Hong Kong, and Singapore have developed and begun implementing national telecommunications initiatives; in Europe, the United Kingdom, France, Germany, and the Nordic countries have developed explicit national strategies for information technologies. Moreover, the European Economic Community has chosen the telecommunications sector as the leading industry of its strategy for achieving regional integration.[23]

Japan has explicitly targeted information technologies — including telecommunications, computers, and information services — as the engines of economic growth in the 21st century.[24] In the Japanese view, these are leading or strategic industries which will play a vital role in promoting the competitiveness of Japanese enterprises and continued growth of the Japanese economy.[25] According to official documents (and in the privately expressed views of many Japanese officials I have interviewed), the "informatization" of Japan will have sweeping social, political, and cultural implications as well.[26] In distinct contrast to the United States, Japan has developed and is implementing a coherent national telecommunications policy intended to place Japanese telecommunications companies and intensive users of telecommunications services in global leadership positions in their respective industries.[27]

Thus, in an increasing number of countries, national policies are premised on the idea that telecommunications is a strategic industry, with economic characteristics that require or deserve special consideration in assessing policy alternatives. While the term "strategic industry" is often used indiscriminately (i.e., meaning that an industry is important), there is a rapidly growing literature analyzing the economic conditions and characteristics of an industry that make it strategic. Although that literature is concerned primarily with international trade theory and policy, and hence addresses "tradable goods," much of the developing theory applies to non-

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[23] Thimm, Alfred L., "Europe 1992 - Opportunity of Threat for U.S. Business: The Case for Telecommunications," California Management Review 31 (no. 2, Winter), 1989, p. 57.

[24] For an excellent discussion of Japan's high-tech policies, see Patrick, Hugh, "Japanese High Technology Industrial Policy in Comparative Perspective," in Japan's High Technology Industries, edited by Hugh Patrick. Seattle: University of Washington Press, 1986.

[25] For an extended discussion, see Robert G. Harris, "Telecommunications Services as a Strategic Industry: Implications for United States Policy," in Competition and the Regulation of Utilities, Michael A. Crew, editor. Kluwer Academic Publishers: Boston, 1990.

[26] See, for example, Japanese Ministry of Posts and Telecommunications (1987; 1988; 1989); and Japan Information Processing Development Center (1987).

[27] For a comparison of Japanese and U.S. telecommunications policies, see Robert G. Harris, "Telecommunications Policies in Japan: Lessons for the U.S.," California Management Review 31(3), Spring 1989."

tradable goods as well and is, therefore, relevant here.[28] The central message of these international developments is that United States telecommunications policies must — in order for the United States to be internationally competitive in the information age — explicitly acknowledge and incorporate the broader economic developmental benefits of telecommunications services. We can no longer regulate telecommunications as if it were a purely domestic industry, when other nations have chosen telecommunications as a leading instrument of national economic development and competitive advantage. Only then can American companies and workers compete successfully in global markets.

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[28] See, for example: Krugman, Paul, "Strategic Sectors and International Competition," in U.S Trade Policies in a Changing World Economy, edited by Robert M. Stern. Cambridge: MIT Press, 1987. See also Porter, Michael. The Competitive Advantage of Nations. New York: Basic Books, 1990.

# ECONOMIC BENEFITS OF LEC PRICE CAP REFORMS

## Appendix B

## Competition in Access and Exchange Services

by
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in support of the
**United States Telephone Association**

May 9, 1994

**Federal Communications Commission**

Notice of Proposed Rulemaking

In the Matter of
Price Cap Performance Review
for Local Exchange Carriers
CC Docket No. 94-1

## 1. Introduction

Local exchange carriers now face real competition for their core lines of business. As never before, revenues from switched services, special access services, and other services are susceptible to competitive forces. In addition, new competitors with significant resources and assets are entering into the provision of telephony services at a rapid rate, ensuring that LECs will face ever widening competition for their core lines of business.

By constructing fiber rings largely in the business districts of major metropolitan areas, competitive access providers (CAPs) have entered into the business of providing special access, private line, and switched services to business customers. Intra-office switched access services, which formerly were provided by the local exchange carrier, are now being provided by private branch exchanges (PBXs) and private customer networks. LECs also face competition from wireless telephony in the provision of switched and special access services.

Although the degree of competition currently afforded by each of these LEC alternatives varies, it is clear that competition faced by LECs will expand rapidly in the near future. Not only are existing competitors expanding into new service offerings, but new entrants are also developing the ability to provide a wide variety of telephony services. These services will encompass both traditional service offerings and new services that take advantage of the latest technology being employed in new networks. A natural outcome of this process is the formation of alliances, where various actual and potential entrants into telephony join together their complementary assets and skills. Many such alliances have been announced. The net result of these alliances are stronger competitors to the LECs, and an accelerated timetable for competition in core business areas of LECs.

Part 2 of this appendix discusses the composition of demand for access and exchange services, examining the concentration of LEC revenues by type of service and type of customer. Part 3 discusses the extent of competition faced by LECs in these key business areas from sources such as competitive access providers (CAPs), private exchanges and private customer networks, and providers of wireless telephony. The section shows that LECs now face the erosion of revenues and market shares in serving high-revenue, low-cost customers such as large volume business customers. Inroads also are being made in the provision of service to residential customers. Thus, LECs face less revenue from which they can offset the costs of providing service to high-cost, low-volume residential customers. The final section of the appendix discusses the "near-future" competitive conditions in telephony, examining the formation of strategic alliances and the strengths of actual and potential entrants into telephony. The analysis shows that LECs currently face competition in many key service areas and that competition to LECs in full-network services is likely to emerge rapidly.

## 2. Composition of Demand for Access and Exchange Services: Sources of LEC Revenues

The composition of demand refers to the way in which the demand for telecommunications services is distributed across customers and classes of services. In telecommunications services, the distribution of revenues is highly concentrated: a small percentage of customers, lines and geographic areas account for a very large share of the revenues in most service categories because the intensity of access and usage varies dramatically across customers and space. In addition, the density of customers varies dramatically across space: that is, the most intensive customers tend to be highly concentrated geographically.

Table B-1 shows LEC operating revenues by the type of service provided. Note that network access revenues account for nearly 25% of LEC revenues and other services (e.g., directory advertising and equipment sales) account for an additional 22% of revenues. Long distance service, such as intra-LATA toll calling, comprises an additional 12% of revenues. Thus, nearly 59% of LEC revenues come from sources other than local service, as illustrated in Figure B-1.

A substantial portion of LEC revenue is derived from business customers. LECs derived approximately 41% of their local revenues from commercial customers in 1993. Business customer growth is expected to be 80% greater than residential customer growth over the next five years.[1] Thus, business customers are an important part of the telephony market, and will become even more so in the future. Recognizing that basic residential service is not as profitable to LECs as other services, it is likely that business customers represent the principal source of profits to LECs.

LEC revenue, particularly business revenue, is derived primarily from extremely concentrated geographic areas. A study recently conducted by InContext, Inc. examined the geographic concentration of business revenues from ten of the nation's largest states. The results from this study are summarized in Table B-2. This analysis shows that 30% percent of business revenues comes from about one percent of land mass in these states. In addition, seventy-five percent of business revenues are generated by eight percent of the land mass in these states.[2]

Other evidence provided by individual LECs confirms that business customers, particularly large firms in central business districts, account for a considerable portion of LEC revenues and profits. Ameritech reports that the top 15% of its business accounts generate 72% of business revenue; the top 2% of business accounts generate about 45% of all business revenue. Residential demand is also concentrated, if somewhat less so: the top third of residential customers account for 54% of total residential revenue, and 64% of non-local loop revenue. In addition,

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[1] Source: INSIGHT Research Corporation.

[2] Analysis conducted by William Lilly of InContext, Inc. that analyzed business phone revenues for ten large states.

Bell Atlantic reports that almost 71% of its special access revenue is derived from 15.0% of its wire centers. Nearly 75% of its total access revenue is derived from 25% of its wire centers.

Figure B-2a shows the geographic concentration of business revenues in Washington state. US West derives 30% of its business calling revenues in the state of Washington from 0.1% of the land area. Moreover, more than half of business revenues are derived from a geographic area that accounts for only 1% of the land area in Washington State. Figure B-2b shows the distribution of Nynex's revenues in New York state. Only 0.3% of New York's land mass generates 30% of Nynex's business and interexchange access revenues in the state of New York. Ninety percent of Nynex's New York business local revenues, including interexchange access, originate from only 10% of the New York geographic land area. LATA132 (which includes New York City) accounts for over 50% of Nynex's total interstate access revenues. Pacific Telesis also reports that 50% of Pacific Bell's high capacity circuits are provisioned out of only 16 wire centers. As shown in Figure 2c, within California, 85% of business calling originates from 5% of the state. Thus, a geographically concentrated group of customers account for a significant portion of LEC revenues and profits.

The customer base for access revenues is even more highly concentrated. The "customers" for access services provided by LECs are primarily interexchange carriers, most notably, AT&T, MCI, and Sprint. IXCs generally pay for the access charge and then incorporate those charges into the rates the IXC charges consumers for long distance. As a result, revenues from AT&T, MCI and Sprint for access charges constitute greater than 80 percent of total LEC access charge revenues.[3]

### 3. Current Competition in Access and Exchange Services

LECs face competition from a variety of sources, including competitive access providers (CAPs), private branch exchanges (PBXs), private networks, wireless providers, and interexchange carriers (IXCs). This section describes the current impact of this competition, demonstrating that each competitor has successfully made inroads into core areas of profitability for LECs, specifically high-volume low-cost business and residential customers. Many of these competitors are growing rapidly, suggesting that an analysis of their current competitive impact may substantially understate their future competitive significance.

Publicly available data has been used to assess the impact of competition on LECs. As a result, the size of the impact is likely to be understated because competitors such as CAPs, PBXs vendors and IXCs do not face the same reporting requirements as LECs. Thus, while LEC revenues, profits and network investment plans are publicly reported, in many cases competitors do not have to report these figures. Competitors receive an advantage from the existence of regulatory restrictions on

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[3] Revenues from AT&T, MCI and Sprint for access charges account for 86% of Nynex access charge revenues, 83.4% of Bell Atlantic access charge revenues, and greater than 85% of Pacific Bell access charge revenues.

LECs and these restrictions are likely to continue in some form until LECs can prove to state and federal authorities that they face substantial competition. Because LECs must rely on the voluntarily reported information provided by competitors to show competitive impact, competitors have the incentive to underreport current penetration levels and minimize future expansion plans. As a result, the degree of competitive impact that is reported below is likely an understatement of the actual degree of competition.

a. Competitive Access Providers

Competitive access providers (CAPs) have arisen in recent years to provide special access, private line, and switched services, largely to customers located in central business districts. The ability of CAPs to offer switched services is increasing rapidly; according to a CAP industry survey, over 25% of CAPs currently offer some form of switched services, and the trend toward increased provision of such services is expected to continue.[4] Teleport, for example, has installed AT&T ESS switches across the country.[5] As another example, MFS Intelenet of Illinois has filed an application with the Illinois Commerce Commission for authorization to operate as a competitive exchange carrier for business customers in downtown Chicago.[6] In October 1993, MFS publicly introduced MFS Intelenet as a full service phone company offering both local and long distance services, initially geared towards customers in New York City and has permission from New York to provide switched services.[7] Nynex transferred ownership to CAPs of entire telephone numbers and dialtone. In 1993, NYPSC released an order certifying intracity carriers (such as MFS) as LECs with privilege of having their own central office codes.[8] This rearrangement means that telephone traffic can terminate directly on the CAP's switches without first being switched by Nynex. Teleport promptly responded that it had been providing local exchange service in New York City for two years, utilizing New York Telephone provided Flexpath circuits (DS1 loops) and large blocs of DID numbers. On April 25, 1994, MFS

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[4] According to Connecticut Research's "ALT Report," switching services (Centrex-like service, toll calling, integrated local/long distance services, extended area calling, public phones, and telephone system management) will increase to 44% of total CAP revenue by 1997 and will by that time exceed access revenue. The "ALT Report," *Connecticut Research*, 1993, p. VI-3.

[5] "Teleport Communications Prepares for Local Service Offensive," *Local Competition Report*, October 4, 1993.

[6] "Application of MFS Intelenet of Illinois, Inc.," Illinois Commerce Commission, Docket No. 93-0409.

[7] See "MFS Intelenet Launches Full Service Phone Company Providing Both Local and Long Distance Services", MFS Communications Company News Release, October 5, 1993.

[8] In addition to their certified local exchange provider status, with the NXX codes, CAPs are able to completely bypass the local exchange to provide Centrex-type services, PBX trunk services, DID services and local exchange lines for business customers.

was authorized to provide local exchange services to business customers in Maryland.[9] According to the order, Bell Atlantic-MD must provide interconnection to MFS and number portability.

As Figure B-3 demonstrates, at least one CAP, and often two or more CAPs, are already located in most major metropolitan areas. CAPs serve 44 of the top 50 metropolitan statistical areas (MSAs) and all 25 of the top 25 MSAs.[10] Thirty-two of the top 50 MSAs have more than one CAP and soon eleven more MSAs will have more than CAP. The top 25 MSAs contain 43% of the US population and the top 50 MSAs contain 68% of the US population. Both Teleport and MFS, the two largest CAPs, are growing by expanding the number of cities they serve, as shown in Table B-3, and by increasing the geographic coverage and their market share in the cities they serve. Currently, CAPs target customers located in business districts, often adding customers on a building-by-building basis. This is made apparent by Figure B-4a, B-4b, and B-4c which show the penetration of competitive access providers in downtown Seattle, the CAP network coverage in Manhattan, and the penetration of CAPs in Los Angeles, respectively.

CAPs have expanded beyond central business districts in major metropolitan areas. Table B-4 shows cities served by CAPs. The table shows that many small cities are served by CAPs. In addition, an examination of CAP locations within MSAs shows that many CAPs have expanded beyond central business districts to reach a greater area of the MSA. For instance, Linkatel in California operates a CAP in Los Angeles, Anaheim, and Santa Monica. Intelcom Group operates a CAP in Boulder, Colorado Springs and Denver. Tampa Electric Company operates a CAP in Tampa as well as nearby Sarasota, Florida. The ability to serve customers in a concentrated geographic area allows the CAPs to maintain relatively low start-up costs. CAPs can establish a fiber ring in a downtown area for a relatively small investment, as low as $1 million in certain cases.[11]

The marketing strategy of targeting high-volume, low-cost customers enables CAPs to grow rapidly. As Table B-5 and Table B-6 show, CAP revenues increased by 43% between 1992 and 1993.[12] Some sources expect CAP revenue to more than triple between 1993 to 1996.[13] Although the percentage of CAP revenues relative to LEC

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[9] See Maryland PSC Order on MFS Local Exchange Competition, Case no. 8584.

[10] Networks are also planned for four more of the top 50 MSAs. See "Report on Competitive Telecommunications", by Connecticut Research, April 1, 1994.

[11] Peter Huber, *The Geodesic Network: 1992 Report on Competition in the Telephone Industry*, 1992, p.2.69.

[12] To reiterate, publicly reported CAP revenues likely understate actual revenues since CAPs are not required to report revenues and they have the incentive to maintain the appearance that LECs do not face significant competition.

[13] "A CAP Market Update," The Yankee Group, July 1993, p. ii.

operating revenue remains small, the competitive presence of CAPs in certain services is much larger. Quality Strategies recently analyzed LEC high capacity service (special access and intraLATA point-to-point services for DS0, DS1, DS3, etc.) losses to competitive parts of ten metropolitan areas in five large LEC territories. Based on over 4,500 surveys, they found that CAPs have captured approximately 30% of high capacity transport services. CAP penetration rates vary in different geographic areas. For instance, CAPs have captured 33% of high capacity transport services in Philadelphia, 28% in Pittsburgh, 27% in Washington, D.C., and 24% in Baltimore. A recent study conducted for Pacific Telesis concludes that CAPs have captured 36% and 32% of revenue for high capacity transport services from point (customer or POP) to point in downtown Los Angeles and San Francisco, respectively. Similarly, CAPs have captured 43% of high capacity transport services in New York City and 36% in Boston. Thus, CAPs have a significant current presence in the provision of those services that generate substantial LEC revenues.

With rapidly increasing revenue and vast market potential, CAPs are rapidly expanding their networks and adding switching equipment. The FCC's Fiber Deployment Update, as illustrated in Figure B-5, shows that CAP networks have increased in size in leaps and bounds. The amount of route miles in CAP networks in 1992 is 24 times the amount of miles in CAP networks in 1987. In fact, the annual route growth rate for MFS and Teleport, two of the largest CAPs, equaled 65.9% and 94.3% respectively between 1987 and 1992. The CAP investment in local loop networks is now well in excess of $1 billion,[14] and is likely to continue to grow rapidly.

CAPs can easily expand their customer base. For buildings currently passed by their network, all the CAP need do is run an access line into the building. As detailed above, most CAP networks are built in the central business districts of cities where the major office buildings and other business facilities are located. Thus CAPs already pass by many large businesses in most metropolitan areas. Even without adding to the size of their networks, CAPs have spare capacity to serve many additional customers on their existing loops. CAPs need only install new electronics to gain more capacity from their existing fiber networks.

For buildings close to but not passed by the CAP network, the CAP need only extend its network to pass those customers. The CAP can gain rights of way to lay its wire from many sources, including the city itself or leases from gas and electric utilities, transit authorities, and cable companies. In practice, some of these entities have traded rights of way for reduced rate telephone services. For instance, Pacific Gas and Electric in California has an agreement with MCI, and MFS has agreements with Los Angeles County and Bay Area Rapid Transit (in San Francisco). Utilities, transit authorities and cable companies, as well as Western Union conduit structure and water company abandoned pipes, can be used for conduit space. CAPs can also directly bury their wires, an alternative that is likely to be especially cost effective as CAPs expand to suburban and rural areas. In addition, if the CAP were to use wireless technology, conduits would not be needed. Alternatively, rather than

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[14] "A CAP Market Update," Yankee Group report, p. ii.

deploy new fiber to expand their network, CAPs can negotiate with other companies for the lease of excess fiber capacity to areas not currently served by the CAP. Finally, to serve new customers, CAPs need access to the buildings where those customers are located. Because in downtown areas, businesses generally rent office space, such access requires approval of the building owner. If one or more of the tenants of the building desire that a CAP have access to the building, it would seem unlikely that the building owner would deny access, especially given that most cities have an abundance of excess office space. In fact, access to multiple telecommunications vendors can be a selling point for a building owner. In addition, IXCs often act as marketing agents for CAPs, notifying businesses of opportunity for savings from using a CAP for access and other services. The clout provided by IXCs such as AT&T, MCI and Sprint should help overcome any reluctance on the part of building managers to deal with CAPs.

Thus, CAPs can expand their networks to accommodate new customers, especially those close to the CAPs' existing network, with relative ease. The rapid expansion of CAPs, not only opening networks in new cities but also enlarging existing networks, supports the ease with which CAPs can expand. As the FCC's collocation order is implemented and as more CAPs deploy switching capability, this expansion is likely to become more profitable because CAPs will be able to offer their customers a broader range of services. Collocation requires that LECs provide connections to their central office switches for alternative suppliers. If a CAP is co-located with the central switch of the LEC, it has access to all of the customers served by that central office of the LEC. While the LEC is not bypassed entirely (it would receive revenues from the portion of the transport from the home or business to the central office), it would be bypassed for part of the route as the CAP could then use its own network to route the call from the central office to another customer on the CAP's network or to an IXC's POP. Collocation will make it easier and less costly for CAPs to expand into the less densely populated regions of metropolitan areas and beyond. The FCC collocation order has been implemented in both New York and California. Based upon the number of central office switches where collocation is in effect, CAPs could provide transport services to over half of the customers of New York Telephone and Pacific Bell through collocation. Once the CAP has developed new customers through collocation, it will have the incentive to expand its network throughout the metropolitan area to increase its bypass of the LEC.

CAPs, therefore, provide significant competition to LECs for access services, especially with the high volume users that provide LECs with a large percentage of their access revenues. LECs can lose revenues due to the existence of CAPs in a number of ways. Suppose a customer on the CAP network wishes to make a call. If it is a long distance call, the CAP delivers the call directly to the IXC's POP and the LEC is bypassed entirely. If the customer wishes to call another customer on the CAP network and the network has switching equipment, the LEC is bypassed again. Only if the customer wishes to call someone on the LEC's network does the LEC receive revenues. However, the LEC loses part of those revenues if part of the call is routed on the CAPs' network. As CAPs expand in size and also in the number of services offered, more LEC revenues will be at risk.

b. Private Branch Exchanges and Private Networks

Because user demands are so highly concentrated in telecommunications services, one of the most important forms of competition is "self-supply" or "contract carriage" by large, intensive users. Increasingly, intra-office switched services for voice and data are being performed by private branch exchange (PBX) systems and private networks. PBX systems compete with LEC Centrex systems because PBX systems allow the user to perform switching functions for intra-office communications without going through the LEC's central office. This facilitates the efficient routing of voice and data within the office environment, and allows the customer considerable freedom in personalizing the features of its phone system. As illustrated in Figure B-6, the installed base of PBX systems dwarfs that of Centrex systems. More than three times the number of firms have installed PBX systems rather than use Centrex systems.

Table B-7 shows that the installed base of PBX systems was estimated at 29.3 million lines in 1993 while Centrex systems totaled 8.9 million lines. Among systems with 1,000 lines or fewer, PBX outnumbers Centrex on a five-to-one basis. Sales of PBX equipment currently total almost $1 billion annually.[15]

By joining their PBX network to a CAP's network or using microwave facilities to connect with IXCs, business customers can achieve a larger degree of LEC bypass. This combination removes the LEC from the provision of intra-office telephony, private-line and special-access services, and some switched services (for connections with other direct customers of the CAP or IXC).

Private customer networks, which constitute another form of bypass, are also increasing in popularity. These networks connect distinct physical locations of a firm or institution such as a university, government agency, or hospital. They have the capabilities of an intra-office PBX system plus a trunk, microwave, or satellite facility to connect various locations of an organization. Some of these systems effectively bypass both the local and interexchange carrier in the provision of telephony services for voice and data.

One type of private network is the VSAT (Very Small Aperture Network) which uses satellite transmissions to convey voice and data, most of which are owned by or operated on a private contractual basis for a single user or affiliated group of users. In 1991, more than 270 VSAT networks were in existence, connecting more than 67,000 terminals.[16] The number of VSAT systems has increased markedly in recent years, bypassing both access and interexchange carriers.[17] In 1993, the number of

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[15] *1993 U.S. Industrial Outlook* pp. 29-4 and 29-5.

[16] *U.S. Industrial Outlook 1993*, pp. 29-16.

[17] It is worth noting that these "private networks" are seldom included in market definitions or reports of market shares, even though they compete directly with public networks. Hence, there is a tendency to overstate the market share of the local exchange carrier, while

VSAT terminals were estimated at 103,000, representing a growth rate of 54% in two years. Satellite revenues from VSAT services have grown in recent years at a 27.5% annual rate.[18] The largest VSAT network is General Motors' Pulsat Network, which contains more than 10,000 terminals. Other examples include the networks of Chevron, Chase Manhattan Bank, Dow Jones, Wal-Mart, K-Mart, J.C. Penney, Associated Press, Reuters, American Airlines, and Enterprise Rent-A-Car.[19] VSAT systems are used by large retailers to obtain credit information and convey point-of-sale business data for improved efficiency in purchasing, inventory, and account management.[20]

Therefore, business customers of all sizes can use a PBX system to bypass the LEC for intra-office switched communications. Larger business customers with multiple offices can bypass both LECs and IXCs through the use of private networks. As mentioned previously, customers in central business areas can typically bypass the LEC for special access services by turning to a competitive access provider. Thus, the most profitable customers for LECs to serve, medium and large business customers, are facing an increasing array of competitive options to LEC services.

c. Interexchange Carriers

Historically, IXCs have provided a complementary service to LECs by providing connections between exchange areas. Following divestiture and the enactment of the Modified Final Judgment, LECs were generally limited to providing intraLATA interexchange services, including intraLATA interstate services. IXCs provided interLATA services. States have determined whether or not IXCs could provide intraLATA interexchange services. Initially, states were reluctant to allow IXCs to provide intraLATA services; in 1984 only 5 states allowed intraLATA toll competition. But recently many states have relaxed those restrictions, and currently 39 states allow intraLATA competition and several other states are currently considering allowing competition in intraLATA toll services. The FCC also allows competition for

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understating its vulnerability to competitive inroads by selective entry and targeted marketing efforts. Although a small share of customers have private networks, this form of self-supply probably accounts for a significant share of the market, but is virtually impossible to measure because traffic moving over private networks is not reported to regulatory authorities. Similarly, IXCs self-supply direct access to large customers, which traffic is not reported or included in market share estimates.

[18] *U.S. Industrial Outlook*, 1993, 1994.

[19] Huber, *The Geodesic Network II*, 1992.

[20] Chevron and K-Mart use VSAT technology to relay credit card purchase information from customers to their credit database. *National Petroleum News*, November, 1993. Chevron, Scientific-Atlanta, Wal-Mart, Target Stores, Holiday Inn, Toyota, TV Answer, Chrysler, and GM affiliated services EDS and Pulsat all use Ku-band VSAT networks. *Satellite Communications*, July, 1993. Wal-Mart Stores, J.C. Penney Co., Circuit City, and Kmart Corp. all use satellite telecommunications for point-of-sale business transactions. Staples, Inc., Chevron, and Merrill Lynch are also VSAT users. *Investor's Business Daily*, February 23, 1993.

intraLATA interstate services. Thus, more and more LECs and IXCs are competing directly for intraLATA customers.[21] For instance, Ameritech reports that Quality Strategies, a market research firm, found that for large and medium business customers in five of seven Ameritech urban markets, Ameritech retains less than half of intraLATA toll revenues. IXCs have an advantage over LECs because they can offer "one-stop" shopping to customers for both interLATA and intraLATA interexchange services. In some areas, LATAs cross state boundaries (such as the LATA covering the Washington, D.C. metropolitan area) and interexchange calls for these services are regulated by the FCC. As noted above, the FCC has allowed competition for intraLATA interstate services and IXCs also provide competition to LECs for these services. For instance, Bell Atlantic competes with at least 44 IXCs for the provision of intraLATA interstate services.

Whether the IXC provides interLATA or intraLATA interexchange services, it must have a means of connecting its customers to its network. The IXC can pay the LEC for use of its network for connection (i.e., pay access charges to the LEC), it can use a CAP, or it can connect with the customer directly. Because LECs generally must charge the same access charges to all customers and the costs of serving larger IXCs is lower than the cost of serving smaller customers, IXCs have the incentive to bypass the LEC if possible. For instance, IXC annual reports indicate that AT&T and Sprint pay 45 cents and MCI pays 54 cents toward access fees for each dollar of revenue they receive from long distance services. Thus, reductions in these costs even by a small amount are likely to increase long distance profitability for IXCs significantly. In addition, since, as noted, the LEC and IXC compete for many services, the IXC may also not want to be dependent on a rival for part of its services. One way the IXCs have accomplished bypass is through encouragement of the development of CAPs. In fact, most CAPs have commitments from IXCs to use the CAP network before they start to build a network in a city, and IXCs have helped CAPs market their services to business customers.[22] IXCs have also developed direct links with customers to bypass the LEC for the provision of interexchange services. Some large private customers have installed microwave facilities to connect with the closest IXC "point of presence," where calls are collected and routed along the IXC's network.

IXCs have also announced their intention to compete with LECs not only for interexchange services but also for intraexchange services, at least for high volume business and residential customers. For instance, MCI has announced its networkMCI and MCI Metro plans. With MCI Metro, MCI intends to develop spend over $2 billion to develop intraexchange capabilities in the top 20 US metropolitan

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[21] Peter Huber, "The Enduring Myth of the Local Bottleneck," 1994, p.55.

[22] "A 2d Divestiture Looms in U.S.: Small Access Carriers Challenging Local Bell Monopolies," *International Herald Tribune*, October 7, 1991.

areas not just to serve its interexchange customers but to serve other IXCs as well.[23] In addition, MCI has announced a strategic alliance with Hancock telephone company (an independent LEC located in suburban Indianapolis) with the intent of offering local exchange services in direct competition to Ameritech in Indianapolis.[24] NetworkMCI is the umbrella that encompasses all of MCI's telephony plans, including MCI Metro, its PCS plans and its plans to link local networks into a seamless national network. Recently, MCI has announced a merger with Nextel, further extending its network plans into wireless.

AT&T's alliance with McCaw also signals the desire to provide a seamless local and long distance telephony service using AT&T's network for interexchange services and McCaw's wireless capability for intraexchange services. As one of the world's largest switch manufacturers, AT&T certainly has the knowledge and incentive to create switching software that would give its tandem switches the capability to provide exchange and enhanced services directly to end users. New York is the first state to implement the FCC's collocation decision requiring LECs to provide collocation services in their central offices for competitors. Nynex requested that CAPs and other potential competitors list the number of central offices where they would wish to have interconnection provided. AT&T by far requested the most number of offices (128 offices) indicating their desire to connect directly with Nynex central offices and, therefore, bypass Nynex's network for a significant portion of signal transmission.

d. Wireless Telephony

Wireless telephony is currently replacing some of the access and switching functions offered by LECs' wired networks. Companies offer wireless technology for the paging and dispatch services and voice communications desired by certain types of individuals that are frequently away from their offices or residences. Cellular providers have primarily targeted those customers that derive added value from the use of telephony services in non-fixed locations. In general, these wireless customers fit the profile of high-volume, multiple-service telephony users, and thus represent a potentially significant revenue source for LECs.

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[23] "Initially MCI intends to use the fibers to link its corporate customers directly to its long-distance network, bypassing the local Bell telephone companies -- and avoiding the "access" charges MCI now pays the phone companies for local connections to corporate customers.... MCI officials said today that the first wave of new networks would be built in Atlanta, New York, Chicago, Los Angeles and more than a dozen other big cities. While the plan seems skeletal at first glance, MCI officials said these networks would run through high-traffic corporate corridors that now account for 40 percent of all its long-distance traffic. Bert Roberts, MCI's chairman and chief executive, said, 'By now it is clear that the local telephone monopolies will never give us what we need,' contending they had not provided 'local access capabilities at a decent price.'" "MCI Plans to Enter Local Markets," *The New York Times*, January 5, 1994. See also "MCI Rolls Out Plans for Local Network in Major Challenge to RHCs," *Common Carrier Week*, January 10, 1994.

[24] See March 19, 1994 MCI Press Release.

The growth of cellular telephony has been phenomenal. As shown in Table B-8, cellular revenue in 1993 is almost six times as great as its level five years ago, and now totals over $6 billion. The number of cellular subscribers has grown almost eight-fold over the past five years (see Figure B-7).[25] The cumulative capital investment in the cellular industry is now almost $14 billion, implying that the cellular infrastructure is becoming increasingly well-positioned to compete against wired telephony. Some recent studies have also shown that use of cellular and land-line services are becoming more competitive, particularly for business or rural customers. For instance, a recent analysis of business calling in California shows that if all cellular access was considered to be business access lines and those are added to LEC business access lines, cellular access lines would account for 30% of business access lines.[26] In addition, a recent study conducted for GTE found that for local subscribers to a small exchange in rural Wisconsin, cellular service was actually cheaper than wireline services for many residence and business users.[27]

In recent years, the price of cellular telephones has dropped seven-fold, and the inflation adjusted price of equipment and service has fallen by more than 50 percent, according to estimates by the Eastern Research Corporation.[28] Trends such as these support the contention in a recent Wall Street Journal special section on wireless communications that there will be widespread, if not ubiquitous, use of wireless telephony for data and voice communications by 1997.[29]

Cellular carriers increasingly compete in "short distance" interexchange services as well, because their "local calling areas" are growing larger, which means that the price of a cellular call can, in some places at some times, be less than the price of a landline call.[30] Before its acquisition by AT&T, McCaw was in the process of building

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[25] Cellular telephony's astounding growth is expected to continue. Link Resources Corp. estimates that the annual growth rate for cellular voice services through the year 1998 will be 20.2% and that the corresponding rate for cellular data services will be approximately 33.0%. *Wall St. Journal*, February 11, 1994, p. R5.

[26] Peter Huber, "Competition and Open Markets in the Telecommunications Markets of California", February 8, 1994, p. 66.

[27] Edward C. Beauvais, "Local Exchange Service: Where is Competition Taking US? or Bottleneck? What Bottleneck?", Presented at Twenty-Third Annual Conference of the Institute of Public Utilities, Michigan State University, December 11,1991.

[28] *The Geodesic Network II*, 1992, p.4.23.

[29] *Wall St. Journal*, February 11, 1994, p. R5.

[30] "Cellular is now cheaper than long distance (intraLATA and interLATA) in many places, including in and around Denver, Dallas-Fort Worth, Florida, metropolitan New York, Tennessee and some parts of California." "Update on Cellular: How Cellular is Cheaper than Landline," *Teleconnect*, February, 1993. Even where local calling and short-distance toll rates are low (as they are in Illinois) and even if, on average, cellular rates remain well above

a fiber optic network to interconnect its cellular properties and supply interexchange services to its cellular customers. Now that AT&T has purchased McCaw, those calls will presumably be routed over AT&T's interexchange network. In addition, the vast majority of access from cellular providers to interexchange carriers is via direct access. Wireless companies routinely use low crossover threshold usage levels of 20,000 minutes per month as the determinant for placing their facilities as direct access.

Cellular carriers, therefore, currently provide competition to LECs, especially for business customers. As is discussed further below, this competition is expected to accelerate in the future as cellular services become less expensive (through the more widespread adoption of digital technology) and as PCS and other new wireless technologies such as Enhanced Special Mobile Radio are adopted.

e. Conclusion

Competitors have made considerable inroads into a variety of traditional LEC services, such as special access and switched services, through competition and substitution to wireless telephony. New entrants have "cherry picked" those services and customers that generate the highest revenue and lowest costs of service, particularly special access services and other services for business customers. As shown previously, these customers account for a substantial percentage of LEC revenues. In addition, many large business customers have also become self-providers of telephony through private networks. IXCs are also competing directly with LECs through the creation of direct links with customers for interexchange services, the provision of intraLATA interexchange services, and, increasingly, through the provision of intraexchange services. Consequently, LECs face substantial competition in the provision of service to high-volume, low-cost customers. The net result is that LECs face the prospect of dwindling revenues and market shares in those lines of business that are particularly profitable for LECs.

Some have argued that current LEC competitors do not have the financial resources to expand into the provision of a full range of telecommunications services. Several factors make this argument incorrect. First, as detailed above, many competitors already have begun to provide a wide range of services in competition with LECs. Second, as shown in Figure B-8, two major competitiors, AT&T and MCI/British Telecom, are very large profitable companies with substantial cash flow to fund expansion and entry into access and exchange service. AT&T and MCI have also built substantial "brand name equity" from millions of dollars in national advertising campaigns. Such brand equity will serve as an important competitive advantage as they expand into additional lines of business through growth or acquisition.[31] Finally,

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wireline telephone rates, cellular carriers' promotional price offers, off-peak discounts, and expanded calling areas will increase the competition between wireline and cellular carriers.

[31] AT&T has announced that it will use the AT&T brand name for McCaw's cellular services once the acquisition is consummated. MCI will bring its "marketing clout" to Nextel, according to a recent Wall Street Journal article reporting MCI's purchase of a 17% equity

as detailed further below, many existing competitors to LECs have entered into alliances to expand the resources and assets available to them in order to provide a greater array of telecommunications services.

### 4. Future Competition in Access and Exchange Services

As reviewed previously, competition in the local exchange market can occur in a variety of forms. Firms can enter into targeted product areas, such as direct access to the interexchange carrier or intraoffice communications, or can enter as full service providers. Targeted entry provides competition to the LEC on a limited basis (although because of the nature of customer demand, such entry places a large percentage of LEC revenue and profits at risk), but also requires a smaller set of skills and assets than those required by a "full service" provider. In addition, once established for the sale of its "targeted" products, the entrant can expand into the provision of a broader range of services.[32]

As discussed above, to date, entry has generally occurred through targeting of specific customers and services. The degree of competition provided by this type of entry will continue to accelerate into the future. As regulatory restrictions are relaxed and as technological change increases the range of services that can be economically provided by each mode of communications, intermodal competition -- among telephone, cable, terrestrial wireless and satellite networks -- will greatly intensify in communications. Thus, LECs will face competition from alternative "full service" networks for traditional telephony services and for a range of other new services, including video and data transmission.

#### a. Strengths of Likely Future Competitors

Many firms possess skills and assets that make them likely future competitors to LECs in the provision of telephony services. Telephony services include the ability to transmit some combination of two-way voice, data and video signals. Some of these firms already are actively providing competition to LECs in some geographic areas while others are still in development but should become competitors in the near future. Firms who are likely to provide increased competition to LECs for the provision of telephony services include: (1) CAPs; (2) cable companies; (3) out-of-region LECs; (4) interexchange carriers; (5) providers of wireless communications; and (6) electrical and gas utilities.

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stake in Nextel's national specialized mobile radio service. "MCI's Entry Adds New Dimension to Wireless Race," *The Wall Street Journal*, March 1, 1994.

[32] This is exactly the strategy undertaken by CAPs. Initially in most cities, CAPs such as MFS and Teleport focussed on providing special access services. Now in many areas CAPs are expanding their service offerings and are providing, among others, switched services, Centrex-like service, public telephone service and private line networks.

*i. Competitive Access Providers*

As mentioned previously, competitive access providers currently provide special access, private line, and some switched-access services to customers in business districts. With further physical expansion of their networks into residential areas, and with the addition of further switching capability, CAPs have the potential to become providers of a full range of local access and exchange services. This capability is enhanced by CAPs' ability to co-locate in the LEC's central office, and it is further enhanced by CAPs' existing relationships with interexchange carriers. In addition, as demonstrated in Table B-4, CAPs are already serving many small cities and suburbs of major cities.

Substantial evidence exists that CAPs are poised for a significant expansion of their services. For example, MFS, with 1993 operating revenues of $135 million, is a publicly-traded company with a market value of nearly $2 billion.[33] This indicates that the current revenues and profits of MFS are much lower than the market's expectation of MFS's future revenues and profits. Teleport has formed joint ventures with eleven cable television companies to build new competitive access services in several cities and expand existing Teleport networks in others.[34] Hyperion Telecommunications has applied for a Certificate of Public Good in Vermont that would allow it to provide CAP services statewide in Vermont. Hyperion plans to use the feeder and distribution plant of its parent company, Adelphia Communications Corp (a cable TV provider), and the fiber backbone built and owned by the Vermont Electric Cooperative.

*ii. Cable Companies*

Cable companies have an existing wire-based network that passes 90% of all homes and businesses in the United States.[35] Increasingly, the backbone distribution network of cable companies is fiber based and thus capable of handling two way communications. In fact, cable operators' use of fiber optics has increased 600 percent since 1988.[36] Thus, cable companies either possess or are installing the physical plant required to provide telephony services. In addition, the fiber optic cable used in their backbone loops for the provision of video services generally has

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[33] *Business Week*, March 28, 1994, p. 69.

[34] Telecommunications Reports, "Teleport Launches Service in Four New Markets", February 28, 1994.

[35] About 60% of all homes actually subscribe to cable TV. Paul Kagan Associates, *Cable TV Financial Databook*, 1992.

[36] Cable companies in 1993 planned to install approximately 465,000 miles of new optical fiber cabling in their networks, for a cumulative installed total to data of about 28 yards of fiber per subscriber. Equivalently, telcos planned to install about 1.8 million miles of additional fiber in 1993, for a cumulative total of roughly 111 yards per subscriber. *Lightwave*, August 1993.

unused capacity. Thus, telephony services could be provided without affecting the amount of video services provided.

A recent study has estimated that the costs of upgrading existing cable plant to provide telephony services (assuming the cable company has already upgraded its backbone transmission plant to fiber optics) would be about $207 per subscriber. If both telephone and distributed video services were provided, the cost per subscriber would only increase to $297 due to significant economies of scope in the provision of telephony and distributed video services. The analysis further demonstrates that upgrades to existing plant represent a large cost advantage to deployment of new networks and that there may be economies of scope between distributed video services and PCS. The author concludes "this outcome increases the value of the incumbent cable television network".[37]

The ability of cable systems to provide telephony services has already been proven in the United Kingdom. Since the provision of telephony services was opened to competition in the U.K., US cable and telephone companies have entered the market and created alliances to develop cable networks capable of providing both one-way video and two-way telephony services. These ventures have had considerable success in gaining customers. Cable companies provide telephone service to 15% of the U.K. homes that they pass, and to 70% of the homes that subscribe to cable. U.K. telephone companies continue to lose an estimated 15,000 subscribers a month to cable telephony.[38]

Some cable companies in the US have begun trials to provide telephony services. For example, in Queens, NY, Time Warner Cable is testing voice-over-cable services to 50 households, and MCI recently announced a joint trial with Jones Intercable to test phone service over the Jones cable network in Alexandria, Virginia.[39] Another cable telephony trial is being conducted by US West and Time Warner in Orlando, Florida where AT&T is providing the broadband switch for the "Full Service Network" being developed there. Cablevision (in conjunction with AT&T) won a competitive bid over Nynex to provide local telephone and cable services to Long Island University's C.W. Post campuses. Cablevision's bid offered students access to cable service, campus and University telephone service, access to local and long distance services and a sophisticated computer hookup. For all but local calls outside the university, university students and employees bypass the local telephone company. In addition, Cablevision plans to develop an 8,000 mile fiber-optic based network in Long Island and New York City to provide video on demand, interactive games and

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[37] See David P. Reed, "The Prospects for Competition in the Subscriber Loop: The Fiber-to-Neighborhood Approach", Presented at Twenty-First Annual Telecommunications Research Policy Conference, September 1993.

[38] Huber, "The Enduring Myth of the Local Bottleneck," 1994, p. iv, 24.

[39] See "Reaching their Potential," *Cablevision*, January 11, 1993, p. 33. See also Huber, 1994, p.27.

alternative phone service.[40] Cable companies are also significantly involved in the development of Personal Communications Systems (discussed further below) that promise to provide wireless telephony in competition to LECs.[41]

*iii. Out-of-Region LECs*

LECs possess knowledge of how to develop and maintain local exchange networks in regions outside their traditional provision of services that they have gained through decades of experience in developing local exchange networks in their regions. LECs have access to switching equipment and knowledge of how to work with the equipment. In addition, they possess expertise regarding network design and control, sophisticated billing techniques, and the provision of individualized services. The major LECs (the RBOCs, GTE & United) are financially strong and have a strong reputation for reliable service. Many LECs also are involved in cellular communications and thus have cellular licenses in many cities outside of their region. Thus, LECs already compete with each other to some degree. In addition, some LECs have entered into alliances with cable companies to provide telephony services out of region. Examples include Southwestern Bell with Hauser Communications and US West with Time Warner Cable. LECs are also actively pursuing PCS licenses as a means of entering other markets as intraexchange competitors. These alliances are discussed further below.

*iv. Interexchange Carriers*

Interexchange carriers (IXCs) have existing relationships with business and residential customers and have a reputation, in general, for quality services. AT&T is by far the most recognized name in telecommunications and generally is more familiar to consumers than even the local telephone company. Interexchange carriers are also involved in cellular communications and have existing licenses for cellular communications and access to the wireless spectrum in many cities.

IXCs, especially AT&T, own microwave facilities that they no longer use for long-distance transmission that can be used as macro cells, or the backbone network, for dispersed microcells in the construction of a purely wireless network. MCI also owns rights of way for an extensive network that they purchased from Western Union in 1990.[42] IXCs also have multiple points of presence in most major cities that have switching capability and some network architecture already developed. These

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[40] See Joshua Quittner, "Cable's Vision: LI Firm to build nation's largest digital data system", *Newsday*, February 25, 1993.

[41] In November, 1993, Continental Cablevision, Cablevision of Boston, and Time Warner Cable became the first cable TV companies to interconnect their systems to conduct a successful trial of PCS services over cable infrastructure, a demonstration that "set the stage for CATV companies to become major PCS players when the FCC auctions PCS licenses." See "CATV networks join to offer PCS," *Telephony*, November 22, 1993, p.8.

[42] See "MCI Plans to Enter Local Markets," New York Times, January 5, 1994, p. B1.

points of presence give IXCs the ability to directly provide originating access (both switched and non-switched) and interexchange services. In addition, their networks have spare capacity that could be used to provide intraexchange services. Thus, the incremental cost to IXCs of carrying additional traffic on their existing networks is quite low. IXCs already provide many individual services to consumers such as call security and registration of personal numbers. IXCs also have a sophisticated national network that they must monitor and control in order to ensure that long distance calls are connected in an efficient and reliable fashion.

As discussed above, IXCs already compete with LECs for the provision of access services and intraLATA exchange services, and have announced plans to enter into the provision of intraexchange services through the use of alternative local transport networks and wireless ventures.

*v. Wireless Companies*

Existing wireless companies have skills and assets useful for the provision of a full array of local access and exchange services. Wireless companies have existing rights to spectrum that could be used for local exchange purposes. Wireless companies have also planned interconnection strategies with landline networks. Cellular firms have developed some switching capabilities to maintain and control their wireless networks. The macro cells used for cellular transmissions can also be used as the backbone network for a provider of more complete telephony services. Also, as mentioned previously, the cost of wireless technologies is declining each year and wireless is becoming a cost effective alternative to wire-based technologies. Finally, wireless companies have existing relationships with some business and residential customers and generally have a reputation for being innovative and reliable firms. Some question exists as to whether cellular carriers would have the capacity at low cost to service a significant share of business and residential customers. Recent and expected developments in technology underlying the wireless networks, however, will expand the capacity and capability of all wireless telephony by a multiple of 5 or 20 times present levels. For example, the cellular systems in the Los Angeles area have present theoretical capacity of 700,000 users but the deployment of digital cellular systems would increase that capacity to 14 million. Capacity can also be increased almost indefinitely through the addition of more cells.[43]

Potential PCS providers must also be considered. While PCS is not yet an existing technology, the FCC plans to auction additional spectrum for PCS providers in the near future.[44] This process could yield up to seven new wireless services providers. PCS is expected to lower the cost of wireless services, thus facilitating more direct competition to LEC wireline services. Some analysts have noted the potential significance of wireless technologies in the future:

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[43] Peter Huber, "Competition and Open Markets in the Telecommunications Markets of California", February 8, 1994.

[44] The FCC now projects that there will be 60 million PCS users in the U.S. within ten years. *The Geodesic Network II*, 1992, p.4.132.

> "Radio technologies are emerging which will ultimately be more cost-effective than a cable network for both narrowband and consumer broadband, for a significant proportion of the local loop. The results of cost-modeling exercises indicate that, in a typical European greenfield case, up to 20%-30% of lines would be better served by radio than by a conventional telephone network."[45]

Mercer Management, Inc. of Lexington Massachusetts recently conducted a national survey, analyzed several market and cost possibilities, and interviewed telecommunications industry experts:

> "Nearly half of the industry experts that Mercer interviewed projected wireless service would become a 'viable substitute' for traditional wire-line service within 10 years... Half of those experts interviewed predicted more than 15 percent of the public would be using a wireless handset in five years, compared with the current 7 percent. They expect that figure to rise to more than 30 percent in 10 years."[46]

It is interesting to note, moreover, that the firms that have applied for experimental PCS licenses and are likely to compete in the auction procedure include all of the types of firms that have been mentioned to this point. To date, 187 companies have obtained experimental PCS licenses. About 10% of those companies are cable companies and cable companies are among the most active in a broad range of cities. For instance, Comcast is conducting trials in five cities, Hauser Communications is testing in five cities, Prime II is testing in six cities, Time Warner is testing in five cities, United Artists Cable is testing in five cities, Viacom is testing in five cities, Cable USA is testing in four cities, and Cablevision is testing in four cities. In addition, CableLabs, a R&D consortium of North American cable companies, is investigating using pre-existing broadband cable infrastructure for PCS. IXCs have also been active in PCS experiments. AT&T has obtained licenses in Boston, Los Angeles, Atlanta and New York. MCI has formed a consortium of 150 companies to attempt to secure national PCS coverage.[47] Other active players include Motorola with tests in ten cities and McCaw with tests in seven cities.

*vi. Gas and Electric Utilities*

Gas and electric utilities have rights of way to almost every residential and business customer within their area. They also use sophisticated network management and control services. They must ensure that electricity is routed through their grid efficiently and without interruption. They also possess sophisticated billing capabilities. In addition, many utilities have installed telecommunications systems to

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[45] *Network Europe: Telecoms Policy to 2000*, Analysys Publications, 1993.

[46] *The New York Times*, February 9, 1994.

[47] Communications Daily, November 18, 1993.

monitor and manage their electrical network. These systems generally have substantial excess capacity and are fiber-based.

Therefore, these systems could be used to provide telephony services, at least as a backbone to a telecommunications transmission network. In addition, electric utilities possess some of the 2 gigahertz spectrum band that the FCC has reallocated for PCS. Thus, gas and electric utilities also own some of the "rights of way" for wireless local exchange services. Gas and electric utilities have begun to install and utilize broadband networks in some areas and have expressed interest in expanding their presence in the telecommunications market, either directly or through alliances. For example, Entergy Corp., whose utility subsidiaries serve 1.9 million customers in Arkansas, Mississippi, Texas, and Louisiana, is testing a energy demand-side management technology called "PowerView." In addition to an "intelligent utility unit" utilized for energy measurements, the device would make the utility's existing infrastructure capable of supporting cable TV service and use switching to provide telephone service. The CEO of Entergy claims that he has no plans to enter the telephony or cable TV market, but that Entergy's broadband network would be available for telcos and cable TV companies seeking to upgrade their systems and, as well, presumably, to competitive access providers looking to expand their networks. [48] In addition, Baltimore Gas & Electric offers CAP services in its serving area. Potomac Electric Power is deploying a significant fiber network targeted for use by large businesses. The Electric Plant Board of Glasgow, KY has installed a coax-based broadband network from which spare capacity is being used for cable television, wide area public data networking, local telephony, and long distance access. Finally, a subsidiary of Citizens Utilities Company owns 98% of ELI. ELI has filed a petition with the Washington State Utilities and Transportation Commission for authority to offer intrastate interexchange and intraexchange switched services. ELI currently owns and operates networks in Seattle and Portland and is in the process of constructing networks in Phoenix, Salt Lake, and Sacramento.

b. Teaming Arrangements Among Various Types of Prospective Entrants May Facilitate Entry

As discussed above, many types of firms have the capability to provide telephony services in competition to LECs. The ability of any one firm to enter into the provision of a full array of access and exchange services can be enhanced by forming a team or alliance with other firms possessing complementary assets. Thus, one might expect certain types of alliances to form in the market and these alliances are already taking place in large numbers. One such example is alliances between competitive access providers, who generally have the physical plant and established relationships to serve business customers, and cable companies, who have the physical plant and established relationships to serve residential customers. Other alliances involve a competitive access provider or cable company and an out-of-region RBOC. The out-of-region RBOC has substantial financial resources and

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[48] See *Telco Competition Report* Special Report, "Utilities Emerging Role in Local Telecom Markets," February 17, 1994, p.15.

expertise in designing a network capable of efficiently handling large volumes of switched traffic. These assets can be used to enhance the capabilities of the physical plant already installed by the competitive access provider or cable company. Yet another type of alliance involves an interexchange carrier and a wireless telephony provider. Interexchange customers may have several points of presence in major metropolitan areas near wired providers of telephony. Thus, the combination of an IXC and a wireless provider may facilitate any exchanges between wired and wireless customers. Moreover, interexchange carriers may have existing microwave facilities that can be used as a backbone by a wireless provider. The teaming of a local wireless provider and an interexchange carrier also holds the ultimate promise of one-stop shopping for local and long-distance telephony. All of these combinations already exist or have been announced to take place.

Combinations of these types will speed entry into the provision of specific services – e.g., a cable company may be able to quickly provide special access services using its fiber network. However, these combinations also will facilitate the entry into "full switched network services" by non-LEC providers. For instance, the combination of an out-of-region RBOC and a cable company would provide the cable company with the switching and network expertise that would allow that company to be competitive in providing a full range of services.

c. Summary of Teaming Arrangements that Have Formed to Date

Many of the players in these alliances have significant physical assets and financial resources with which to accomplish their goals, and have announced ambitious plans for providing telephony services. Below, a detailed description is provided of some of the more notable alliances:

*i. Cable/CAP relationships:*

Cox, TCI, Continental, Comcast, Time Warner Cable and Teleport: Cox and TCI acquired Teleport Communications Group (TCG), the largest CAP, and sold minority stakes to the two other MSOs (multiple system operators) in 1993. The acquisition was completed with the intent of setting up ventures with local cable systems, which would hold stakes representative of their share of the market, leaving some portion of the business to the national Teleport venture.[49] Cox owns a 25.05% stake, followed by TCI with 24.95%, and Time Warner, Comcast, and Continental with 16.67% each.

TCI, ATC & TeleCable: The MSOs have participated in a joint venture known as FiberNet, since 1989 in and around Kansas City, Mo. TCI, American Television and Communications (ATC) and TeleCable jointly own the all-fiber network, covering close to 200 route miles on both sides of the Missouri River. The network now serves upwards of eight interexchange carriers, several airline reservation subsidiaries,

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[49] "Cable as the Alternative," *Cablevision*, March 22, 1993.

financial brokerage houses and other large firms requiring diverse paths to carry their traffic.[50]

Continental Cablevision, Cablevision of Boston, and Time Warner Cable: The three Boston MSOs became the first cable TV companies to interconnect their systems to demonstrate how PCS could be offered over CATV systems in late 1993. The demonstration allowed the MSO's to overcome their problems with interconnecting with differing systems and offering telecommunications subscribers extended and seamless service by using a combination of technology and cooperation. The companies had to do very little to their basic cable infrastructure to offer wireless services and to bypass the local telephone company.[51]

Monmouth Cablevision, Adelphia Cable, and Comcast Cable Communications: The three cable operators in Central New Jersey began setting up an inexpensive fiber interconnect in 1993 through a joint venture that will open new business opportunities for them such as alternative access to long distance services. Each company expects its cost for the interconnect to be less than $50,000. [52]

Continental Cable and Hyperion: The MSO and the telecommunications subsidiary of Adelphia agreed to set up a metropolitan area network through a joint venture in Jacksonville, Fla. The network will utilize Continental's existing fiber backbone and will require some construction of a series of fiber rings and fiber hookups to the premises of potential users. Between 30 and 40 large business users have been identified as likely connection points for the operation.[53]

Continental Cable and Teleport: The MSO and CAP began building loops around greater Boston and in the Willshire corridor of Los Angeles through a joint venture since 1992. TCG has been able to extend its business beyond the city limits via fiber routes available over Continental's suburban systems, allowing the MSO to enter the business without devoting a tremendous amount of startup effort.[54]

Comcast and Eastern Telelogic: Comcast agreed to acquire a 51% stake in the CAP in July, 1992 and subsequently expanded the CAP's operations in Philadelphia.[55] Terms of the deal were not disclosed.

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[50] "In Teleport's Shadow," *Cablevision*, September 21, 1992.

[51] "CATV networks join to offer PCS," *Telephony*, November 22, 1993, p.8.

[52] "RBOCs? Who Needs RBOCs?" *Cablevision*, December 6, 1993.

[53] "In Teleport's Shadow," p.31.

[54] "In Teleport's Shadow," p.31.

[55] "In Teleport's Shadow," p.31.