III. Local Loops

III. LOCAL LOOPS

The *Local Competition Order* defined local loops that must be unbundled to include "two-wire and four-wire analog voice-grade loops, and two-wire and four-wire loops that are conditioned to transmit the digital signals needed to provide" advanced data services such as ADSL.[1] The FCC has already declared its "strong expectation" that under the necessary/impair standard, "loops will be generally subject to unbundling obligations."[2]

Loops, however, are provided in a wide range of different markets. The availability of competitive substitutes varies accordingly. It makes no economic sense to treat "the loop" as a single product supplied to a single class of consumers in a single national market. In this context, even more so than with other UNEs, it is necessary to take into account the fundamental differences between ordinary and high-capacity loops, between business loops and residential ones, and between rural markets and urban ones.[3]

In urban areas, many business customers are already served by CLEC fiber or fixed terrestrial wireless networks. And in most areas there is already extensive competition for the business of any customer that requires the very-high-capacity connections provided over dedicated fiber-optic plant. Numerous competitors already vie to supply either dark or lit fiber.

Other competitive alternatives to ILEC copper loop are also evolving very rapidly. Cable does not offer a competitive substitute to ILEC loop in most markets today, but AT&T has recently staked over $90 billion on the belief that cable plant can be upgraded to substitute for loops in residential markets nationwide. Wireless alternatives are developing very quickly too: prices are falling sharply and capabilities are improving. For many customers, mobile wireless service qualifies as a loop substitute today. And the class of customers that can be served competitively over wireless loops is likely to expand rapidly in the next few years. As Chairman Kennard has acknowledged, local

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[1] *See Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, First Report and Order, 11 FCC Rcd 15499, 15691 ¶ 380 (1996) ("*Local Competition Order*").

[2] *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, Second Further Notice of Proposed Rulemaking ¶ 32, CC Dkt. No. 96-98 (rel. Apr. 16, 1999) ("*Second FNPRM*"); *see also*, William Kennard, Chairman, FCC, *A Stable Market, A Dynamic Internet*, presented before Legg Mason, Washington, DC, Mar. 11, 1999; William Kennard, Chairman, FCC, *A Competitive Call to Arms*, Association of Local telecommunications Services (ALTS) Convention, Nashville, TN, May 3, 1999.

[3] The 1996 Act and the FCC indeed recognize that local competition will develop differently in different geographic markets. Section 271 of the Act establishes two separate tracks for Bell companies to obtain long-distance relief: Track A for states where facilities-based competition develops quickly, and Track B for states where it does not. In the *Local Competition Order*, the FCC adopted a three-zone pricing structure to reflect disparities in the costs of deploying facilities in different areas. *See Local Competition Order*, 11 FCC Rcd at 15882 ¶ 765. The FCC recently has stayed this three-zone pricing rule. *See Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, Deaveraged Rate Zones for Unbundled Network Elements*, Stay Order, CC Docket No. 96-98 (rel. May 7, 1999).

markets are now seeing an "acceleration of competition" comparable to what the Commission "ha[s] seen in other markets, especially long distance and cellular."[4]

A. Large- and Medium-Sized Business Customers

The FCC recently defined "large business customers" as those with "twenty or more access lines."[5] (This is roughly equivalent to a single T-1 line, which provides 24 voice-grade circuits.[6]) Customers at the low end of this category typically spend at least $1000-$1500 per month on their purely local telecommunications service.[7]

As both the FCC and the Department of Justice have held, large business customers occupy a discrete telecommunications market.[8] A loop to a business customer is not bought, sold, or used, in the same market as a loop to a residential customer. Business customers pay much higher prices.[9] The differences are clearly sharp enough to place business and residential customers in separate markets. A 5 percent increase in the price of residential loops will not, in itself, attract new competitive supply from providers of business loops.[10]

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[4] William Kennard, Chairman, FCC, Statement Before the Subcommittee on Commerce, Justice, State, and the Judiciary, U.S. House of Representatives, Mar. 25, 1998.

[5] *Telecommunications Carriers' Use of Customer Proprietary Network Information and Other Customer Information*, Second Report and Order and Further Notice of Proposed Rulemaking, 13 FCC Rcd 8061, 8128, ¶ 88 (1998) (CPNI notice and opt-out approach "does not extend to business customers with twenty or more access lines. For these large business customers . . .").

[6] *See* H. Newton, *Newton's Telecom Dictionary* 583 (11th Ed. 1996).

[7] The average local rate for businesses with a key system line in urban areas is $60.02. FCC, *Reference Book of Rates, Price Indices, and Household Expenditures for Telephone Service*, at 24 (Jul. 1998) ("*FCC Reference Book*").

[8] *See, e.g.*, *Competition in the Interstate Interexchange Market*, Notice of Proposed Rulemaking, 5 FCC Rcd 2627, 2654 ¶ 60 (1990) (large business customer market is properly "distinguish[ed]" from "the marketplace as a whole."); *see also id.* ("large business customers tend to be better informed and more sophisticated in their evaluation of their telecommunications alternatives than other customers."); *id.* ¶ 61 (large customers are "unique" in that they "generally have substantial bargaining power," because a very small percentage of business customers accounts for a relatively large percentage of all revenues); *Applications of NYNEX Corp. and Bell Atlantic Corp.*, Memorandum Opinion and Order, 12 FCC Rcd. 19985, 20016 ¶ 53 (1997) (large business customers "are served under individual contracts and marketed through direct sales contracts."); Report of the United States Recommending Denial of NYNEX's Request for a Waiver to Provide International Telecommunications Services Through Private Transatlantic Telecommunications System, Inc. at 17-18, *United States v. Western Elec. Co.*, No. 82-0192 (Aug. 4, 1988) ("[i]f NYNEX had proposed to limit the [provision of services] to large users in New York City, the Court would have to determine whether NYNEX has established a lack of bottleneck power with respect to any such economically distinct class of customers.").

[9] The average price of monthly business service (for key line systems in urban areas) is $60.02, compared to an average of $19.49 for residential service in urban areas. *See FCC Reference Book* at 3, 24.

[10] Under DOJ's Horizontal Merger Guidelines, a product market is the smallest group of products or services for which a hypothetical monopolist could profitably impose a "small but significant and nontransitory" increase in price, on the order of 5 percent. *Department of Justice and Federal Trade Commission, Horizontal Merger Guidelines*, § 1.11 (1992, as amended Apr. 8, 1997).

1. CLEC fiber. CLECs reach many large- and medium-sized business customers directly, over the CLECs' own fiber networks. Indeed, CLEC fiber already serves nearly 15 percent of all commercial office buildings in the country.[11] CLECs routinely extend their fiber networks to reach larger business customers, and widely advertise their willingness to do so.[12]

Within the top 50 MSAs, CLECs have deployed nearly 30,000 miles of fiber. *See* Appendix A. CLECs have deployed fiber in all but 15 of the MSAs ranked between 51 and 150.[13] *See* Appendix B. According to ALTS, CLECs serve in excess of 350 Basic Trading Areas ("BTAs").[14]

Businesses invariably cluster in downtown areas and business parks – the areas of highest daytime population. Accordingly, competitors have deployed their fiber networks to areas of highest daytime population. Geographic Data Technology, Inc. compiles a database that provides daytime population by zip code, which we have used to derive the figures below.

- In Los Angeles, CLEC fiber passes through 91 percent of the zip codes that make up the top 10 percent of all zip codes within the state in terms of daytime population. Ninety-six percent of such zip codes in San Jose are passed by CLEC fiber, as are 100 percent of the zip codes in San Diego. *See* Map 1.

- In New York City, CLEC fiber passes through 75 percent of the zip codes that make up the top 10 percent of all zip codes within the state in terms of daytime population. One-hundred percent of such zip codes in Syracuse and Binghamton are passed by CLEC fiber. *See* Map 2.

- In New Brunswick, NJ, CLEC fiber passes through 78 percent of the zip codes that make up the top 10 percent of all zip codes within the state in terms of daytime

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[11] *Compare* New Paradigm Resources Group, *1999 CLEC Report,* at Ch. 6 p. 23 (10th ed. 1999) ("*1999 CLEC Report*") (104,097 office buildings served by CLECs) *with* U.S. Dep't of Commerce, *Statistical Abstract of the United States 1998*, 118th ed., at Table 1229 (Oct. 1998) (705,000 commercial office buildings nationwide).

[12] *See, e.g.*, CNBC/Dow Jones, Interview with Robert Manning, CFO, Intermedia Communications, Jun. 25, 1998 (Intermedia connects its fiber rings to "the main Class-A buildings in a downtown business district."); A. Lindstrom, *Fiber: Part II*, America's Network, Sept. 1, 1998. (MFN will "bring our fiber right up to our customers' floors in their buildings and provide them with wall-to-wall seamless connectivity."); W. Schaff, *Taking Stock: No Strings Attached*, Information Week, Feb. 22, 1999 ("Nextlink . . . has been concentrating on building fiber-optic connections to large offices and business parks. . . . Nextlink, however, intends to use the wireless system as a way to get to market faster. Once it has established service to a given location, it will build a fiber-optic connection to that location and relocate the radio equipment to another building.").

[13] MSAs 51-150 range in population from 489,000 to 1.1 million. *See* Rand McNally, *Commercial Atlas & Marketing Guide 1999*, 130th ed. at 60 (1999).

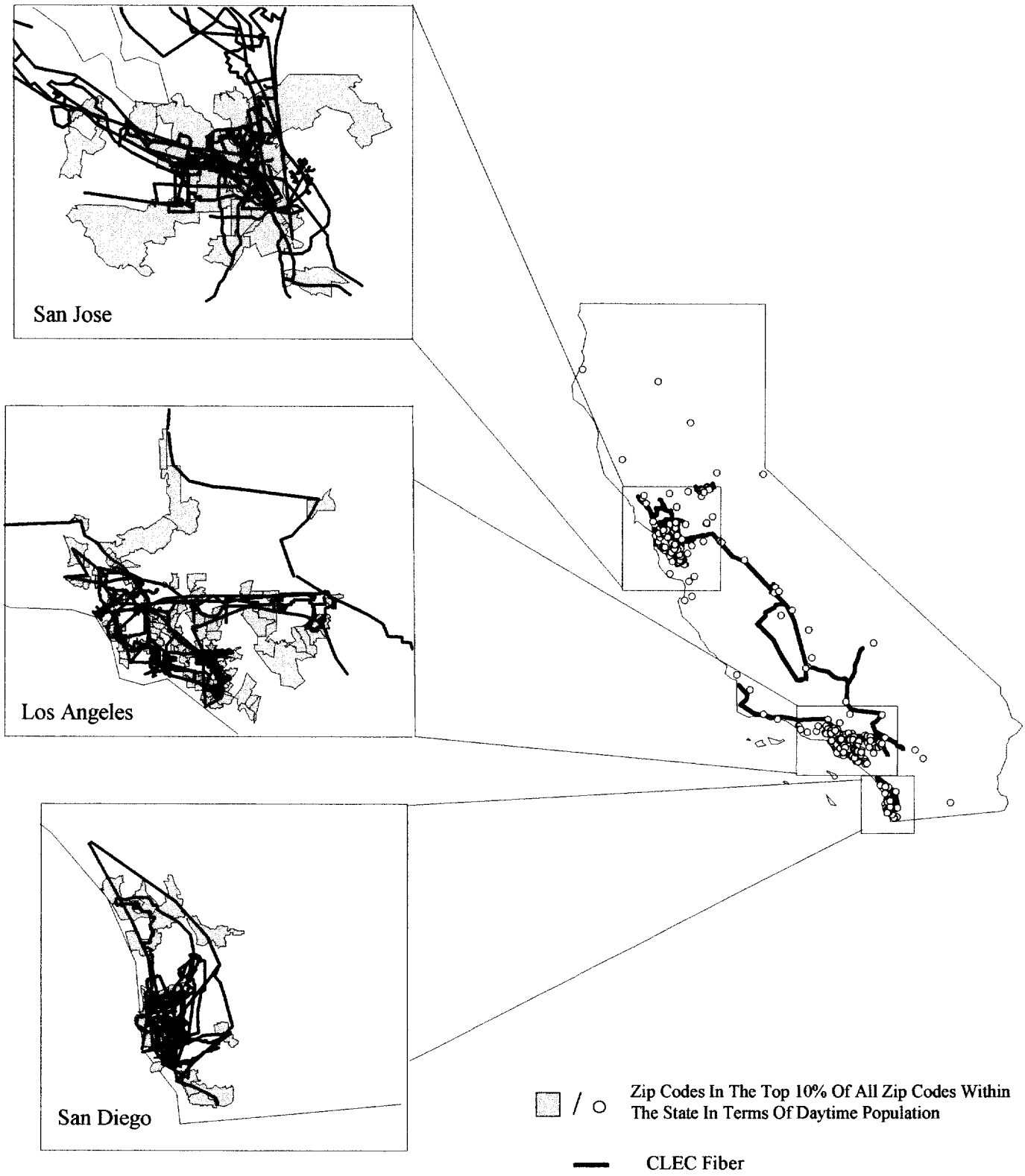
[14] ALTS, *Telecom Act's Third Birthday Wish*, Feb. 8, 1999. This represents 72 percent of the 487 BTAs in the U.S. *See* Rand McNally, *1999 Commercial Atlas & Marketing Guide* (1999).

population. Sixty-seven percent of such zip codes in Trenton are passed by CLEC fiber. *See* Map 3.

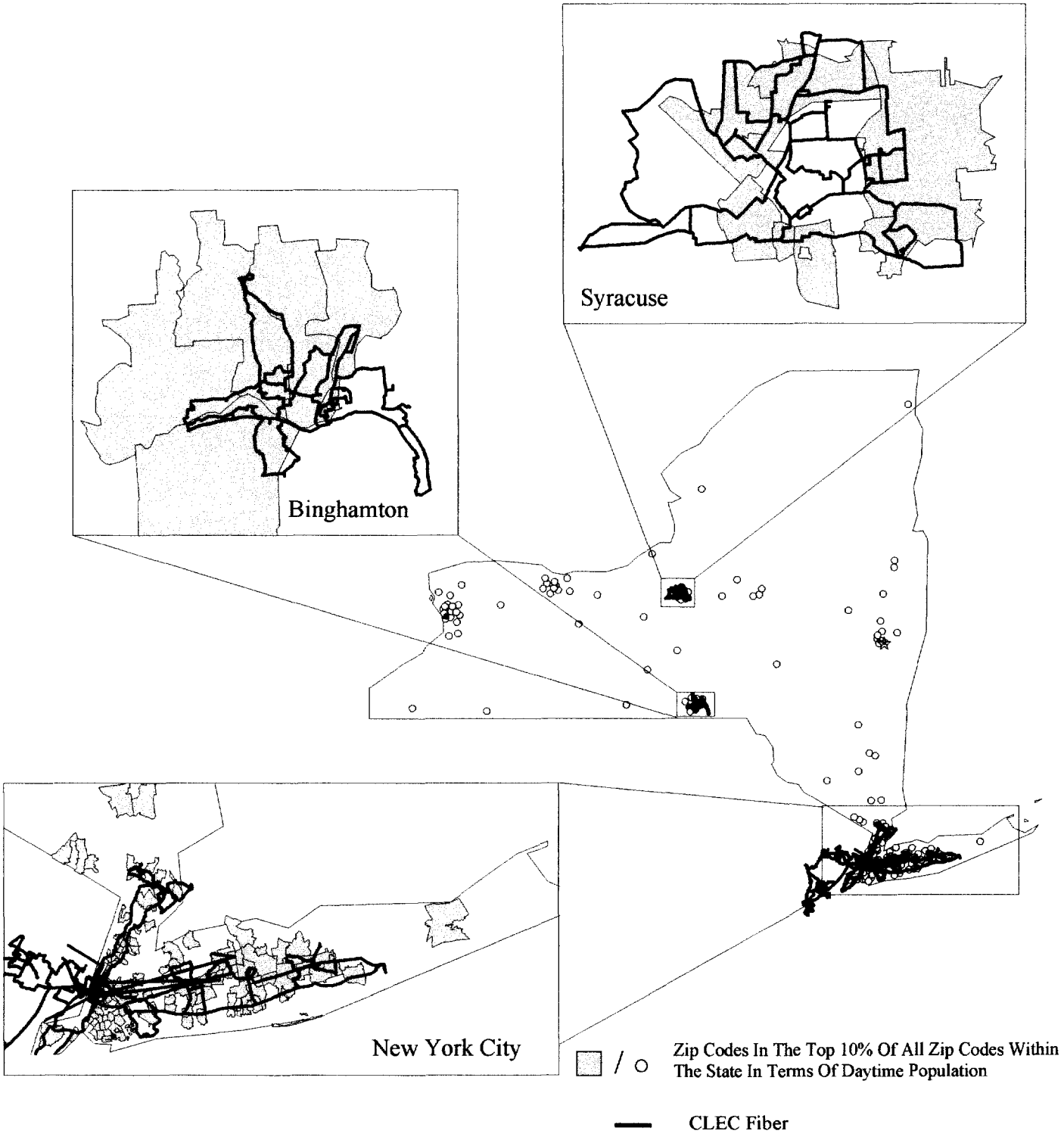
- In Northern Virginia, CLEC fiber passes through 93 percent of the zip codes that make up the top 10 percent of all zip codes within the state in terms of daytime population. Forty-eight percent of such zip codes in Richmond are passed by CLEC fiber. *See* Map 4.

- In Philadelphia, CLEC fiber passes through 95 percent of the zip codes that make up the highest 10 percent of all zip codes within the state in terms of daytime population. Forty-four percent of such zip codes in Allentown are passed by CLEC fiber. *See* Map 5.

Map 1. CLEC Fiber And Areas Of High Daytime Population

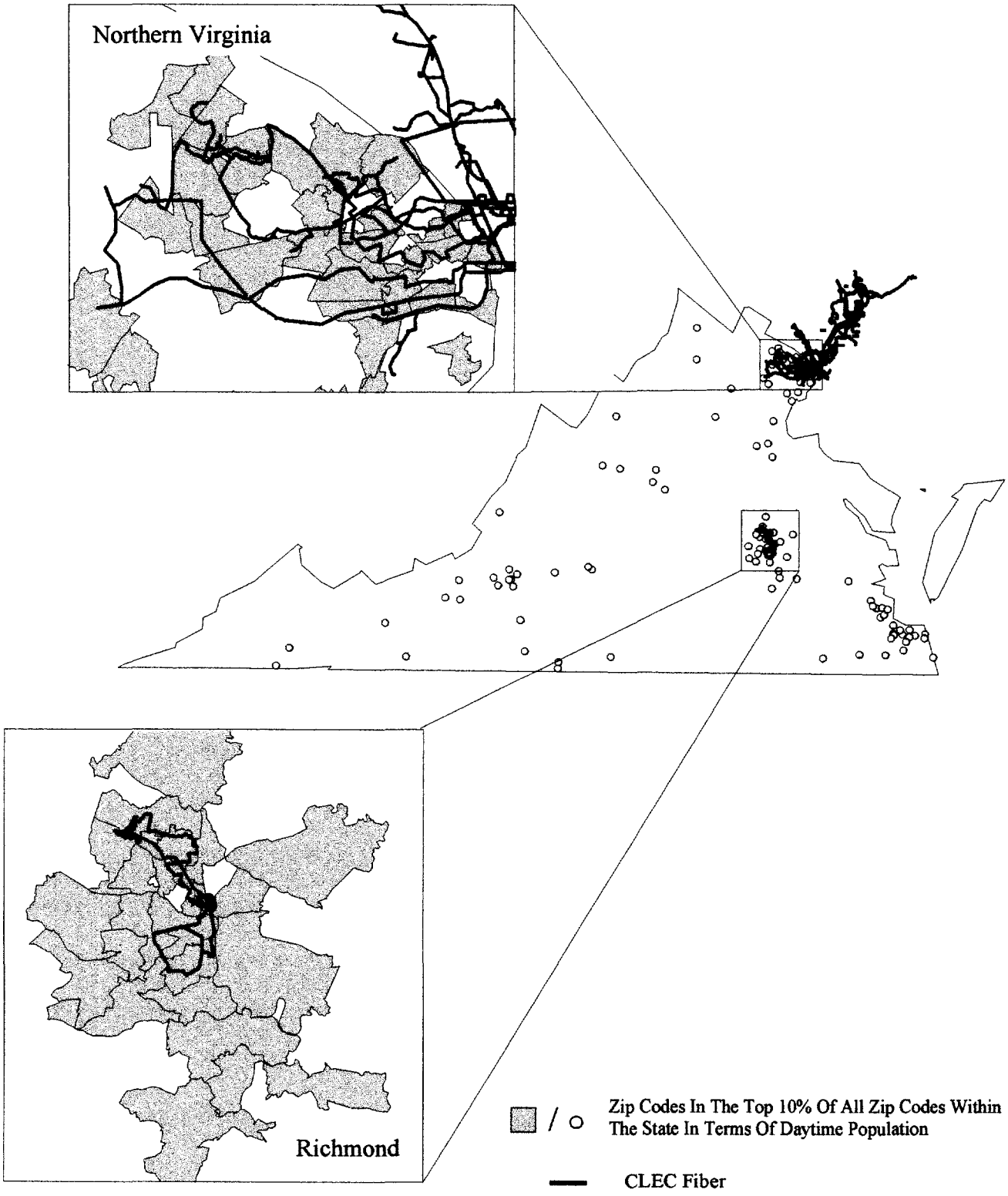


Map 2. CLEC Fiber And Areas of High Daytime Population



Map 3. CLEC Fiber And Areas Of High Daytime Population

Map 4. CLEC Fiber And Areas Of High Daytime Population



Map 5. CLEC Fiber And Areas Of High Daytime Population

2. Fixed terrestrial wireless. Fiber is the most important alternative loop technology, but it is not the only one. CLECs can and do also reach large- and medium-sized business customers via microwave and fixed terrestrial wireless connections.[15] As the Commission has recognized, fixed wireless access (wireless local loop, or WLL) offers "a replacement for the 'last mile' of copper wire."[16]

WLL is relatively inexpensive to deploy. According to the International Engineering Consortium, "deployment costs [are] expected to drop to $200 per subscriber installation."[17] This compares to a thousand dollars or more per wireline loop.[18] Moreover, WLL costs are not distance sensitive,[19] and almost every business in a license area can be reached as soon as service is activated. Roll out times are very short – "[a]ctivating a system within 90 to 120 days is feasible."[20] WLL is modular,[21] scalable,[22]

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[15] "WinStar estimates that it has to sell only 10 lines to break even on a point-to-multipoint system." *See* W. Schaff, *Taking Stock: No Strings Attached*, Information Week, Feb. 22, 1999. Winstar's average customer orders 20 access lines. *See* J. Dix, *High Fliers*, Network World, Apr. 26, 1999.

[16] *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Third Report*, 13 FCC Rcd 19746, App. F at F-1 (1998) ("*Third CMRS Report*"). Similarly, the Personal Communications Industry Association (PCIA) describes WLL as "hav[ing] the potential to serve as 'backbone' telephone service facilities, . . . and constitut[ing] potential competitors to traditional LECs." Letter from J. Kitchen, President, PCIA, to the Hon. Thomas Bliley, Chairman, Committee on Commerce, U.S. House of Representatives, Dec. 1, 1998, at 7.

[17] International Engineering Consortium, http://www.webproforum.com/amd/topic01.html.

[18] *See, e.g.*, *Third CMRS Report* at App. F, F-11 n.49 (*citing* Aberdeen Group estimate of WLL connection at $700-800 and wireline connection at $5000); P. Flanagan, *This Year's 10 Hottest Technologies in Telecom*, Telecommunications, May 1998 (WLL costs, which continue to fall, are $500-$1000 per-line, compared to as much as $2500 per-line for wireline); F. Dawson, *AT&T Throws Fixed Wireless Market for a Loop*, Inter@ctive Week, Mar. 18, 1997 (WLL provider "Tadiran claims a cost improvement of up to 60 percent over wireline networks."); J. Bartash, *Local Wireless Carriers Signal Advance*, CBS MarketWatch, Mar. 9, 1999 (WLL allows providers to charge up to 30% less than ILECs).

[19] *See* International Engineering Consortium, http://www.webproforum.com/amd/topic01.html.

[20] *Id. See also Third CMRS Report* at App. F at F-1 at n.1 (citing report that wireless networks cost one-third and can be deployed in one-third the time of wireline networks); F. Dawson, *AT&T Throws Fixed Wireless Market for a Loop*, Inter@ctive Week, Mar. 18, 1997 (*quoting* AT&T: WLL "doesn't require us to sink capital into a connection until we have a signed order.").

[21] *See, e.g.*, Nortel Networks, *Reunion System Overview*, http://www.nortel.com/wireless/bwa/overview.html (WLL "[d]esigned to be both modular and flexible . . . grows as you and your customers grow. Network buildouts can be gradual, minimizing capital investment in comparison to wired networks."); Lucent, *Flexent CDMA Wireless Local Loop*, http://www.lucent.com/wirelessnet/products/networks/flex_cdma_wll.html (The "Wireless Local Loop platform is modular. You can add capacity and capabilities when and wherever required and custom tailor your network design to meet your marketplace opportunities, while mixing fixed and mobile traffic on the same base stations.").

[22] *Third CMRS Report* at App. F, F-1 ("WLLs can be launched in much smaller segments than wireline systems."); Strategis Group, Press Release, *Wireless Broadband Forecast to be Strong Contender in Liberalizing Local Access Markets*, Feb. 1999 (WLL "has significant advantages, particularly the quick time to market and scalable systems. This means costs for infrastructure are incurred as customers are signed on and returns on investment start sooner.").

movable[23] and easier and cheaper than wireline loops to maintain. It also offers greater capacity and speed than a standard copper loop,[24] with equivalent quality of service.[25]

As the Commission has already concluded, WLL allows "faster time to market advantage over fiber-based networks; key strategic relationships with wireline CAPs and CLECs who wish to extend their fiber networks to end users not currently connected; initial service to a niche customer base of small-medium sized business customers, many of which are not served by fiber facilities provided by CLECs or CAPs . . . and the ability to bundle services from a versatile spectrum base that is already used to offer local, long-distance and Internet access services in one package."[26] "[F]ixed wireless technology has developed to the point where it has the potential to provide a competitive alternative to the incumbent LEC network."[27]

Many of the largest CLECs already have obtained wireless facilities (including licenses) to extend their fiber networks. AT&T holds 38-GHz licenses in over 200 geographic areas, including more than 95 of the largest 100 metropolitan markets. MCI WorldCom has recently invested nearly $700 million to obtain fixed wireless connections to complement its local fiber networks. MCI WorldCom CEO Bernard Ebbers has stated that, while his company has already purchased enough cable to cover half the country, his goal is to eventually cover 70 percent, and to use this fiber to serve as a local loop to small and mid-sized businesses.[28] Sprint has made four recent fixed wireless acquisitions that it plans to use to provide access to its ION network. Other major providers of WLL services include Winstar, Nextlink, Teligent, and Advanced Radio Telecom (ART). *See* Table 1; Maps 6 & 7.

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[23] Lucent explains: "Wireless allows you to redeploy access facilities on a large scale without losing a large share of embedded investment." F. Dawson, *Are Clouds Clearing Over Wireless Local Loop?*, Inter@ctive Week, Mar. 2, 1998.

[24] *See, e.g.*, *Third CMRS Report* at App. F, F-11 (WLL offers higher data speeds); J. Bartash, *Local Wireless Carriers Signal Advance*, CBS MarketWatch, Mar. 9, 1999 ("wireless broadband is already capable of equaling a T3 line.").

[25] Recent developments have alleviated line-of-sight requirements and obstruction concerns. Clarity Wireless Corporation, recently acquired by Cisco Systems, "is the first to provide high-speed, reliable operation in obstructed environments." Cisco Press Release, *Cisco Systems to Acquire Clarity Wireless Corporation*, Sept. 15, 1998.

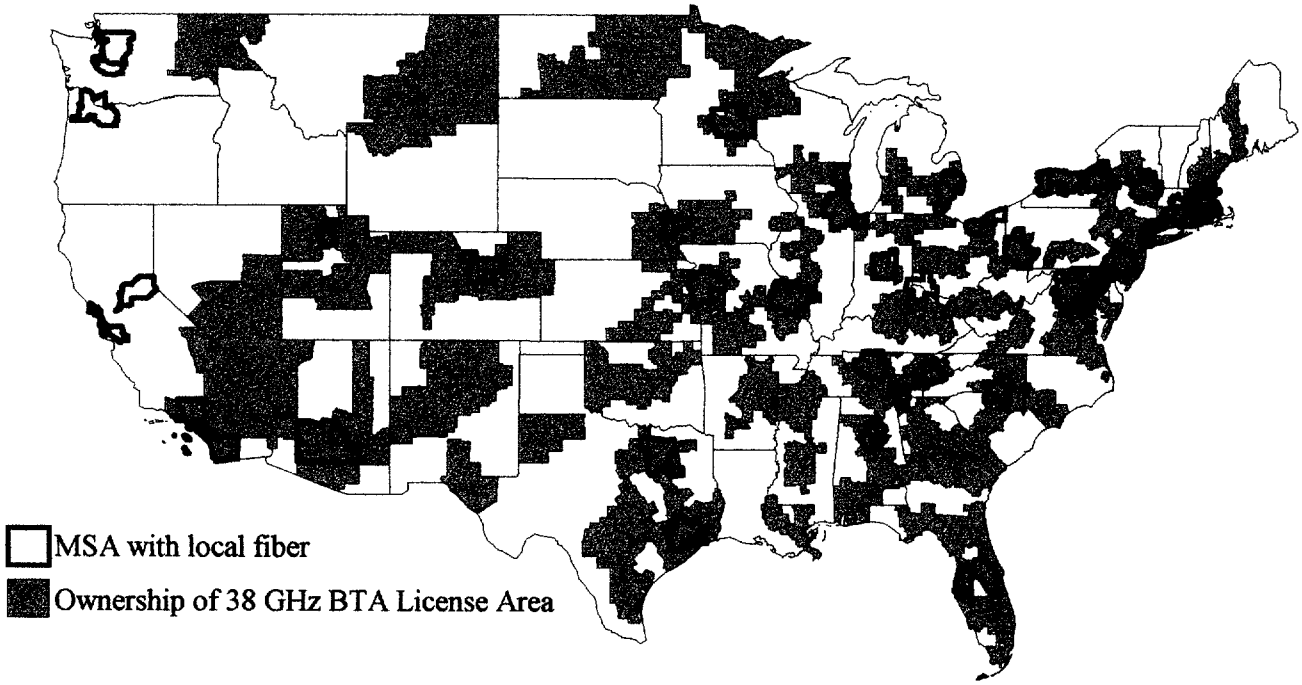
[26] *Third CMRS Report* at App. F, F-12.

[27] *Amendment of the Commission's Rules to Establish Competitive Service Safeguards for Local Exchange Carrier Provision of Commercial Mobile Radio Services*, Report and Order, 12 FCC Rcd 15668, 15701, ¶54 (1997). *See also*, *William Kennard, Guest Opinion: Access: Key Word for New Millennium*, Wireless Week, Feb. 15, 1999 (*quoting* Chairman Kennard: "new wireless companies are building networks that can help break down the local loop or 'last mile' bottleneck controlled by the incumbent wireline firms, allowing wireless to become a significant substitute for wireline telephony.").

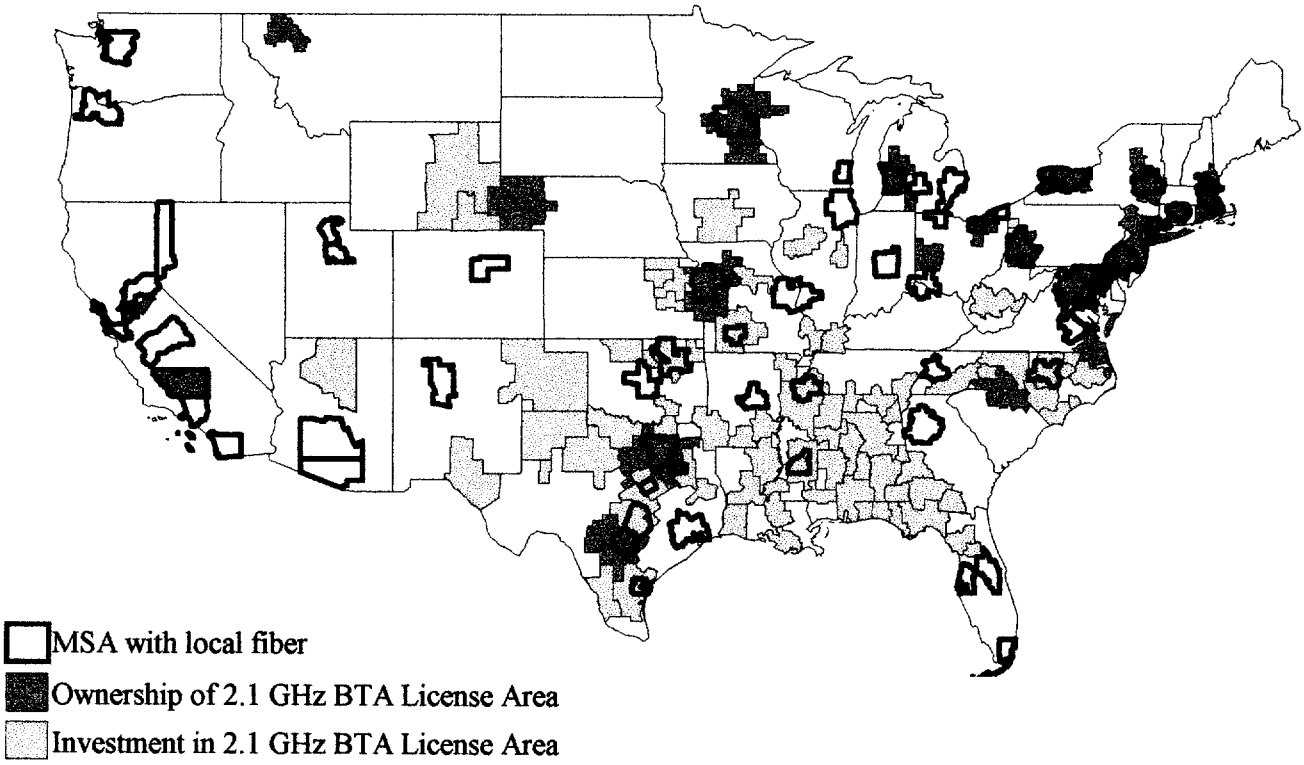
[28] *See* CIBC World Markets, Daily Teletimes, May 21, 1999 (summarizing comments of Bernard Ebbers at MCI WorldCom's Annual Meeting on May 20, 1999).

Table 1. Use of Wireless Technology to Extend CLEC Networks		
	Wireless Coverage	**Wireless Strategies**
WinStar	28- and 38-GHz licenses in 160 markets nationwide	"WinStar's 'Wireless Fiber' service offers a flexible and profitable alternative for extending the reach of an existing fiber ring or providing local transport."
Teligent	24-GHz licenses in 74 markets	Teligent CEO Alex Mandl: "When I decided to do this more than two years ago, there weren't a lot of people who even knew what [fixed wireless] is...Today, I think everybody in the industry recognizes that fixed-wireless networks and point-to-multipoint networks will be a very important part of how the industry will evolve."
NEXTLINK	39 A Block LMDS licenses and 1 B Block LMDS license, with 114 million POPs, and coverage of 95% of the top 30 markets.	"NEXTLINK is well positioned to leverage its unique combination of assets, including its growing number of metropolitan fiber networks, its fixed broadband wireless spectrum, and the high-speed IP-centric fiber backbone connecting over 50 cities in the U.S. and Canada that is currently under construction."
Advanced Radio Telecom (ART)	38 GHz licenses in 90 of the top 100 U. S. markets and 210 markets nationwide.	"By integrating its own fixed wireless national spectrum assets with fiber optic transport, ART is capable of serving the vast majority of businesses that do not have direct fiber connectivity."
AT&T	Through AT&T's acquisition of TCG/BizTel, it gained 38-GHz Licenses in 213 geographic regions and 95 of the top 100 largest markets.	38-GHz licenses allow us to "bring TCG's service to customers that cannot be served economically with fiber optics. Thus we can expand our geographic reach using our own facilities predominantly, and achieve higher penetration in all communities we serve."
MCI WorldCom	Acquired CAI Wireless for $483 million (licenses in New York City, Rochester and Albany, N.Y.; Philadelphia, Washington and Norfolk/Virginia Beach, Va. Long Island, Buffalo and Syracuse, N.Y., Providence, R.I., Hartford, Conn., Boston, Baltimore and Pittsburgh). CAI Wireless also has a 94% stake in CS Wireless, with licenses in 10 markets. Invested $200 million combined in Wireless One (licenses in 80 markets); Heartland Wireless (licenses in 90 markets); CAI Wireless (14 markets); and CS Wireless (10 markets). Signed a five-year national agreement with WinStar for "Wireless Fiber."	Ernest D. Yates, Wireless One Executive VP and Chief Operating Officer: "Wireless data services . . . offers affordable alternatives to traditional local loop services for the 'last mile' connections." Nate Davis, Senior VP, Network Operations and Chief Operating Officer, MCImetro: "We're excited about the potential of WinStar's Wireless Fiber service. It will allow us to expand our network reach and provide more choices for MCI customers."
Sprint	Acquired People's Choice TV for $469 million (licenses in Chicago, Detroit, Indianapolis, Houston, Phoenix, St. Louis, Milwaukee, Salt Lake City, Tucson and Albuquerque). Acquired American Telecasting, Inc. (ATI) (licenses in 55 markets). Acquired Videotron USA for $180 million and Transworld for $30 million (licenses in San Francisco, San Jose, and Oakland, Calif; Tampa, Fla.; Seattle and Spokane, Wash.; and Greenville, S.C.).	"The beauty of Sprint ION is that it is compatible with all broadband access methods. Fixed wireless is one such method, and PCTV's markets are exceptionally well-suited for deployment." "Together with our recently announced merger with People's Choice TV, this transaction gives us a wireless alternative to deliver advanced communications services to our customers," said William T. Esrey, Sprint chairman and chief executive officer. "[W]e will be able to greatly extend the reach of Sprint's Integrated On-Demand Network to consumers and small businesses."
Electric Lightwave	3-year agreement for 300 wireless paths (equivalent to 1200 DS-1 circuits) in the Pacific Northwest.	ELI President David Sharkey: "Our relationship with ART allows us to move quickly into our planned market buildout, stepping up the time line."
ICG/ChoiceCom	3-year, $3.5 million agreement, for wireless DS-1 and DS-3 access in up to 10 states, including California, Tennessee, Colorado, Texas, and states in the Ohio Valley and the Southeast.	ICG President Sheldon Ohringer: "This agreement is an excellent fit with our plans to develop and expand our presence in the markets we serve."
Williams Communications	Purchased 2% of WinStar's "Wireless Fiber" capacity for $400 million.	Williams President and CEO Howard E. Janzen: "WinStar's proven ability to provide wireless T-1s, together with Williams' technologically advanced fiber-optic network, offers Williams' carrier customers an unmatched end-to-end solution."
Sources: See Appendix C		

Map 6. AT&T Local Fiber & Terrestrial Wireless Service Areas



Map 7. MCI WorldCom Local Fiber & Terrestrial Wireless Service Areas



3. CLEC deployment of competitive loops to business customers. CLECs already generate a larger share of their revenues from the provision of facilities-based, switched local service than from any other category of service.[29] For the customers that they reach, these networks offer complete, facilities-based local service, including, of course, transport from the customer's premises to the CLEC's switch.

CLECs reach a significant, and rapidly growing number of customers. Though it is impossible to know precisely how many facilities-based lines CLEC networks are providing, there are two ways reliably and conservatively to estimate this figure.

First, we can estimate CLEC lines based on the number of interconnection trunks CLECs are using. Facilities-based CLECs do not obtain trunks unless they have local lines and traffic to support and use such trunks. Based on ILEC engineering experience, a single trunk can support up to approximately 10 facilities-based lines. Since CLEC networks may not be engineered for maximum efficiency (*i.e.*, to serve the most efficient number of customers per trunk), and since CLECs disproportionately serve heavy-use Internet lines, we can conservatively assume that CLEC trunks are serving between 2.5 and 5 facilities-based lines per trunk. At least one CLEC – U S LEC – estimates its own access lines in precisely this manner, and estimates that each trunk serves 5 business access lines.[30]

ILEC engineers involved in provisioning trunks to CLECs inform us that only about half of all such trunks have actually been activated to carry traffic. We have therefore estimated the total number of "activated" trunks to be one-half the number of "provisioned" trunks. We next multiply the number of activated trunks by the average lines per trunk. We then subtract the number of unbundled loops CLECs are taking from ILECs, since the traffic carried on these loops also travels over interconnection trunks.

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[29] In 1998, CLECs earned $3.54 billion in switched revenues, which represents over 30 percent of all CLEC revenues. The second highest category was data ($2.46 billion), followed by dedicated access/private line ($2.45 billion), and long-distance ($1.04 billion). *1999 Annual CLEC Report* at Ch. 7, p. 3.

[30] The company's website states as follows:

> **Equivalent Access Lines:** This term is used by management to quantify the size of the Company's network. It is based on the number of customer lines and Trunks and the utilization of those lines and Trunks during the "busy hour". The "busy hour" refers to the hour of the day when line usage is at its highest level. The company calculates its Equivalent Access Lines by multiplying the number of its Trunks in service by five and adding to the result the number of its separate access lines in service. The decision to use five as the multiplier is based on management's experience, which now indicates that the typical business access line is in use for approximately 400 seconds during the busy hour (or approximately 11.1% of capacity during the busy hour) and a typical business Trunk is in use for approximately 2,000 seconds during the busy hour (or approximately 55.6% of capacity during the busy hour) or approximately five times use during the busy hour of a typical business line. NOTE: Beginning in July, 1998, management changed the multiplier that it uses in the calculation of EAL from six to five in order to reflect changes in the usage of its network."

US LEC, *Legal Information*, http://www.uslec.com/legal.htm.

Applying this methodology, we estimate that CLECs are serving between 2.5 and 5.4 million lines over their own (non-ILEC) facilities in BOC and GTE service territories.[31] *See* Table 2.

Table 2. Facilities-Based CLEC Lines, by Region (Based on Interconnection Trunks)

	A Provisioned Trunks	B Activated Trunks (A/2)	C Unbundled Loops	D Facilities-Based Lines ((2.5*B) – C))	E Facilities-Based Lines ((5*B) – C))
Ameritech	347,607	173,804	122,208	312,302	746,812
Bell Atlantic	655,216	327,608	79,403	739,617	1,558,637
BellSouth	389,157	194,579	55,400	431,048	917,495
GTE	143,275	71,637	22,500	156,593	335,685
SBC	438,451	219,226	59,638	488,427	1,036,492
U S WEST	306,678	153,339	6385	376,963	760,310

Second, we can estimate CLEC lines based on the minutes of use (MOUs) exchanged between ILEC networks and CLEC networks. In the most recent month for which data are available, CLECs exchanged 13.2 billion MOUs with the BOCs and GTE, including 804 million MOUs originating on CLEC networks and terminating on BOC/GTE networks, and 12.4 billion MOUs originating on BOC/GTE networks and terminating on CLEC networks.[32]

The first category of MOUs (originating on CLEC networks) is most reasonably attributed entirely to voice calls, since most competitive networks use ILECs' networks for the termination of such calls. We assume that the average business line carries 500 MOUs of local calling each month.[33] Dividing 804 million MOUs by 500 (average use per line), we estimate that CLECs are serving 1.6 million voice-grade lines on their own networks (including unbundled loops obtained from ILECs).

The second category of calls (originating on ILEC networks) are predominantly data calls; many CLECs are also Internet Service Providers (ISPs),[34] or have numerous ISP customers. Moreover, because a typical customer will make and receive the same number of calls, a portion of calls that originate on ILEC networks and terminate on CLEC networks is already accounted for in the first category, and therefore must be subtracted. We assume that lines used primarily for Internet access are used, on average, 10,000 minutes a month.[35] Applying this methodology, we estimate that CLECs are serving 1.2 million data lines on their own networks.

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[31] This data is current as follows: for Ameritech, as of 4/99; for Bell Atlantic, as of 2/99; for BellSouth, as of 12/98; for GTE, as of 12/98; for SBC, as of 12/98; for U S WEST, as of 12/98.

[32] This data is current as follows: for Ameritech, as of 3/99; for Bell Atlantic, as of 2/99; for BellSouth, as of 3/99; for GTE, as of 3Q98; for SBC, as of 2/99; for U S WEST, as of 12/98.

[33] Estimate derived from internal company data.

[34] *E.g.*, MCI WorldCom, AT&T, RCN, WinStar, Electric Lightwave, and Frontier each operate major Internet backbones. *See* Boardwatch Magazine, *Directory of Internet Service Providers*, at 4 (Winter 1998 – Spring 1999).

[35] Estimate derived from internal company data.

Adding these two totals and subtracting the number of unbundled loops CLECs are taking, we estimate that CLECs are serving approximately 2.5 million facilities-based lines in BOC and GTE service territories.[36]

Table 3. Facilities-Based CLEC Lines, by Region (Based on MOUs Exchanged)

	A MOUs from CLEC to ILEC	B Facilities-Based Voice Lines (A/500)	C MOUs from ILEC to CLEC	D Facilities-Based Data Lines ((C-A)/10,000)	E Unbundled Loops	F Total Facilities-Based Lines (B + D – E)
Ameritech	103 million	205,600	2.5 billion	239,720	122,208	323,112
Bell Atlantic	304 million	609,610	4.3 billion	397,452	79,403	927,659
BellSouth	186 million	371,449	3.0 billion	324,575	55,400	640,624
GTE	80 million	159,896	1.5 billion	142,002	22,500	279,398
SBC	131 million	262,450	1.1 billion	93,581	59,638	296,393
U S WEST	N/A	N/A	N/A	N/A	6385	N/A

The overwhelming majority of lines provided over CLECs' own facilities are serving business customers within the densest wire centers. It is therefore reasonable to measure CLEC penetration by comparing CLEC lines with the ILEC lines that CLECs compete against most directly – that is, ILEC business lines within dense wire centers. As discussed in Section II (Interoffice Transport), it is reasonable, and conservative, to conclude that competitive fiber is present in ILEC wire centers that (a) serve between 20,000+ to 40,000+ loops and (b) have attracted one or more collocated CLECs. These wire centers are where the vast majority of CLEC–supplied loops are likely to be found.

We therefore compare total CLEC facilities-based lines as a percentage of all business lines (ILEC plus CLEC) served by dense wire centers with collocation. Using this methodology, we estimate that CLECs are serving between 9 and 18 percent of all business lines within BOC and GTE wire centers with 40,000+ more lines and one or more CLECs with collocation; between 8 and 17 percent of all business lines within wire centers in which there are 30,000+ lines and one or more CLECs with collocation; and between 8 and 15 percent of all business lines within wire centers in which there are 20,000+ lines and one or more CLECs with collocation.[37] *See* Tables 4, 5, & 6.

Table 4. CLEC Share of Business Lines In RBOC/GTE Wire Centers with 40,000+ Lines and One or More Collocated CLECs

	A. Estimates of Facilities-Based CLEC Lines			B. RBOC/GTE Bus. Lines in Wire Centers with 40,000+ Lines and 1 or More Collocated CLECs	C. Estimates of CLEC Share (A/(A+B))		
	1. Table 2, Col. D	2. Table 2, Col. E	3. Table 3, Col. F		1.	2.	3.
Ameritech	312,302	746,812	323,112	4,156,948	7%	15%	7%
Bell Atlantic	739,617	1,558,637	927,659	5,411,364	12%	22%	15%
BellSouth	431,048	917,495	640,624	2,657,386	14%	26%	19%
GTE	156,593	335,685	279,398	909,893	14%	27%	23%
SBC	488,427	1,036,492	296,393	8,254,453	6%	11%	3%
U S WEST	376,963	760,310	N/A	2,440,057	13%	24%	N/A

[36] This total excludes U S WEST.

[37] These totals exclude U S WEST.

Table 5. CLEC Share of Business Lines In RBOC/GTE Wire Centers with 30,000+ Lines and One or More Collocated CLECs							
	A. Estimates of Facilities-Based CLEC Lines			B. RBOC/GTE Bus. Lines in Wire Centers with 30,000+ Lines and 1 or More Collocated CLECs	C. Estimates of CLEC Share (A/(A+B))		
	1. Table 2, Col. D	2. Table 2, Col. E	3. Table 3, Col. F		1.	2.	3.
Ameritech	312,302	746,812	323,112	4,730,235	6%	14%	6%
Bell Atlantic	739,617	1,558,637	927,659	6,029,247	11%	21%	13%
BellSouth	431,048	917,495	640,624	3,386,045	11%	21%	16%
GTE	156,593	335,685	279,398	1,346,841	11%	20%	18%
SBC	488,427	1,036,492	296,393	8,650,388	5%	11%	3%
U S WEST	376,963	760,310	N/A	2,907,703	10%	19%	N/A

Table 6. CLEC Share of Business Lines In RBOC/GTE Wire Centers with 20,000+ Lines and One or More Collocated CLECs							
	A. Estimates of Facilities-Based CLEC Lines			B. RBOC/GTE Bus. Lines in Wire Centers with 20,000+ Lines and 1 or More Collocated CLECs	C. Estimates of CLEC Share (A/(A+B))		
	1. Table 2, Col. D	2. Table 2, Col. E	3. Table 3, Col. F		1.	2.	3.
Ameritech	312,302	746,812	323,112	5,315,461	6%	12%	6%
Bell Atlantic	739,617	1,558,637	927,659	6,454,705	10%	19%	13%
BellSouth	431,048	917,495	640,624	3,881,485	10%	19%	14%
GTE	156,593	335,685	279,398	1,641,869	9%	18%	15%
SBC	488,427	1,036,492	296,393	8,904,965	5%	10%	3%
U S WEST	376,963	760,310	N/A	3,221,720	10%	19%	N/A

In sum, CLECs serve between 8 and 18 percent of all business lines in dense wire centers with collocation. By comparison, three and a half years after *Execunet II*, AT&T's competitors were serving less than 5 percent of business lines.[38] At least one market analyst has noted that "CLECs as a group [have] achieve[d] in less than two years after the Telecom Act what it took MCI and other alternative long-distance carriers over 10 years to achieve during the 1970s and 1980s."[39]

B. Residential Customers

Although competition for business loops is well established and widespread, competition for residential loops has been slower to develop. But technologies that compete directly against traditional copper loops are rapidly being deployed across the country.

1. Cable. There can be little serious doubt, now, that cable will offer a direct substitute for ILEC loops to most U.S. households.[40] AT&T and other cable operators

[38] *See* William Kennard, Chairman, FCC, Statement Before the Subcommittee on Commerce, Justice, State, and the Judiciary, U.S. House of Representatives, Mar. 25, 1998; C. Yang, *Yes, Virginia, There Is Phone Competition*, Business Week, Sept. 28, 1998.

[39] J. Grubman, et al., Salomon Smith Barney, *CLECs Surpass Bells in Net Business Line Additions for First Time*, May 6, 1998.

[40] This development was anticipated in 1996. In the Conference Report to the 1996 Act, Congress noted "that meaningful facilities-based competition is possible, given that cable services are available to more than 95% of United States homes. Some of the initial forays of cable companies into the field of local

have clearly concluded that it is economically feasible to upgrade cable to provide direct substitutes for ILEC loops to residential customers.[41]

The FCC has found that "numerous MSOs" are offering commercial cable telephony, and that the service is now "available to a large number of customers in many markets."[42] *See* Table 7. For example, Cox Communications introduced local phone service in 1997,[43] now offers it "in parts of five major markets,"[44] and its offerings have been quite successful.[45] MediaOne Group recently introduced cable phone service in Atlanta, Los Angeles, Jacksonville, Boston, and Pompano, Florida, and says its results are "encouraging."[46] Jones Intercable has "had continued success with its rollout in the Washington, DC metropolitan area and plans to expand service within the region."[47] Cablevision is offering cable telephony on Long Island and in several Connecticut markets, and achieved penetration rates of 12 percent in just the first few months.[48]

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telephony therefore hold the promise of providing the sort of local residential competition that has consistently been contemplated." H. R. Conf. Rep. No. 104-230, 104th Cong., 2d Sess. at 148 (1996).

[41] The experience in the United Kingdom supports such conclusions. Nearly 40 percent of U.K. households now have the option to purchase cable telephony; that figure is projected to rise to 75 percent by 2002. *See* Opposition and Reply of British Telecom and MCI at 14, The Merger of MCI Communications Corporation and British Telecommunications plc, Dkt. No. 96-245 (F.C.C. filed Feb. 24, 1997). Fully one-quarter of the households that can subscribe to competitive local service opt to do so. *See* Independent Television Commission, ITC Cable Statistics, http://www.cable.co.uk (7 percent of all residential lines are cable-based); International Telecommunications Union, World Telecommunications Development Report, 1995 (number of U.K. households); M. Fagan, *Government Backs £13bn BT-MCI Deal,* Evening Standard (London), Feb. 26, 1997, at 35 (10 percent of all nationwide exchange lines are provided by BT competitors).

[42] *Annual Assessment of the Status of Competition in Markets for the Delivery of Video Programming*, Fifth Annual Report, CS Docket No. 98-102, FCC 98-335, ¶ 59, (rel. Dec. 23, 1998) ("*Fifth Annual Video Programming Report*").

[43] *See* Moody's Investor Service, *Cox Communications*, Investext Rpt. No. 3275589, (June 13, 1998). to residential customers in Orange County, California, and Omaha, Nebraska).

[44] *Fifth Annual Video Programming Report* ¶ 59.

[45] *See* L. Cauley, *Right Number? In Southern California, Cox Communications Rattles a Baby Bell*, Wall St. J., Aug. 6, 1998, at A1.

[46] L. Cauley, *Telecommunications (A Special Report): Bypassing the Bells*, Wall St. J., Sept. 21, 1998, at R14.

[47] *Fifth Annual Video Programming Report* ¶ 59. Jones has been offering phone service to MDU residents in Alexandria, VA since late 1995 and to Prince George's County, MD residents since 1996. *See* K. Gibbons, *Back From the Dead; Demand for Telephony*, Multichannel News, Jun. 29, 1998, at 22A.

[48] *See* J.R. Cohen, *et al.*, Merrill Lynch Capital Markets, *Cablevision Systems Corp. – Company Report*, Rpt. No. 2691812 (May 14, 1998).

Table 7. Provision of Local Telephone Service by Cable Operators				
	Circuit-Switched Cable Telephony		IP Telephony Over Cable	
	Commercial Deployment	Planned Rollouts	Commercial Deployment	Planned Rollouts
Adelphia	Palm Beach County, FL	Buffalo, NY (trial)		
Cablevision	29,200 homes on Long Island; Fairfield, CT	200,000 additional homes in Connecticut and New York		
Comcast	West Palm Beach; Ft. Lauderdale; Baltimore	Negotiations with AT&T to offer AT&T-branded telephony in all Comcast markets.		
Cox	Cheshire, Manchester, Meriden, South Windsor, Southington, CT; Omaha, NE; Orange County, CA; San Diego, CA; Phoenix, AZ	San Clemente, CA; Hampton Roads, VA		
Jones	Alexandria, VA; Prince William County, MD.			
MediaOne	150,000 homes in Atlanta; Los Angeles; Jacksonville and Pompano, FL; Boston; 5,000 customers in Richmond, VA; Northville, Plymouth, MI	Minneapolis-St. Paul	Detroit	New owner AT&T plans to test IP telephony services in MediaOne's circuit-switched markets.
TCI	Arlington Heights, IL; Hartford, CT; Fremont/Sunnyvale, CA			New owner AT&T expects to have 60% of TCI's systems IP compatible by the end of 1999, and 90% by 2000.
Time Warner	Rochester, NY			Negotiations with AT&T to offer service on Time Warner's facilities beginning in year 2000.
Source: *See* Appendix C.				

Led by AT&T, much of the rest of the cable industry will soon follow. AT&T itself states that its recent investments in cable answer "a big part of the question about how [AT&T] will provide local service to U.S. consumers."[49] AT&T has acquired the nation's largest cable company (TCI) and has reached an agreement to acquire the fourth largest (MediaOne).[50] AT&T's two direct acquisitions of cable properties represent a $90 billion investment in alternative local-loop technology. The company is also forging alliances with the second largest cable company (Time Warner) and the fifth largest (Comcast).[51] AT&T says it will offer "AT&T-branded cable telephony service to residential and small business customers over Time Warner's existing cable television systems in 33 states."[52] Time Warner indicates that they will offer the same services currently available to local phone customers and that "services will be competitively priced."[53]

Overall, about 20 percent of U.S. cable subscribers are already served by two-way systems.[54] Time Warner expects 85 percent of its cable plant "to be upgraded by the end of 1999."[55] TCI projects that by the end of 1999, 60 percent of its plant will be upgraded to two-way capability, and by 2000, 90 percent will be.[56] According to MediaOne, broadband telephony will be available to most of the homes in its service areas by the end of 2000.[57] MediaOne estimates the cost of upgrades to provide telephony and other two-way services at about $800 per customer. "This compares with roughly $1000 to $1200 of capital expenditure per subscriber that the RBOCs currently have.'"[58] And once the upgrade is made, cable companies can offer many services that basic residential loops

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[49] AT&T Press Release, *AT&T, TCI to Merge, Create New AT&T Consumer Services Unit*, Jun. 24, 1998.

[50] S. Schiesel, *Tasty Morsels and Digestive Challenges for AT&T*, New York Times, Apr. 26, 1999, K. Chen, *AT&T Buyout of MediaOne is Expected to Win Approval*, The Wall Street Journal, May 6, 1999.

[51] *See* AT&T Press Release, *AT&T and Time Warner Form Strategic Relationship to Offer Cable Telephony*, Feb. 1, 1999; L. Cauley, *Comcast Reaches Accord with AT&T on Media One*, The Wall Street Journal, May 5, 1999. These negotiations have been delayed pending AT&T's completion of the Media One deal. *See* R. Blumenstein, *AT&T Puts Cable Agreements on Hold*, The Wall Street Journal, May 20, 1999, at B9.

[52] Time Warner News Release, *AT&T and Time Warner From Strategic Relationship to Offer Cable Telephony*, Feb. 1, 1999.

[53] *Id.*

[54] Based on research by Kinetic Strategies, 20% of North America's cable plant is upgraded and activated to provide two-way services, passing 21 million homes. CableWeb Systems, *Market Opportunity*, www.cable-web.com/cable_web_marketing.htm.

[55] Time Warner News Release, *AT&T and Time Warner From Strategic Relationship to Offer Cable Telephony*, Feb. 1, 1999.

[56] *See* C. Mason, *Where Are CATV's Trump Cards?*, America's Network, Jun. 1, 1998.

[57] *See* MediaOne, *Overview*, http://www.mediaone.com/who_we_are/default.htm

[58] S. Masud, *Cable Telephony: Say Hello to Your New Phone Company*, Telecommunications Magazine, Dec. 1998.

cannot. Cox Communications estimates that the "breakeven penetration rate is in the high single digits."[59]

Cable is emerging even more quickly as an alternative for the loops used for data traffic. Data loops in fact account for much of the current growth in usage of ILEC loops – households obtain second phone lines mainly for fax and Internet services.[60] Cable modem service is now available to an estimated 20 million homes, or roughly 20 percent of the U.S. mass market.[61] It will reach an estimated 20-30 million by the end of 1999.[62] An estimated 13 million cable modems will be deployed in the next three years.[63]

Before long, all of these data channels will be capable of providing voice too. AT&T plans to begin deploying IP telephony on TCI's systems in 1999.[64] Much of the work has already been completed;[65] trials are already under way in Atlanta, Baltimore, Boston, Miami, Phoenix, San Francisco, and San Jose.[66] In the words of AT&T's Chairman, "IP telephony is here."[67] TCI President Leo Hindery claims that "within 5 years, 100% of homes passed by AT&T will be able to take Internet protocol (IP) telephony," and thirty percent actually will subscribe."[68] IXC is about to begin trials of IP telephony over cable modems. Cisco Systems recently introduced the first Data Over

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[59] *Id.*

[60] *See, e.g.*, L. Selwyn and J. Laszlo, ETI, *The Effect of Internet Use on the Nation's Telephone Network* at Table 3 (Jan. 22, 1997) (prepared for the Internet Access Coalition) (the demand for 6 million "second" residential subscriber lines in 1995 – almost half of all "second" residential lines – can be attributed principally to on-line access). The Commission itself recognized that fact when it opted to raise monthly subscriber line charges on second residential phone lines, but not on first lines. *Access Charge Reform*, First Report and Order, 12 FCC Rcd 15982, 16014 ¶ 78 (1997).

[61] *See* Paul Kagan Associates, Inc., *Cable TV Technology*, Aug. 26, 1998, at 3, *as cited in* NCTA, *Cable Television Year-End Review 1998* (as of mid-1998). This number is estimated to grow to 39 million homes by 2000, and to more than 67 million homes by 2005. *Id.*

[62] *See* J.J. Bellace, et al., Merrill Lynch Capital Markets, Investext Rpt. No. 2706388, Wireline Communications Equipment – Industry Report at *1 (June 22, 1998).

[63] *See High Speed Internet Access to Reach 16 Million U.S. Households by 2002, According to Forrester*, Business Wire, Sept. 1, 1998 (predicting cable modems will capture 80 percent of the high-speed market). *But see Study Sees Cable Modem Deployments Surpassing ADSL Installations by 2003*, Broadband Networking News, Aug. 4, 1998 (estimating 10 million cable modem users by 2003).

[64] *See* S. Schmelling, *Ghostbusting*, Telephony, Apr. 12, 1999.

[65] Technology for IP telephony, according to AT&T's Chief Technology Officer and President of AT&T Labs David Nagel, is "well in hand" and "makes good economic sense." "The period of invention," Mr. Nagel declared, "is over." *AT&T Plans $4.4- Billion Upgrade*, Television Digest, Jul. 6, 1998.

[66] *See* AT&T, *AT&T Connect 'N Save® Service – Welcome*, http://www. connectnsave.att.com.

[67] *AT&T Proposes a Deal to Buy TCI*, CNN Moneyline News Hour with Lou Dobbs, Jun. 24, 1998.

[68] *Hindery Denies Athome-Roadrunner Talks, Cable Fault In Rate Hikes*, Communications Daily, Mar. 29, 1999.

Cable Service Interface Specification (DOCSIS) 1.1 cable modem with router to deliver IP telephony.[69] CableLabs is in the process of completing the DOCSIS 1.1 standard.[70]

Most communities are served by only a single cable operator: upgraded cable will therefore provide a substitute for ILEC loop to only a single CLEC, unless incumbent cable operators are required to unbundle cable's capabilities in the same manner as incumbent LECs. It is worth noting, however, that the residential long-distance market remains dominated by just two providers, AT&T and MCI WorldCom.[71] In October 1995, when the Commission declared AT&T to be "non-dominant,"[72] and without significant market power, AT&T still served about 75 percent of presubscribed residential long-distance accounts; and MCI served 12 percent.[73]

2. Mobile Wireless. Cellular and PCS services clearly offer a functional alternative to wireline connections. Advanced digital technology has eliminated the quality gaps between wireline and wireless connections. But until quite recently, wireless service was not price competitive with wireline service, and therefore did not provide an economic substitute.[74]

In May 1998, however, AT&T introduced its Digital OneRate service plan. Since then, the company has widely advertised the service as a direct substitute for wireline

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[69] *See New Media*, Communications Daily, Apr. 21, 1999.

[70] *Id.*

[71] In 1997, the latest year for which such data is available, AT&T and MCI together had 79.8 percent of all residential pre-subscribed lines. *See* FCC, Common Carrier Bureau, *Long Distance Market Shares Fourth Quarter 1998*, Mar. 1999, at 23 Table 4.1.

[72] *Motion of AT&T Corp. to be Reclassified as a Non-Dominant Carrier*, Order, 11 FCC Rcd 3271, 3356 ¶ 164 (1995). AT&T became exempt from regulation for its residential long distance, operator, 800 directory assistance, and analog private line services, in addition to the business services that already were regulated as nondominant. *Id.*

[73] FCC, Common Carrier Bureau, *Long Distance Market Shares Fourth Quarter 1998*, Mar. 1999, at 23 Table 4.1.

[74] *See, e.g., Application by BellSouth Corporation, et al. Pursuant to Section 271 of the Communications Act of 1934, as amended, To Provide In-Region, InterLATA Services In Louisiana*, Memorandum Opinion and Order, 13 FCC Rcd 6245, 6290 (1998) (PCS providers "appear to be positioning their service offerings to become competitive with wireline service, but they are still in the process of making the transition 'from a complementary telecommunications service to a competitive equivalent to wireline services.'") (*quoting Implementation of Section 6002(b) of the Omnibus Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Commercial Mobile Services*, Second Report, 12 FCC Rcd 11266, 11326 (1997)).

service.[75] AT&T Wireless, Sprint PCS, and Nextel all offer nationwide plans without additional roaming and long distance charges.[76]

In announcing its OneRate plan, AT&T's Michael Armstrong stated that the company would market the service not just as a complement to wireline service, but as a direct substitute.[77] "Pretty soon, someone's going to wonder why that [wireline] phone is sitting there."[78] Sprint reached the same conclusion: "It's no wonder our customers are beginning to use their Sprint PCS phones as their one and only communications tool every day."[79]

Wireless is particularly competitive for second lines. AT&T is testing a mobile phone plan in Plano, TX where subscribers receive unlimited local phone calls inside Plano and pay for bundles of minutes that can be used elsewhere.[80] AT&T is offering the service to encourage people "to buy mobile telephone service rather than a second home line."[81] Frontier Cellular is likewise targeting applications such as a "phone line for a vacation home, a second line for a teenager, or a line for a rural residence without access to a landline."[82]

Usage patterns strongly suggest that a rapidly growing number of consumers view wireless as a direct substitute for wireline calling. The average PCS subscriber now makes 250 to 350 minutes of calls a month[83] – about double the usage levels in 1998.[84] And usage levels continue to rise very fast.[85] A Yankee Group manager stated that PCS

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[75] One AT&T ad states: "...[W]ith rates as low as 11 cents a minute, every call is like a local call. It could make your wireless phone your only phone." Ad for AT&T Digital OneRate, *New York Times*, Apr. 15, 1999, at A11.

[76] A PCIA spokesperson states "that simplified pricing – with no roaming and no long distance charges – is the clear trend for the wireless industry." Remarks of Mary McDermott, Senior Vice President, PCIA, at ICM's Third Annual Strategic Telecom Pricing Conference, Jan. 27, 1999.

[77] *AT&T Wireless Joins Sprint PCS in Single-Rate Offer, But Adds Contracts*, Communications Daily, May 8, 1998, at 7-8.

[78] *Id.*

[79] Sprint PCS News Release, *Sprint PCS Unveils All-Inclusive Nationwide Service Plans With Prices As Low As A Dime A Minute, Anytime, Anywhere*, Oct. 1, 1998.

[80] *See* J. Files, *AT&T Tests Mobile Phone Promotion*, The Dallas Morning News, Nov. 12, 1998.

[81] *Id.*

[82] Frontier Cellular Press Release, *Frontier Cellular Offers Digital Wireless Local Access*, Feb. 9, 1999.

[83] *See* P.D. Walter, et al., The Robinson-Humphrey Company, Inc., Investext Rpt. No. 3356892, *PCS Versus Cellular – Industry Report* at *9 (June 25, 1998).

[84] *See* Strategis Group, Press Release, *Good News for Mobile Phone Industry—Minutes of Use Are On the Uptick, The Bad News—So is Churn*, Nov. 10, 1998.

[85] *See* C. Motz, Credit Suisse First Boston Corporation, Investext Rpt. No. 2740395, *Wireless Telecommunication Svcs: the Wireless Review #35*, at *3 (Feb. 18, 1999). *See also* C.M. Motz, et al., Credit Suisse First Boston Corp., Investext Rpt. No. 2690909, Wireless Telecommunications Services – Industry Report at *2 (Apr. 23, 1998) ("We are seeing evidence of more minutes of use now with the PCS,

providers are "showing average minutes of use that are triple the historical cellular number. That's the primary way of initially deploying wireless local loop in a domestic marketplace."[86] As a sign that residential usage is rising, many providers have eliminated free off-peak and weekend calling and are instead offering packages of bulk minutes during these times.[87]

The Commission itself has acknowledged that wireless providers are now "using aggressive pricing to position their services as true replacements for the wireline based services of LECs."[88] "As wireless service rates continue their downward trend and the use of wireless service increases, there is a greater likelihood that customers will view their wireless phones as a potential substitute for their wireline phones."[89] "[W]ireless and wireline technologies are increasingly competing for a single pool of minutes-of-use. ... [W]ireless providers can compete for local access by creating pricing plans that encourage their customers to use mobile phones as substitutes for wireline phones."[90]

Analysts have likewise concluded that wireless rates have fallen below the wireline "displacement point." Exact price parity is not the right test; wireless phones offer the considerable advantage of mobility, so consumers are willing to pay more for them, just as they are willing to pay more for cable service than for (free) broadcast television. The Yankee Group estimates the point of displacement is a wireless-to-wireline price ratio of 3-1.[91] Moreover, PCS providers routinely bundle in Caller ID, voice mail, and paging. On a bundled basis, these services are already priced at levels directly comparable to those charged for similar bundles of wireline alternatives, in both business and residential markets. Wireless calling is cheaper still when large calling areas (which eliminate many toll calls) and the elimination of long-distance charges under "one rate" plans are factored in

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digital cellular, and ESMR carriers. Most PCS carriers [are] seeing significantly higher minutes of use than their analog cellular counterparts. Although it takes a while to alter the averages, both large and small PCS players are reporting minutes of use in the range of 180-350 minutes per month. Bell Atlantic Mobile, a digital cellular carrier, says that converted analog users are using about 280 minutes per month. ESMR operator Nextel reports that it is seeing minutes of use in excess of 300 per month.").

[86] Pat Blake, *Hybrid WLLs*, Telephony, Jun. 1, 1998, at 26.

[87] *See, e.g.*, BestBeep.com, *Sprint PCS Service Plans*, www.bestbeep.com (On the Standard Sprint Service plan, unlimited off-peak hours can be purchased for an additional $9.99); New City Wireless Communications, Inc., *Cellular Service Promotion*, www.ehot.com/newcitywireless/promotion.html (under GTE Cellular Choice Plan users may purchase 1000 off-peak minutes per month for $10); newyorl.citysearch.com, *Personal Communication Center*, www.newyork.citysearch.com/E/V/NYCNY/0015/61/12/4.html (AT&T Digital PCS plans offer the option to buy unlimited evening and weekend airtime for an extra $9.99 per month)

[88] *Third CMRS Report*, 13 FCC Rcd at 19817.

[89] *Cellular Telecommunications Industry Association's Petition for Forbearance from Commercial Mobile Radio Services Number Portability Obligations and Telephone Number Portability* ¶ 23, WT Dkt No. 98-229 (rel. Feb. 9, 1999).

[90] *Third CMRS Report*, 13 FCC Rcd at 19776-19777.

[91] *See* Yankee Group, *Yankee Group Pricing Study: All-Inclusive Wireless Rates Usher in The Era of Landline Displacement*, Jan. 4, 1999.

According to the Personal Communications Industry Association, "42% of all Americans would consider switching their local phone service to wireless."[92] Industry observers note that the "[w]ireless industry is winning new customers at the expense of wireline rivals, with very young and heavy volume customers most likely to yank wireline phone in favor of mobility."[93] AirTouch and Western Wireless figure that by 2001, some 10 percent of their wireless customers would use their wireless phone as their primary phone.[94]

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[92] PCIA Press Release, *PCIA Launches Advertising Blitz on Wireless Competition*, Mar. 26, 1998.

[93] *Executives See Low Volume and Heavy Users for Wireless*, Communications Daily, Feb. 10, 1999.

[94] *See id.*; J. Files, *Wireless Market Looks Homeward*, The Dallas Morning News, Feb. 9, 1999.

C. Dark Fiber

The Commission has sought comment on whether it should "modify the definition of 'loops' or 'transport' to include dark fiber."[95]

Fiber is principally deployed as a loop to very large customers.[96] Using the current standard in loop electronics, a single fiber pair can transmit at speeds of at least OC-12, and OC-48 is quickly emerging as the new standard.[97] OC-12 enables connections of 622 million bits per section – the equivalent of over 10,000 voice-grade lines. Only the very largest customers require connections of this magnitude. Over 65 percent of BOC and GTE wire centers in fact contain 10,000 or fewer lines. And even in those wire centers, ILECs routinely deploy fiber-optic interoffice trunks.[98]

There can be no serious doubt that CLECs have and will continue to lay fiber to reach any customer capable of generating traffic volumes at such levels. One observer notes that "[l]arge companies have been able to use their marketplace clout to obtain direct fiber connections to network backbones."[99] Where CLECs do not have their own fiber-optic facilities in place, they can often lease dark fiber from wholesalers who do. Major wholesalers include Frontier, GST, IXC, Level 3, MFN, Qwest, and Williams.[100] *See* Table 8. Many utility companies are deploying fiber either on their own or in partnership with CLECs. *See* Table 9.

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[95] *Second FNPRM* ¶ 35.

[96] There are also instances, however, of small and medium businesses with access to alternative fiber networks, as well as residential customers within multiple dwelling units.

[97] *See* A. Lindstrom, *Terabit Routing: The Network's New DNA*, Americas Network, Jan 1, 1999 ("OC-48 is being deployed now") (*quoting* Cisco Project Marketing Director Andrew Greenfield); A. Lindstrom, *Optical networking: The Future of OC-768 Depends on Speed and Need*, America's Network, Sept. 15, 1998 ("The industry is starting to migrate from OC-12 to OC-48."); A. Lindstrom, *Sonet Cheats Death by Penetrating Local Loop*, America's Network, Apr. 1, 1999 ("We are driving to commoditize the market, making OC-48 deployment 'casual'") (quoting Rob Koslowsky, director of marketing, Cerent Corp.); T.J. Erickson, et al, Dain Rauscher Wessels, *Network Technology*, Report No. 2708837, Jul. 22, 1998., *3 ("Backbone ISPs are beginning to provision networks based on OC-12(633 Mbps) connections, with OC-48 just over the horizon."); W.T. Scott, et al, Furman Selz LLC., *Industry Report- Competitive Local Exchange Carriers*, Report No. 2648310, *3 (The 12,000 mile network being jointly constructed by ACSI, fonorola and IXC will carry voice, data, video and IP traffic at OC-12 rated transmission speeds"); GST Telecommunications, *GST Network Information*, http://www.gstcorp.com/network ("GST's network infrastructure is based on its own OC-48 fiber and ATM switches, with the ability to upgrade to OC-192.")

[98] J. Kraushaar, *Fiber Deployment Update, End of Year 1997* (1998), at 18 ("Fiber deployment data disclose that much of the fiber deployed to date has been in interoffice plant.").

[99] M. Kennedy, *Broadband Access for the Middle Market*, Telecommunications Online, Jan. 1999, http://www.telecoms-mag.com/issues/199901/tcs/kennedy.html.

[100] According to some estimates, "35% of the fiber already in the ground is 'dark.'" C. Mack, *Fiber Frenzy*, Forbes, Apr. 19, 1999, at 252. Since June 1998, "the wholesale spot price of bandwidth is down 35%, thanks to ample supply." *Id.* Bandwidth is now sold as a commodity through numerous clearinghouses, including Arbinet, AT&T Global Clearinghouse, GRIC Communications, IXTC WweXchange, and Ratexchange RTBX. *See* K. Henderson, *Market Makers Push "Telecommodities,"* Phone+ Magazine, Dec. 1998.

Table 8. Major Suppliers of Dark Fiber		
	Fiber Network	**CLEC Purchasers**
Frontier Corp.	20,000 route miles planned (interconnecting 120 major cities), 57 percent lit	• Level 3 Communications (8,300 route miles of fiber)
GST Telecommunications	5,751 route miles (including network currently under construction)	• FTV (owned by Williams, Enron, and Touch America) (745 route miles in California)
IXC Communications	10,200 route miles (16,400 miles by the end of 1999) IXC is currently in 36 of the top 50 MSAs and 57 of the top 100 MSAs	• Electric Lightwave (20 years, $101 million and 2,800 route miles of fiber) • Telco Communications Group (3 years) • STAR Telecommunications (20 years, $31 million, covering Los Angeles, Dallas, Atlanta, Miami, Phoenix and other areas) • Digital Teleport ($33 million) • Level 3 Communications (7,355 route miles of fiber) • Time Warner (2 years) • RSL Communications (10 years)
Level 3 Communications	1,300 route miles (nearly 16,000 mile intercity network by first quarter of 2001)	• INTERNEXT ($700 million for capacity over the entire route) • RCN
Metromedia Fiber Network	230,000 fiber miles (expanding to over 1 million fiber miles)	• Allegiance (Dallas and New York) • Time Warner (20 years in the New York/New Jersey metropolitan areas) • Intermedia ($56 million, covering Boston, Chicago, New York, Philadelphia, San Francisco, Silicon Valley and Washington) • Hyperion (Chicago, New York and Washington) • e.spire ($29 million, covering New York, Philadelphia and fibers on the New York to Baltimore intercity corridor) • WinStar (25 years, $40 million, covering Chicago, New York, Washington, Philadelphia, and San Francisco)
Qwest Communications	15,000 route miles (18,815 by mid-1999)	• Advanced TelCom Group ($63 million, 7 years) • STAR Telecommunications (20 years, $85 million) • Sprint • MCI • AT&T • ELI ($122 million)
Williams Communications	17,600 route miles (32,000 route miles connecting 125 cities by the end of 2000)	• WinStar ($640 million for four strands of fiber over approximately 15,000 route miles) • Intermedia (20 years, $450 million, IRU on nationwide network) • Frontier ($68 million and 3,000 route miles through Houston, Atlanta, Tampa and Miami) • UniDial

Table 9. Fiber Deployment by Utilities	
	Fiber Deployment
American Electric Power Company	"[AEP] is currently offering high capacity long haul data and voice service to major inter exchange carriers, competitive local exchange carriers, wireless providers and others."
PECO Energy-Hyperion	500-mile fiber optic network in southeastern Pennsylvania
Conectiv Communications	"State-of-the-art fiber optic network that spans over 600 miles in the region."
Entergy Corporation-Hyperion	350-mile SONET networks in Baton Rouge, Jackson, and Little Rock
Boston Edison	200-mile fiber optic backbone
MaineCom Services	In the process of constructing the New England Optical Network, a high-capacity inter-city fiber network. $20 million joint venture with Brooks Fiber to construct a fiber optic network to serve the Portland market
VPS Communications	270-mile fiber optic backbone
Montana power	8,000 mile network called Touch America, which covers thirteen states
SCANA Communications	2,500-mile fiber optic network stretching from the Carolinas to east Texas
C3 Communications	Fiber optic network that covers Texas, Arkansas, Oklahoma, and Louisiana
Sources: See Appendix C.	

The FCC itself has found that CLECs "now have at least 11% of the total fiber optic system capacity potentially available to carry calls within local markets."[101] And the Commission's finding was in fact based on a vast understatement of CLEC fiber. It was based on the FCC's Fiber Deployment Update, which lists CLECs as having deployed 35,351 fiber miles as of year end 1997.[102] New Paradigm Resources Group, which surveyed far more CLECs than the FCC, put the number at more than double the FCC's estimate – 78,506.[103] In 1998, New Paradigm reports, CLECs increased their fiber networks by nearly half again, to 108,000 miles.[104] According to Corning, one of the largest fiber suppliers, CLEC demand for fiber grew 45 percent in 1998, whereas demand from ILECs increased only 10 percent.[105]

[101] *FCC Local Competition Report* at 2.

[102] J. Kraushaar, Industry Analysis Division, FCC, *Fiber Deployment Update, End of Year 1997*, at Table 14 (1998).

[103] *See 1999 CLEC Report* at Ch. 6, Table 4.

[104] *See id.*

[105] Corning Press Release, *Worldwide Demand for Optical Fiber and Photonic Products Showed Continued Growth in 1998; Corning Expects Stronger Growth in 1999*, Feb. 23, 1999.

D. Network Interface Devices (NIDs)

In the *Local Competition Order*, the FCC found that "[i]n many cases, inside wiring is connected to the incumbent LEC's loop plant at the NID," and that "[i]n order to provide service, a competitor must have access to this facility."[106]

The FCC implicitly acknowledged years ago, however, that NIDs are at least potentially competitive. In a 1990 proceeding concerning the deregulation of inside wiring, the FCC eliminated the requirement that end users connect their inside wiring to the telephone network through a carrier-installed jack (*i.e.*, a NID).[107] End users were permitted to supply their own NIDs or methods of interconnection to the network. As recapitulated by the FCC, AT&T argued at the time that "the customer should be allowed to install a jack at any point on the customer's side of the protector. This can be accomplished with little or no hazard to the customer and, if proper wire and jacks are used, with assurance of no harm to the network."[108] In an unrelated 1988 proceeding, AT&T in fact urged the Commission to deregulate the NID entirely.[109]

A NID is an inexpensive, off-the-shelf piece of equipment that any CLEC can acquire on the open market from numerous non-ILEC sources. NIDs are sold on the open market, by numerous companies, and in any volume. NID manufacturers include Siecor, Keptel, Gusto Communications, AMP, 3M, Charles Industries, Lucent Technologies, Raychem, Reltec, and TII Industries.

NIDs are cheap, often cheaper than handsets. The FCC has noted that the Hatfield model pegged the cost of a residential NID at $25 (plus $4 per line for a protection block) and assumed that each NID could handle up to six lines.[110] The Hatfield model pegged the cost of business NID at $40, plus $4 for a protection block.[111]

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[106] *Local Competition Order*, 11 FCC Rcd at 15697 ¶392.

[107] *Review of Sections 68.104 and 68.213 of the Commission's Rules Concerning Connection of Simple Inside Wiring to the Telephone Network and Petition for Modification of Section 68.213 of the Commission's Rules Filed by the Electronic Industries Association*, Report and Order and Further Notice of Proposed Rulemaking, 5 FCC Rcd 4686, 4687 ¶5 (1990).

[108] *Review of Sections 68.104 and 68.213 of the Commission's Rules Concerning Connection of Simple Inside Wiring to the Telephone Network and Petition for Modification of Section 68.213 of the Commission's Rules Filed by the Electronic Industries Association*, Order on Reconsideration, Second Report and Order and Second Further Notice of Proposed Rulemaking, 12 FCC Rcd 11897 (1997).

[109] In a brief before the FCC, AT&T argued: "[C]onsistent with the Commission's fundamental principle to assign costs to the cost causative customer, all expenses associated with installation of interface devices on the customer's side of the protector should be accounted for as a nonregulated activity and not charged to ratepayers." AT&T Comments on Direct Cases at 14, *Annual 1988 Access Tariff Filings*, CC Docket No. 88-1, Phase II (filed July 18, 1988).

[110] *See Federal-State Joint Board on Universal Service, Forward-Looking Mechanism for High Cost Support for Non-Rural LECs,* Further Notice of Proposed Rulemaking, 12 FCC Rcd 18514, 18558 ¶ 114 (1997).

[111] *Id.*