal government, both in the divestiture of AT&T and in the actions of the FCC. There is no practical way that effects of technological and economic developments which make competition possible can be reversed.

Despite the breakup of AT&T, and the emergence of new companies in long distance service, there is still a significant rate setting role for both Federal and State regulators, and this will remain so for some time.

However, the approaches to rate regulation are changing significantly. Interstate long distance rates, which have been charged on a per minute basis, will soon change to a combination of flat and per minute rates. The Maine PUC has ordered similar changes in some local rates. Nationally, competition in long distance service is resulting in lower rates, but local exchange rates are increasing.

The changes in prices are the most noticeable effect of the telecommunications revolution for most people. A fundamental question of telecommunications policy is what, if anything, should be done to keep phone rates the same as they have been.

A second issue raised by the changes in telecommunications is whether and how the regulatory process itself should change to reflect the emergence of competition.

As discussed below changes in phone rates are a necessary part of the emergence of competition, and exactly what changes will be necessary should be left to the regulators to decide. A clear policy context for those decisions is the most important aspect of general state telecommunications policy towards rates. Modifications to the regulatory process which may be appropriate are discussed below.

RATE SETTING AND STATE POLICY

The most noticeable effect so far of the divestiture of AT&T is a series of changes in telephone rates. Nationally, long distance rates are declining, and local exchange rates are rising. Both interstate long distance rates and some local exchange rates are being changed from a purely variable charge to

a fixed charge of $1.00/month and a variable rate beginning June 1 of this year.

As a result, the relationship between telephone rates and the emergence of competition needs to be well understood. The basic problem is that what made sense for the pricing of telephone services under the AT&T monopoly does not apply to pricing in a competitive industry. But there is disagreement on exactly how prices should be set in a competitive market.

Until fairly recently, telecommunications has meant communication through the wires and switches of the telephone system. Each phone is connected to a central office where a switch routes calls among users in the local area. Other lines and switches connect the central offices to each other, allowing long distance calling.

This type of system is extremely capital intensive -- a substantial investment must be made in wires, poles, switching equipment, etc. The needed investment is so large that it would be extremely inefficient to have many companies providing service. Thus, it was decided in the early years of the telephone industry to permit only one company to provide telephone service in an area. In exchange for the exclusive right to provide service, the company would be regulated by the government, in order to avoid the problems associated with

monopolies.

The process of regulating the monopoly telephone company is, in concept, a fairly simple one. The basic rate-setting equation is as follows:

Revenue Requirement = (Rate base x rate of return) + operating expenses

The revenue requirement is the total dollar amount to be paid by consumers. The rate base is the real and personal property the company devotes to the purposes of the utility, valued at original cost less depreciation. The rate of return is the cost of capital, including both debt and equity (the return on equity being the shareholder's profit). Operating expenses are salaries, taxes, maintenance, etc.

In a rate case, the PUC reviews the capital investments made by the utility to be sure they were made for purposes related to the operation of the utility, determines the fair rate of return to be earned on investments, and reviews the operating costs of the company to determine which it will be allowed to recover from ratepayers.

Once the Commission has determined the revenue requirement, the next step is to set the rates for the various classes of

service (local exchange and long distance rates, businesses, residences, WATS lines, coin telephones, etc.).

While this procedure is relatively straightforward, substantial complications arise from the nature of telephone services. The most difficult problem is how to allocate the common costs of the network among the various kinds of services, particularly local and long distance.

The common costs are essentially the costs of the wires, poles, and a major part of the switches; equipment common to both local and long distance calls. It is not clear how the costs of this equipment should be allocated between local and long distance rates, yet it is a central issue in telephone rate regulation, because the common costs are also the largest costs in the system and so have an enormous influence on rates.

In establishing rates, the common costs must first be divided between state and federal jurisdictions. In the past, this was been done through negotiations between the FCC and State utility regulators over the separation of the common costs of the AT&T system into the portion to be paid by interstate long distance rates under the FCC's jurisdiction, and the portion to be paid by local and intrastate rates governed by the state utility commissions. A final "separation" of these costs was made in the Court order on AT&T's divestiture.

Both the regulators and the phone companies have long had a goal of maintaining universal service, and have determined that this could best be accomplished by keeping local exchange rates as low as possible. Thus, the tendency over time was to assign higher and higher portions of the common costs to the FCC and interstate long distance rates. As long as the sole provider of most phone service was AT&T, the actual distribution was relatively unimportant from the Company's perspective, although there were significant implications for the distribution of costs among consumers.

With competition, however, particularly in interstate long distance services, the question of how to assign the common costs among the various services becomes critically important. A number of different methods to allocate these costs have been either proposed or used. Four theories are most frequently cited:

1. Common Costs are Local Exchange Costs

In this view, (held by many phone companies and by the current FCC) all the basic costs of wires, poles, switches, etc. are considered to be the costs of local exchange service. Since

these facilities are all necessary to any local calls, local rates should be set to cover the costs of these services. However, because the practice in the past has been to assign increasing shares of common costs to long distance service, the effect has been, according to this view, that long distance rates subsidize local rates.

The implication of this view for the pricing of telephone service is that local rates should rise and long distance rates should decline to more properly reflect the "actual" costs of the network. The development of competition in the long distance network is seen as an added impetus to these changes in pricing, since the overpricing of long distance service provides significant incentive to users, particularly large users, to avoid high priced long distance charges by building their own systems and bypassing the network. This would leave the remaining users of the network to pay higher rates in order to cover the costs of the network.

2. The Marginal Cost Theory

According to this theory, adopted by the PUC in its most recent NET rate case, there is no single true division of the common costs between local and long distance services. Since all types of calls use the same equipment, there is no certain way to

decide how much of each wire, pole, or switch is in fact a cost of local and how much of long distance service.

Rather than trying to divide costs among local and long distance service, the long run marginal cost of the system as a whole should be determined, and rates set to cover these costs. When prices cover marginal costs only competitors who can provide service at lower marginal costs than the regulated utility would enter the market.

The implications of marginal cost pricing for phone rates are still unclear, since the PUC has not yet fully used marginal cost pricing. The approach to rate setting using marginal costs that is frequently suggested by economists would set lower prices for long distance services, where demand is most sensitive to price. Basic local rates would be somewhat higher, because demand is less sensitive to price.

If this approach were adopted, the result would be generally similar to that suggested by the "common costs are local costs" theory. Long distance rates would decline and local rates would rise.

3. The Cost Causation Theory

This theory is propounded by Dr. William Melody, a widely known expert in telecommunications. According to it, the costs of the system needed to provide only local calls can be distinguished from the costs of the system needed to provide long distance calls. The facilities needed to provide long distance service are seen as costing more than those needed to provide local service, and so "cause" the system to be more expensive. Thus, substantial portions of the common costs are considered to be properly assigned to long distance rates.

This view leads to a pricing conclusion that is just the opposite of the common costs theory. Since long distance services cause the entire system to be more expensive, and thus are a major share of common costs, it is entirely appropriate that local rates be much lower than long distance rates. In fact, this theory holds that local rates may acutally subsidize long distance rates.

4. The 50/50 split theory.

A final approach would simplify the problem of dividing the common costs between local and long distance services by splitting the costs evenly in local and long distance rates. This was suggested by a witness for the Public Advocate in a

recent rate case. Its implications for rates in Maine are unclear.

Given these conflicting theories -- two of which lead to opposite conclusions, and two of which has as yet uncertain implications for rate setting -- the future relationship between local and long distance rates is unclear. However, the approaches adopted by Federal and Maine regulators suggest that a re-arrangement of local and long distance rates will take place. The only differences between the approaches appear to be about the rate of change, not the necessity for it.

In addition to dealing with questions of local and long distance rates, regulators must also decide how to set rates to reflect the fixed and variable costs of the telephone system. This problem is at the core of the controversies over the access charges orderd by the FCC and local measured service ordered by the Maine PUC.

Long distance rates have historically been variable charges, while local rates have been fixed charges. But both charges had to cover costs that were both fixed and variable. Regulators are now proposing that these rates be changed to reflect some portions of the actual fixed and variable costs.

In the case of interstate long distance rates, the FCC will

now divide long distance charges into a variable portion and fixed charge of $1.00/month*.

The Maine PUC 's local measured service order requires, for the first time, that customers in those exchanges equipped with electronic switches be billed on a per minute basis for a portion of local calls for the first time.

These changes in rates will mean that both local and long distance rates will now be billed partly on a flat rate and partly on a variable rate basis. These changes will re-distribute the costs of the phone system. Under the access charge, everyone will now have to pay a portion of the costs of the long distance phone system, regardless of actual use.

Under local measured service, those who have made relatively large use of the local phone system while only paying a flat rate charge will now have to pay part of their bill as a usage charge and part as a fixed charge.** Both of these changes were justified by the regulators as necessary to help maintain universal telephone service.

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* This charge goes into effect on June 1, 1985. It will rise to $2.00/month on June 1, 1986. A charge of $6.00/month is already in effect on business lines.

** The fixed charge portion allows a certain amount of calling per month.

The FCC argues that access charges are necessary to avoid long distance rates so high that large customers will be forced to bypass the system, leaving everyone else with much higher bills (see below). The PUC argues that measured service, combined with a lower installation charge for low income customers, will permit low income people to have access to a phone and pay a lower rate than is possible with a higher flat rate.

Yet both of these changes are also vehemently opposed as threatening to universal service. The higher monthly costs imposed by the FCC are seen as a burden for low income individuals. Measured service is derided as a "pay phone in your home", which will force those low income people who rely heavily on their phone to pay much higher prices. It is also a concern to some businesses and non-profit institutions whose bills would significantly increase.

It is apparent from these differing views that rate-setting in the telephone system is an inexact science at best. The arguments over the appropriate view of costs and rates are highly technical and arcane, and are best left to the regulatory commissions.

But these decisions are critical, since which costing approach one chooses directly translates into the pricing of

telephone services, which in turn affects how the phone industry will evolve. The relationship between local and long distance rates is likely to have an effect on that evolution because the industry is moving towards competition in the provision of these services at different speeds.

Since competition is coming first to long distance service, the issue of bypass has become a central issue, as seen by the FCC's view that long distance rates must be reduced to prevent bypassing of the system by large users. The concern is that large long distance users, who have paid a large share of the costs of the network under the old monopoly pricing rules, will find it more attractive to build their own systems or find some other way to lower their long distance costs. The revenues lost if these large users leave the network would then have to be made up by the remaining users. The problem can be seen in Maine, where 50% of the long distance revenues are paid for by only 9% of the customers.

Bypass is seen as a significant threat because the economics appear more and more attractive. The increased attractiveness of "building your own Bell" has occurred in part because the costs of technologies suitable for high volume communications (satellites, microwaves, etc.) has been steadily declining. Microwave systems can be purchased for as little as $25,000.

Regulatory decisions by the FCC are also contributing to the possibility of bypassing the network. The FCC recently allowed the owners of private microwave systems to resell any excess capacity in their systems to other users. Many existing microwave networks are not fully utilized, and newer microwave systems have even greater capacities. The FCC's rule opens up a wide array of potential new communications networks, even in Maine where Central Maine Power and the Maine Public Broadcasting Network own statewide microwave networks.

In addition to building a private network or using already existing capacity to bypass the network, it is also possible for large long distance users to be tied directly to a long distance switch. Currently, long distance companies pay a fee to the local exchange company for the routing of a long distance call through the local switch, with the fees reflected in long distance charges.

By simply leasing a private line (or otherwise directly connecting to a long distance switch), a large user can save the expense of the local switch and receive a lower long distance rate. This form of "service bypass" is seen as the most significant threat of bypass in the immediate future because it is the lowest cost form.

Bypass is also seen as a significant threat to local rates

because of concern that bypass may be occurring as a result of improper rate-setting. If long distance rates are too high because regulatory agencies have improperly related costs to rates (either through a subsidy or by ignoring marginal costs, depending on the theory used), then inefficient (or uneconomic) bypass would occur.

On the other hand, if long distance rates are properly set, according to either of the major theories about how to set rates, then bypass would simply be the entering of more efficient companies into the market place.

Given the complexity of the issues surrounding rate-setting, general State telecommunications policy should not attempt to choose one approach to rate making over another. It should be left to the regulators to sort out the various theories, and decide which are most appropriate.

COMPETITION AND THE REGULATORY PROCESS

Rate-setting is only one of the changes which may occur as competition develops. The degree of regulatory oversight may also need to change to some extent. Most of the regulation that the Public Utilities Commission does is rate-setting regulation, where the commission conducts detailed reviews of the costs of providing telephone service, decides which expenses are

justified, and then sets the rates to recover those costs.

The process is quasi-judicial in that a phone company proposing to offer a new service or change rates seeks the approval of the PUC by presenting evidence on the need for the change. Following extensive hearings and investigations to determine if the change is warranted, during which the views of the Public Advocate, intervenors, and other interested parties are presented, the Commission makes a decision based on the evidence presented in the case. Rules of evidence similar to those used in courts apply to the presentation of the pro and con arguments.

The process places the burden of proof on the company seeking to make the change to show that the change is warranted and assures that the public has input into the decisions of the Commission, since the Commission acts as a surrogate to the market to assure that unreasonable prices are not charged. However, the process can be very time consuming and expensive for all parties involved.

The process is appropriate where one company is the sole or dominant provider of a service. But where new companies seek to enter a market to compete with a utility, and as competition grows, the need for full evidentiary hearings and rate-setting procedures should decrease. Thus, some measure of deregulation

for companies with small market shares would be appropriate.

In fact, the PUC has already taken steps in this direction by partially deregulating the markets for one way paging and marine telephone services. Companies in these industries need only file their rates with the PUC, but are otherwise free to compete. This form of regulatory oversight is also being applied in other States as market competition occurs and the principle was adopted by the Legislature this year in a bill concerning telephone equipment for the hearing impaired.

In sum, competition in providing telecommunication services will provide a number of significant benefits to Maine, but the transition from monopoly to competition will not be a rapid or easy one. There will still be a role for regulators, and the need to avoid disruptions in universal service goals will constrain the options available to producers, regulators, and customers.

4. MODERNIZATION

The Maine economy, like the national economy, is becoming more information-intensive. As this occurs, the ability to move information, rather than just goods, becomes a key to economic growth.

An adequate telecommunications network should thus be considered as essential to the long term health of the Maine economy as an adequate road network. This is true for existing businesses and for businesses which Maine might hope to attract, in competition with other states such as Nebraska, Illinois, Minnesota, and New York, that are acitvely seeking to improve their telecommunications networks.

A number of technological developments have contributed to affect the amount of information that must be moved, and the ability of the telecommunications network to handle it. Developments in computers and data processing, particularly the increasing use of micro or personal computers, have vastly increased the quantity of information that is being transmitted over the telecommunications network. Data transmission is by far the fastest growing demand on telecommunications.

Data transmission is increasingly required by a wide variety of businesses, as computers and computer networks find new applications. Banks must transmit information from automatic teller machines to central computers, insurance agents must transmit orders to the home office, retail chain stores increasingly use point of sale terminals where the cash register automatically transmits sales and inventory information to central computers. Publishers rely on transmission of text by electronic means.

The need for data transmission is not limited to business. The increasing availability of home computers has also increased the potential demand for data communications. A recent survey of Maine households* found that almost 10% of households now have a computer, and that this may grow to 15% within two years. Only a few of these households make use of telecommunications currently, but the survey indicated that as many as 38,000 households have some interest in using their communications in connection with their computer.

Although data communications is the fastest growing segment of demand on the telecommunications network, it is still a small percentage of demand compared with voice. But voice

* The survey was conducted by MainePoll, Inc. for New England Telephone Company and the Task Force.

communications has also grown. Services such as incoming WATS (800) service have grown to the point where phone books listing only 800 numbers are now published.

Developments in computer technology have not only affected the demand for telecommunications but the way in which the telecommunications network functions. The heart of the network are the switches which route calls. These switches were once electro-mechanical devices that routed calls by means of step by step relays. These switches had no or very limited "intelligence" -- that is they could not keep track of calls easily or search out the most direct routes for a call. Today's switches are electronic devices, essentially computers with significant "intelligence" that can provide greater capacity, route calls faster, with greater reliability, and at lower operating and maintenance costs.

Electronic switches have themselves been developing rapidly, with the newest generation based on more sophisticated technology than earlier versions. These newer switches allow more functions, such as call waiting (allowing the user to put an incoming call on hold), call forwarding (automatically routing calls to another number) and speed calling (having the computer-switch remember numbers that are automatically dialed after a one or two digit code is entered).

Electronic switches also are much more efficient transmitters of data, especially the more modern digital switches that, coupled with modern data transmission channels, eliminate the need for conversion between analog and digital signals.

Transmission technologies are also becoming more efficient. Fiber optic lines greatly increase the number of messages that can be carried in the same space as conventional copper wires, and the transmission capabilities of copper wires themselves have also been improved greatly in recent years.

Trends in technological development and the economy point in general to an increasingly strong relationship between telecommunications and development of the "information economy". The pace of innovation in both computers and telecommunications is such that the link is only likely to strengthen over time, as evidenced by the introduction of computers and telephones combined into one unit.

Telecommunications is only one factor among many that affect the economy and business location decisions. It would be a mistake to over-emphasize the importance of telecommunications as the sole key to economic development, as it would any single factor. Very modern telecommunications facilities exist in a number of rural areas in Maine (such as Winthrop, China, and Hampden), but catalytic effects from these facilities on economic

development in these areas are not yet apparent. And areas with significant economic growth, such as South Portland, are served by relatively old equipment.

Thus, it should not be concluded that Maine must immediately acquire all the most modern telecommunications equipment in order to have economic development; overly rapid investment would add to the rate base and increase rates without corresponding benefits.

However, it is clear that the long term relationship between economic growth and the ability to move information means that the telecommunications system in Maine should be considered a resource for the State. In order to improve use of that resource, three steps should be considered: encourage competition, develop new information for regulators about the benefits of modern technology, and, in certain specific cases, consider public investments in telecommunications*.

First, competition in the communications industry should be encouraged. As already suggested, competition will bring investment and different approaches to meeting the telecommunications needs of Maine. It is the most effective

* Minority views are expressed in Appendix II.

single action the State can take to assure long term improvements in telecommunications.

However, regulatory review will still be the most influential force in the short term. The PUC's review of capital expenditures to determine which will be allowed in the rate base and the pace at which costs will be recovered (depreciation) has become a source of concern to some who believe capital investment in the phone system has been inadequate.

Maine has a low percentage of its exchanges converted to electronic switches. Statewide, 32% of phone lines are currently serviced by electronic switches, with 26% of New England Telephone's customers using electronic switches. Statewide figures for other New England states are unavailable, but in the New England Telephone system as a whole, about 50% of customers are served by electronic switches.

The PUC allows into the rate base those investments it determines to be cost effective, that is, those investments that provide service at the same or lower cost to ratepayers.* Both operating and maintenance costs are considered, so that electronic switches are allowed to replace older switches when

* Unlike the electric utilities, the PUC does not review and approve the investments of the telephone utilities companies before the investment is actually made.

the capital and maintenance costs of the new switch are lower than the capital and maintenance costs of the older switch. Similarly, where high capacity transmission lines such as fiber optic lines can provide service at a lower cost than a number of lower capacity lines, they are permitted in the rate base.

Using this cost effectiveness test means, according to the PUC, that Maine's somewhat lower rate of capital investment compared to other New England states is simply reflective of the somewhat higher costs of providing service to a state with significantly lower population densities than other States. The Commission points out that investment has first occurred in Maine and elsewhere in the areas of highest population densities, and that, over time, as older equipment becomes increasingly expensive to maintain, it will be replaced with more modern technologies.

Others have argued that the level of modernization in Maine is having a retardant effect on economic development. A survey conducted for the Portland Chamber of Commerce of businesses throughout Maine found that large companies which were also intensive users of the phone system, especially for data communication, had serious concerns about the adequacy of the existing phone network to meet their needs. Many of these companies were at least considering some form of bypass if their

needs could not be met.

It should be noted that those concerned with the communications network were a minority among all those surveyed; most respondents were owners of small businesses who did not perceive telecommunications as a major factor for them, other than a concern for the cost of services. Moreover, the survey itself was not designed to be a scientific sample. But the survey did point to an existing concern about the state of Maine's telecommunications networks.

The desire to provide faster modernization of the phone system has lead to the suggestion that the PUC should take more explicit account of the economic development potential of telecommunications, and permit a faster investment rate.

The Commission has responded to this suggestion in two ways: First, it notes that a basic principle of ratemaking is that existing customers should not be required to pay for services for which there is no current demand. This would simply raise the rates for everyone. The Commission also notes that whenever a demand can be shown sufficient to pay the costs of a new investment, the investment will be permitted; and that there is no evidence that any demonstrated demand has not been satisfied.

The PUC, in its 1984 decisions on New England Telephone's

rate requests, approved funds for a significant expansion of investment in electronic switching. Portland will receive a new long distance switch that will significantly increase the capacity to handle traffic. Towns such as Kennebunkport, Rockland, Camden, Yarmouth, Freeport, Biddeford, Saco, Old Orchard Beach, Bath, and Brunswick are scheduled to receive new switches within the next three years.

Despite the basic capabilities of the regulated utilities to meet Maine's telecommunications needs, there remains a question of whether the utilities and the PUC can improve the evaluation process for investments to assure that the full benefits of modern telecommunications technologies are considered.

A major distinction between the free market and the regulated monopoly is how well consumer preferences are able to be translated by a company into pricing and output decisions. In a free market, it is the sum of individual consumers buying decisions which provides the signals to the company about how much to produce, and at what price. But for a regulated utility, the regulator serves as the proxy for the consumer in signalling to the company what investments are needed and what prices should be charged.

Ideally, the regulator (working with the utility and others) is able to discern accurately consumer preferences for services

and, through their decisions on investment and rates, indicate to the company the same levels of services and prices that would be produced by a competitive market, if one existed.

But no regulator can ever know the preferences of all the consumers for all the services available. Instead, they attempt to make their decisions on the basis of the desire of almost all consumers for adequate and reasonable service at the lowest possible cost.

This approach is sensible and appropriate to questions about basic voice telephone service. However, it may be somewhat limiting when the range of potential services to be offered is constantly being expanded as a result of new technologies. Electronic switches replace electromechanical switches when the total costs of the new switches are lower than those of the old. But the new switches offer significantly expanded services such as call waiting or call forwarding. They may provide higher capacities for businesses that are high volume phone users, or more rapid and reliable data transmission.

The value of these "side benefits" may not be fully understood beforehand by the utility, the regulator, or even the consumer. But these benefits may be the most important aspect of the new technologies, since they can greatly expand the usefulness of the telecommunications network.

As technologies become increasingly sophisticated, and the demand for information transmission grows, the dilemma of how to consider the benefits of these technologies in the regulatory process will grow. These benefits are inherently difficult to measure, and consideration of them will further complicate an already difficult and time consuming process.

But efforts should be made to find ways in which the nature and extent of these benefits can be meaningfully brought to the PUC for its consideration in regulatory decisions. Telephone utilities, the PUC, and the University of Maine could all contribute to an effort to better understand how modern telecommunications services and technologies benefit Maine, and to develop useful means of measuring these benefits.

The final step which should be considered as part of an effort to continue assuring an adequate telecommunications network is to decide whether the network should be considered as an essential part of Maine's infrastructure; and therefore warrants public investment, as has been done for roads, cargo ports, etc.

For the most part, private capital should be adequate to meet most of Maine's needs. But it may be that public investments in telecommunications facilities may be justified in

certain circumstances. For example, competition is likely to develop first in the most densely populated areas of the state, where the customer base is largest and costs are lowest. This would likely be along the I-95 corridor from Kittery to Bangor. If the benefits were sufficient, the State might wish to assist with guaranteed loans or some similar financial assistance to a company that wished to extend competitive services to Presque Isle or into Hancock and Washington Counties. The federal government has historically aided telephone investments through the Rural Electrofication Administration.

Another area where the State may wish to consider making specific investments would be in specific instances where an investment would have a significant catalytic effect on development. For example, it has been suggested that a satellite ground station at the proposed Orono Industrial Park would greatly enhance the attractiveness of that facility. If this were shown to be the case, State assistance in funding might be desirable.

5. UNIVERSAL SERVICE ISSUES

Whatever the long term benefits of the changes in the telecommunications industry, it appears to many that the short term effects are simply to increase the costs of telephone service. The changing relative costs of local and long distance services (increasing local and decreasing long distance rates), and the rearrangement of rates into both fixed and variable components, are seen as particularly troublesome to low income people.

Although the inflation adjusted rates for local exchange service have actually declined slightly in recent years*, there is fear that those who can least afford phone service may find it difficult to pay the higher rates, and so may either give up phone service entirely or give up on some other necessity to continue having phone service.

Another cause of concern is the potential effect of these changes in telecommunications on the way in which the different costs of high and low density areas are reflected in pricing.

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* Basic phone rates in 1971 were $6.40, and were $3.82 in real dollars in 1984. Real basic exchange costs declined 40% from 1971 to 1983. There was an 8% increase in the real rates from 1983-1984. SOURCE: NET Price Date for Largest Calling Area, CPI.

Current practice is to set rates on the basis of total statewide costs, with relatively small variations in rates among different areas. This practice effectively ignores any large differences in costs which may be due to population density, and keeps local and long distance rates substantially the same throughout the State. The development of competition could mean that it would be difficult to maintain average rates, as has been done with only one company.

There is a great deal of evidence about the benefits to society from maintaining the current level of telephone subscribership. The phone is essential for communication with emergency services and with government agencies who provide assistance to low income people. It is also clear that changes in telecommunications should not have the effect of making telephone costs prohibitively expensive in rural areas of the State.

State telecommunications policy already recognizes these needs, but should go on to recognize that the dislocations that may accompany the development of a competitive telecommunications industry can be dealt with directly through a variety of means.

Meeting the needs of universal service means addressing the needs of low income citizens by providing direct assistance to those deemed to be eligible, and by preventing significant price

differentials between low and high density areas. It will also require State telecommunications policy makers to be mindful of the effects of changes in regulatory policy or practice and changes in State and University telecommunications purchasing practices.

Low income assistance programs

The best way to meet the universal service phone needs of Maine people is to provide direct financial assistance to low income people so that they may continue to have a basic level of phone service.

A number of questions must be resolved to establish a universal service assistance program. Who should be eligible? Recipients of existing public assistance programs, and if so, which ones? What should be done if changes occur in the public assistance programs used to determine eligibility for universal service assistance?

What will be the test of universal service? Choices include maintaining the current percentage of Maine households with a phone (currently 93% of all Maine households), or increasing the percentage of low income households (only 83% of households with incomes less than $7000) with a phone. Should assistance be

given to households for more than access to the most basic phone service. There is also a strong case that assitance should include a minimum level of calling service in addition to assitance for simply having a phone in the home. The exact level of service which should be assisted has not been determined, however.

How will an assistance program be administered, and by what agency, and how should the program be funded?

This last question has been extensively discussed. Two choices are generally recognized: taxpayer funding and ratepayer funding. Because of the need to assist low income people, the funding mechanism for such assistance should ideally be developed so that those with greater incomes provide assistance to those with less. This is best done through the progressive income tax directly, or through the General Fund which is also generally progressive.

But while taxpayer funding of an assistance program through the personal income tax or general fund is preferable on equity grounds, it would have the disadvantages of competing with other needs for general fund revenue sources and might not be available at the same time as a major rate increase goes into effect. Ratepayer funding may be considered as a means of providing assistance until the Legislature can provide assistance from the

General Fund. But ratepayer funding should be viewed only as a stopgap, temporary measure.

A direct assistance program is already envisioned by the FCC in its access charge decision. The FCC recognizes that the additional fixed rates may have adverse effects on low income customers, and so has allowed the charges to be waived for those low income customers whom the State determines to be eligible for assistance. Half the funding to provide assistance will be provided by the federal government from a portion of interstate long distance charges and half from the states, who may use any funding mechanism they choose.

Maine should be prepared to implement a direct assistance program for low income phone users no later than June 1, 1986, the date on which the access charge will rise to $2.00 per month.

The development of a direct low income assistance program does not mean that the structure of rates is unimportant. The PUC's decision to establish a $10.00 installation charge for low income people was motivated by the Commission's understanding of the Legislature's policy directive concerning universal telephone service. The Commission lowered the cost of basic service, provided an amount of local calling within the base rate, placed a cap on increases in overall rates, and also lowered the installation charges for low income customers.

Measured service may assist in maintaining universal access to the phone system, particularly if local rates rise substantially. There remain questions about the effects on some low income phone users, who heavily rely on their phones. A study of phone bills during the test period for local measured service found adverse effects on low income people. If local measured service is implemented, special assistance may be considered as part of any universal service assistance program, such as funds for additional calls over basic service, or some form of unlimited calling to specific numbers (the doctor's office, for example).

Assistance to Rural Areas

A second problem in maintaining universal service is the potential for increased costs to rural and remote areas. Although the costs have never been examined in any detail by the PUC or the phone companies, the cost per user of providing telephone service is likely to be lower in Portland than in Portage.

The reason is that Portland has a much greater population density of people, so there are more customers and they are closer together; per customer fixed costs are lower. Resulting

cost differentials have not historically been figured into the rates that each user pays. The costs are averaged across all users, so that basic service costs are generally the same throughout the service area of a company; and long distance charges are the same throughout the State for any call of a given time and distance.

As competition to provide phone service develops, it may become increasingly difficult to maintain average rates. The result of a rapid or severe "de-averaging" of rates could be to sharply increase the rates for rural areas of the State. It is conceivable that entire communities could be threatened with costs so high that most people in the community, regardless of income, would give up phone service. It is clearly necessary to maintain access at reasonable rates to both local and long distance services in all parts of the State.

The best way to handle this problem is not clear. The FCC has ordered that a high cost assistance program be implemented as part of its recent access charge decision. Under this program, a portion of interstate long distance rates will be used to assist those exchanges which have higher than average costs. The State may wish to consider a similar program to supplement the federal decision.

One method may be to require all Maine phone customers to pay a portion of the costs of the entire Maine phone system. When a call is placed from Portland to Portage, costs are incurred at both ends of the line, and the users in both places should pay some share of the costs.

6. THE STATE AND UNIVERSITY AS CONSUMERS OF TELECOMMUNICATIONS SERVICES

State government is the largest user of telecommunications services in Maine. Most of the State's use is in-state long distance calls, particulary those between State agency offices. The University of Maine is among the five largest users in the State, and it also has a heavy demand for in-state long distance services between campuses.

Advances in telecommunications should be of great benefit to State government and the University. State government already runs a microwave network for law enforcement agencies and the Department of Transportation, and the University is considering establishing a network to improve computer links among its seven campuses. Video teleconferencing could be used to conduct meetings with people from throughout the State, and could greatly expand the ability of the University to provide educational services.

The Bureau of Public Improvements, which purchases all telecommunications services for State government on a competitive basis, has recently issued a request for information, asking telecommunications companies to present information on the use of new communications technologies in State government.

The combined dominance of State government and the University has several important implications for the development of the telecommunications system in Maine. Because they utilize long distance services so heavily, they are prime candidates for constructing their own network, and are thus the largest potential "bypassers" in Maine. If they were to entirely leave the New England Telephone network while NET was still providing most of the phone service in Maine, higher phone rates for everyone could be the result.

It is, in fact, unlikely that either State government or the University could entirely leave the public network, because of the large number of facilities throughout the state and a continuing dependence on local calling wherever State and University facilities exist.

However, the State and University would be in an excellent position to take advantage of the development of competition in intrastate long distance service. As competiton develops, the ability of the State and University to purchase long distance services from more than one provider would be an important stimulus to provide improved services and lower prices. If there is a highly competitive telecommunications industry in Maine, the State could simply seek the lowest cost service with little or no effect on other ratepayers.

But the pace at which Maine will move towards greater competition in providing phone services is uncertain. There will be, in the near future, a number of opportunities when State government and the University will have to choose between investing in their own system or staying with New England Telephone.

These decisions must be carefully evaluated to assure that the actions taken do not significantly affect overall rates. The long term policy with respect to the purchase of State and University telecommunications facilities and services should be to seek the highest quality service at the lowest price, so long as there is a net benefit to the State, considering the effects on both ratepayers and taxpayers.

The ability of the State and University to influence the development of the telecommunications network in Maine also depends on the extent to which the two act together, particularly with respect to long distance transmitting/receiving facilities such as microwave relays. Given the large investments involved and the effects on the development of Maine's telecommunications network, a formal relationship between State government and University telecommunications facilities planners should be instituted. This could be done by requiring the preparation of a joint State/University telecommunications facilities plan and

requiring that requests for large source telecommunications facilities by the State Government or the University be consistent with the plan and be accompanied by an analysis of the investment's effects on both ratepayers and taxpayers.*

* Minority views are expressed in Appendix II.

7. PLANNING FOR THE FUTURE

Planning for the future of the telecommunications network has not been a government function because in the past it was done almost exclusively by AT&T and its subsidiaries. But as telecommu- nications services come to be provided by a number of different companies, an overview of the entire system from the perspective of the public's needs will become increasingly necessary.

The State cannot and should not place itself in the role of making all the decisions about what the system should be, but the State can perform several important functions. These include monitoring the evolution of technology and the telecommunications industry in Maine, determining the high priority needs for telecommunications services in the State, and research and development of new applications of technology to meet Maine's needs. Both State government and the University can play roles in performing these functions.

A number of aspects of telecommunications must be understood by government agencies. First, the evolution of technology and the telecommunications industry must be closely monitored in order that informed decisions may be made. Federal regulatory actions and Congressional action affecting telecommunications

policy must also be monitored. Several regional and national agencies, such as the National Association of Regulatory Utility Commissioners, the Council of State Planning Agencies, and the New England Association of Public Utility Commissioners can help in this task.

The State should develop a clear sense of priorities for the needs of various regions and industries in the State. As the telecommunications network evolves, the State must know its own needs in order to assure that its actions as regulator or purchaser meet those needs. Telecommunciations issues should be considered as ongoing responsibilities for existing state agencies.

It will also become increasingly important for Maine to take an active role in helping develop useful applications for the new telecommunications technologies to meet the State's needs and in informing Maine businesses and households about the changes in telecommunications technologies. As an example, new developments in cellular radio might provide telecommunications services to rural areas at significantly lower cost than the long strings of wire now necessary, but the federal government is only considering cellular radio for mobile telephone service in urban areas. One small company in Mississippi has filed for permission from the FCC to use cellular radio for rural areas, but the demand for mobile service is so great that it will be many years

before the FCC can consider the application.

There is such a wide variety of potential new uses for telecommunications that Maine will have a much better chance of being well served by the telecommunications revolution if we are leaders in understanding and utilizing it rather than hoping that innovations will be developed somewhere else.

Maine's needs are not unique in this respect. Most of the "action" in telecommunications is taking place in the more densely urbanized States first. The needs of States that are largely rural and low in population density, such as Maine, are not receiving a great deal of attention from the Federal Government or the communications industry. There is an opportunity, therefore, for Maine to become a national leader in understanding and furthering the role of telecommunications in improving the quality of life and promoting economic development, particularly in low population density regions.

Nebraska has already established a Telecommunications and Information Center to direct that State's efforts to better utilize telecommunications in economic development, education and aid to rural areas. A similar effort should be considered for Maine, perhaps using divisions of the University of Maine, such as the Electrical Engineering School at Orono and the Center for Research and Advance Study at Portland.

A final aspect of planning for the future is the integration of telecommunications with the business attraction functions of the State Development Office and other local and regional development agencies. Maine already has a telecommunications network capable of meeting many business needs, and it is being improved significantly in the next few years with expanded digital switching. A number of small towns already have very modern switches which could make them attractive as locations. Development agencies should be made aware of the advantages of Maine's current telecommunications network so they may convey the information to businesses interested in locating or expanding in Maine.

The State Planning Office, State Development Office, and other development agencies (such as the Maine Development Foundation) should work with the telephone utilities to prepare a telecommunications resource guide for the use of development agencies.

Finally, the changes in the technologies of communications and in the structure of the telecommunications industry are so rapid, that it is important that state policy in this field be continually monitored and reevaluated. A new Task Force on Telecommunications should be established in three years to review developments in technology, the industry, regulation, universal

service, and other areas and to make further reccomendations on Maine's policy in the increasingly important area.

APPENDIX I

Executive Order

OFFICE OF
THE GOVERNOR

NO. 8FY 83/84

DATE March 14, 1984

TASK FORCE ON TELECOMMUNICATIONS POLICY

WHEREAS, the pace of technological change has greatly increased the range of available and forthcoming telecommunication services in Maine; and

WHEREAS, the business institutions that design, deliver, and oversee telecommunications services have changed dramatically in recent years, and are certain to change more in the future; and

WHEREAS, these changes will have increasing impact on the lives of virtually all Maine citizens and businesses; and

WHEREAS, it is in the best interest of the citizens of Maine that State government assure an orderly process of change and the availability of adequate telecommunication services at reasonable cost,

NOW, THEREFORE, I, JOSEPH E. BRENNAN, do hereby establish a Task Force on Telecommunications Policy.

MEMBERSHIP: The Task Force will consist of the following:

Director of the State Planning Office (Chair)
Chief Executive Officer of the Finance Authority of Maine;
Director of the State Development Office;
Public Advocate;
Commissioner of the Department of Agriculture, Food & Rural Resources; and the
Senate and House Chairmen of the Joint Standing Committee on Public Utilities or their designees, and a minority member selected by them.

SCOPE OF WORK: The Task Force will address the following questions, without limitation; and hold public meetings and conduct studies as necessary to develop findings and recommendations respecting each:

1. How may basic telephone costs best be structured to ensure universal voice service in Maine?

2. What specific economic development opportunities do advance telecommunication services present to Maine, in expansion of existing businesses and attraction of new businesses? How

may State development activities be directed to realize these opportunities?

3. Are Maine businesses constrained by existing or anticipated levels of telecommunication services?

4. Does private market demand provide sufficient stimulus for the modernization of Maine's telecommunication network? Is it in the public interest for State government to establish incentives for investment in advanced telecommunication facilities?

5. How do current rate regulation and corporate capital investment policies affect modernization of Maine's telecommunication services?

6. Will by-passing the public telephone network by large system users have significant effects on rates for remaining users?

7. Will current investment in parallel telecommunication systems impede or enhance the establishment of the most efficient and advanced telecommunication network in Maine?

8. To what extent need technologies and businesses not now regulated by the State (cable TV, microwave radio transmission, satellite communications systems, and paging services) be brought within the purview of the Public Utilities Commission?

9. How will the availability of advanced telecommunication services affect the demand for public facilities such as schools, roads, hospitals, and government buildings

10. How may State government best coordinate the efforts of those public agencies involved in telecommunications policy?

11. In what manner and to what effect should State government involve itself in federal regulatory and legislative activity dealing with telecommunications policy?

TECHNICAL ADVISORY GROUP: In pursuing its investigation, the Task Force will consult with interested individuals and affected parties, both public and private, and incorporate their concerns in its deliberations. In particular, the Chairman will establish a technical advisory group to the Task Force, comprising representatives of those interests whose knowledge, experience, and perspectives are necessary to a full and adequate expression of a sound telecommunications policy for Maine.

REPORT AND RECOMMENDATIONS: The Task Force will report to me not later than January 1, 1985, with a proposed statement of State Telecommunications Policy, and any draft legislation needed for its implementation.

Joseph E. Brennan
GOVERNOR

APPENDIX II

STATE OF MAINE
ONE HUNDRED AND TWELFTH LEGISLATURE
COMMITTEE ON UTILITIES

June 13, 1985

To: Richard Barringer, Director, State Planning Office
From: Senator Baldacci, Representative's Vose & Paradis
Subj: Telecommunication Task Force: Minority Report

We are in agreement with most of the conclusions of the Task Force, but there are three issues on which we have somewhat different views than those expressed in the report. These issues are competition, modernization, and bypass by State agencies, as amplified below.

1. Competition in equipment is a fact of life, and competition in interstate long distance service is beginning in Maine as a result of the Federal goal of increased competition. The status of competition in the intrastate market is far less clear. The report supports creation of a competitive industry to provide intrastate toll service. We are unsure about the desirability of such competition at this time. Two potential problems are apparent. Both could arise from "cream-skimming" by competitive long distance companies in the highest use areas. If competition is permitted, how can we make sure that adequate service at affordable prices is provided throughout the State? And, if one carrier is required to serve while others are not, how can we avoid economically crippling that carrier (or its customers)? These considerations lead us to believe that we should not go on record in blanket support of competition in the intrastate market. Therefore, we would replace the statement on competition in the report with the following:

> "Maine State government should consider the impact very carefully before supporting creation of a competitive telecommunications industry in Maine."

STATE HOUSE STATION 2, AUGUSTA, MAINE 04333 TELEPHONE 207-289-2947

2. Modernizationof the telecommunication system within the State is one of the crucial issues facing Maine today. Electronic switching and high quality lines are necessary for many applications. Without them, Maine will be relying on old-fashioned technology while other states will be benefiting by up to date equipment. There is a debate over which comes first, the demand or the equipment, but we believe that is a sterile debate. New equipment does cost money, and there is room for judgment as to the optimum pace for modernization. But the important thing is to get there and to do so within a reasonable time. A definite goal could help us achieve modernization and would send signals to others of our intentions. Therefore we would replace the generalized modernization goal of the report by a specific goal as follows:

> "It is the goal of the State of Maine to have electronic switching and high quality transmission lines in all parts of the State by 1992."

3. State agencies including the University are indeed among the largest users of telecommunications services in Maine. The cost of those services is a concern to all of us, especially in this time of tight state budgets. However, we are extremely concerned that a decision to establish a separate telecommunications network for State agencies may increase the cost to other ratepayers, especially those least able to pay. To emphasize this point we would add to the statement in the report the following:

> "The decisions concerning State and University communications systems should consider the impact of bypass in increasing telephone costs to some even though State taxes may be reduced slightly to others."

HW/elk/2797

APPENDIX III

TECHNICAL ADVISORY GROUP

Robert Catell
AT&T
Yarmouth

Joe Chaisson
Harpswell

Paul Cianelli
New England Cable TV Association
Braintree, Mass.

David Clough
National Federation of Independent Businessmen
Augusta

John Connor
Community Service Telephone
Winthrop

Leighton Cooney
Bureau of Public Improvements
Augusta

John Cox
Dead River Company
Bangor

E. Stuart Ferguson
Whitefield

Doug Hall
Department of Human Services
Augusta

Marion Ham
Merrill Bank
Bangor

Cheryl Harrington
Public Utilities Commission
Augusta

Judith Harrison
Union Mutual Insurance Co.
Portland

Mary Ann Hayes
Maine People's Alliance
Augusta

Scott Howard
L.L. Bean
Freeport

Mark Katz
Department of Labor
Augusta

Joseph Kelley
New England Telephone
Portland

Bruce Larsen
New England Telephone
Manchester, N.H.

Gilbert Lea
Tower Publishing
Portland

Ronald Locke
Department of Transportation
Augusta

Jennifer Logan
Southport

Mike McCluskey
New England Telephone
Portland

Holly Peck
MCI
Boston

Kay Rand
Maine Muncipal Association
Augusta

Dick Rome
Maine Information Systems
Bangor

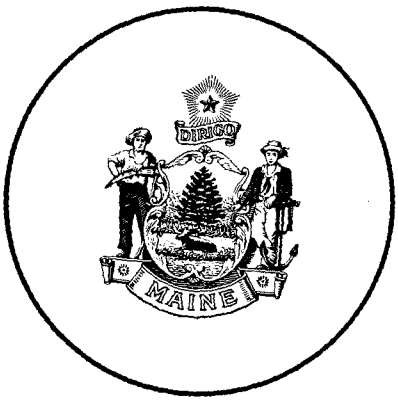
Gerry Salemme
GTE Sprint
Boston

Edmund Sheppard
University of Maine
Orono

Kit St.John
Pine Tree Legal Assistance
Augusta

Curt Sweet
Key Bank
Augusta

Thacher Turner
Maine Chamber of Commerce
and Industry
Augusta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