

Introduction and Summary

As discussed in this Reply, these assertions are directly refuted with evidence from the ETI Study, *Assessing Incumbent ILEC Claims to Special Revenue Recovery Mechanisms: Revenue opportunities, market assessments, and further empirical analysis of the "Gap" between embedded and forward-looking costs* ("Assessing Incumbent ILEC Claims").¹ ETI's study, *Assessing ILEC Claims*, anticipated many of the arguments and assertions that have been raised by USTA and the ILECs, and provides an empirical framework and concrete evidence to refute ILEC claims to special revenue recovery mechanisms. In addition, we augment ETI's previous study with extensive evidence on technological advances - some of which has been announced by manufacturers since the study was completed just a few weeks ago - that will dramatically extend the life of the installed base of ILEC plant. This evidence strongly negates the technological substitution theories advanced by USTA and ILEC experts.

In this Reply, we identify a number of critical flaws in the arguments and assertions presented by USTA and the ILECs that nullify ILEC claims to special revenue recovery mechanisms.

- USTA/ILEC arguments are based fundamentally upon the application of rate of return regulation concepts no longer applicable under price cap regimes;
- USTA/ILEC arguments assume that capacity, technology, and customer requirements driving ILEC investments are based on the provision of basic local exchange and exchange access service, when in fact a significant amount of ILEC investment must be explained by *other* than demand growth for basic service;
- USTA/ILEC arguments ignore or discount other revenue sources available to the ILECs for recovery of embedded plant which must be taken into account in assessing the need for special recovery mechanisms; and
- USTA/ILEC arguments assume the ILEC embedded base of copper cable and digital switching plant is declining in value and rapidly becoming obsolete, despite documented technological advances demonstrating that these important categories of ILEC embedded plant are both useful and valuable, and will likely remain so into the foreseeable future.

The relevant issue now before the Commission is not whether the embedded costs incurred by the ILECs are costs of doing business for the ILECs, but rather whether those embedded costs are properly recovered through special revenue recovery mechanisms to be assessed on ILEC competitors and customers of ILEC noncompetitive service offerings.

1. The ETI Study was attached to AT&T Comments, dated January 29, 1997, submitted in this proceeding.

Introduction and Summary

Absent a demonstrative showing of a cost causative link to basic local exchange or exchange access services for the ILEC plant currently on the books, and which according to the ILECs, is on the verge of replacement, no persuasive claim of special revenue recovery can be made. As shown in this Reply, USTA and the ILECs have not come close to demonstrating the required cost causative link in their Comments in this proceeding.

2 | USTA AND ILEC ASSERTIONS FAIL TO SUPPORT THEIR CLAIMS FOR SPECIAL REVENUE RECOVERY

USTA/ILEC arguments are based fundamentally upon application of rate of return regulation concepts no longer applicable under price cap regimes.

USTA asserts that the difference between embedded costs allocated to the interstate jurisdiction and forward-looking costs are “legitimate costs of doing business” the recovery of which should be allowed.² Individual LECs make similar arguments. For example, BellSouth characterizes the “historical costs” of past LEC network investments, and the investments of the LECs allocated to the interstate jurisdictions by the separations process” as “real costs” for which ILECs are entitled to recovery.³ US West asserts that the Commission “may not take action which operates to deprive ILECs of the opportunity to recover their investment - or to recover their ongoing costs of doing business” and further asserts “the right of regulated companies to the opportunity to earn a reasonable rate of return so long as they are regulated.”⁴

These are “strawman” arguments. The issue before the Commission is not whether ILEC embedded costs are costs of doing business for the ILECs. Rather, the issue is whether those costs are properly recovered through special revenue recovery mechanisms and from competitors of the ILECs and customers of ILEC noncompetitive services.

2. USTA Comments at 68.

3. BellSouth Comments at 53.

4. US West Comments at 4-6.

The majority of plant currently carried on the ILECs' books is relatively new, i.e., acquired on or after January 1, 1990.

ETI's study, *Assessing ILEC Claims*, provides specific empirical evidence directly pertinent to this issue. The study's "Vintage analysis" demonstrates that 65% of aggregate ILEC historical book investment as of the end of 1996, can be attributed to plant vintages of 1990 or later.⁵ As shown in Table 1, this pattern was found to be quite consistent across the RBHCs and SNET.⁶ Thus, we find that the majority of plant carried on the ILECs' books is relatively new, having been acquired during the 1990s - a time period in which fundamental regulatory changes including the adoption of price cap regulation, competitive inroads, and corresponding strategic responses were clearly being contemplated by the ILECs.

Table 1

<u>RBHCs</u>	Aggregate Projected Net TPIS Year End 1996 (\$000)	Aggregate Net TPIS Attributed to Pre 1-1-90 Vintages		Aggregate Net TPIS Attributed to Post 1-1-90 Vintages	
		(\$000)	Percent	(\$000)	Percent
Ameritech	\$14,636,125	\$5,766,633	39.4%	\$8,869,492	60.6%
Bell Atlantic	\$18,232,039	\$6,508,838	35.7%	\$11,723,201	64.3%
BellSouth	\$23,026,512	\$7,161,245	31.1%	\$15,865,267	68.9%
Nynex	\$16,915,514	\$5,396,049	31.9%	\$11,519,465	68.1%
Pacific Telesis	\$14,509,056	\$5,339,333	37.0%	\$9,169,723	63.5%
SBC Communications	\$15,027,699	\$5,920,913	39.4%	\$9,106,786	60.6%
US West	\$17,359,694	\$5,364,145	30.9%	\$11,995,549	69.1%
TOTAL RBHC	\$119,706,639	\$41,457,156	34.6%	\$78,249,483	65.4%
SNET	\$2,055,409	\$719,393	35.0%	\$1,336,016	65.0%

Sources: FCC ARMIS 43-02; ETI Study, *Assessing ILEC Claims*, Table B1.

5. See *Assessing ILEC Claims*, pp. 12-13.

6. Data was not available to perform these analyses for GTE

USTA and ILEC Assertions Fail to Support Their Claims

For digital switching plant categories, 75% of ILEC historical book investment as of the end of 1996, was acquired on or after January 1, 1990.

As discussed below, a major theme of USTA and ILEC comments is the impending obsolescence of the ILECs' embedded base of digital switching plant and the resulting depreciation reserve deficiencies (for which the ILECs assert an entitlement to recover).⁷ Building upon the Vintage Analysis presented in *Assessing ILEC Claims*, we respond to ILEC assertions concerning the obsolescence of digital switching plant by investigating the relative age of ILEC net book investment in digital switching plant categories. The results of our analysis are presented in Table 2. As shown in Table 2, the results of the Vintage Analysis performed for digital switching plant categories alone show the same, and indeed stronger, pattern to hold true. We find that 75% of ILEC historical book investment in digital switching plant as of the end of 1996, was acquired on or after January 1, 1990.

Table 2

<u>RBHCs</u>	Digital Switching Projected Net TPIS Year End <u>1996 (\$000)</u>	Digital Switching Net TPIS Attributed to Pre 1-1-90 Vintages <u>(\$000)</u> <u>Percent</u>		Digital Switching Net TPIS Attributed to Post 1-1-90 Vintages <u>(\$000)</u> <u>Percent</u>	
	Ameritech	\$2,998,704	\$825,530	27.5%	\$2,173,174
Bell Atlantic	\$3,227,092	\$1,014,879	31.4%	\$2,212,213	68.6%
BellSouth	\$3,867,021	\$993,627	25.7%	\$2,873,394	74.3%
Nynex	\$3,843,722	\$1,095,550	28.5%	\$2,748,172	71.5%
Pacific Telesis	\$1,271,784	\$244,130	19.2%	\$1,027,654	80.8%
SBC Communications	\$2,058,452	\$458,425	22.3%	\$1,600,027	77.7%
US West	\$2,915,419	\$562,327	19.3%	\$2,353,092	80.7%
TOTAL RBHC	\$20,182,194	\$5,194,468	24.8%	\$14,987,726	75.2%

Sources: FCC ARMIS 43-02, ETI Study, *Assessing ILEC Claims* Worksheets.

7. See, e.g., USTA Attachment 12, Poitras and Vanston, "Implications of Technology Change and Competition on the Local Exchange Carriers," USTA Attachment 14, Vanston Affidavit; USTA Attachment 15, Rohlfs, Jackson, and Richardson, "The Depreciation Shortfall," (Strategic Policy Research Study (SPR) study, SNET Comments at 49-50; Bell Atlantic/NYNEX at 28-31; Pacific at 46-47; Southwestern Comments at 56-58.

Beginning January 1, 1990, if not earlier, ILECs were well aware of and had ample opportunity to actively manage ongoing investment and construction planning to reflect the emerging competitive market environment.

The date January 1, 1990 is significant, because it marks the beginning of the time period in which price caps and other forms of incentive regulation for the ILECs had either been adopted or under formal consideration in the federal and many state jurisdictions.⁸ In this time period, ILECs knowingly accepted, and indeed aggressively sought, the delinking of costs and prices, and the opportunity to realize both the risks and rewards associated with capital investments made from that point forward. From that date forward, ILECs were well aware of and had the opportunity to actively manage ongoing investment and construction planning to reflect the emerging competitive market environment.

Under price cap regulation, adoption of which was actively sought by the ILECs, the rates of return earned by the ILECs reflect their own business initiatives, operating efficiencies, and responses to the emerging competitive environment, rather than a pre-determined rate of return on rate base established by the regulator. Under price caps, ILECs have been able to earn rates of return significantly in excess of a "fair" (i.e., competitive) return on their net book investment and to enjoy increased freedom to make market-driven decisions.⁹ The excess earnings that are permitted - and that have been achieved - under price caps have provided the ILECs with additional recovery of the costs of their local network facilities. The ILECs now appear to be asking the Commission to guarantee that they will be made whole - using the old rate of return standard - for historical book investments *the majority of which were made under a price caps regime*. To provide such a guarantee now is totally inappropriate, given that under price caps the ILECs have been able to enjoy excess earnings and have made capital investment decisions in full contemplation of the emerging competitive telecommunications market environment.

8. Price caps regulation was adopted for the ILECs in the interstate jurisdiction in 1990, having been under formal consideration by the Commission in the preceding year. See *Policy and Rules Concerning Rates for Dominant Carriers*, CC Docket 87-313, 5 FCC Rcd 6786 (1990), "LEC Price Cap Order." Adoption of price caps and other forms of incentive regulation in state jurisdictions has occurred throughout the period beginning January 1, 1990, and even earlier in some states, e.g., California. See California PUC, Re: Alternative Regulatory Frameworks for Local Exchange Carriers, I.87-11-033, Decision 89-10-031, October 12, 1989. As noted by the Kansas Corporation Commission, "Southwestern Bell Telephone (SBC)...has been operating under an incentive rate making plan in Kansas since February, 1990, with no earnings sharing mechanism in place. In effect there has been no cap on regulated earnings". KCC comments at 10. BellSouth notes that "in [that ILECs'] service territory, all nine State commissions have adopted price regulation." BellSouth Comments at 46-47. It is reported that over 70% of current ILEC revenue streams are regulated on the basis of "pure price caps" regulation. Merrill Lynch Report, "Telecom Services - Local," April 23, 1996.

9. *Assessing ILEC Claims*, pp. 5-6, pp. 25-26.

USTA and ILEC Assertions Fail to Support Their Claims

Apparently, the ILECs would like to enjoy the rewards of price cap regulation (the opportunity to earn excessive returns), but without having to absorb any of the downside risks.¹⁰

Bell Atlantic/NYNEX argue that “price cap regulation is an extension of the enduring compact with the regulator that the regulated company will have an opportunity to recover its actual costs.”¹¹ In framing their argument, Bell Atlantic/NYNEX are explicitly recognizing the change in regulatory regime that occurred with the adoption of price caps. They nonetheless improperly seek to apply the rate of return concept of cost-based regulation to price caps.¹² The delinking of prices and costs is the fundamental defining attribute of price cap regulation vis-a-vis rate of return regulation. In any event as discussed below, ETI’s study *Assessing ILEC Claims* demonstrates that ILECs have had, and will continue to have, ample *opportunity* to recover embedded investment in plant acquired in the post 1990 time frame. Not only are special revenue recovery mechanisms not required, establishment of such mechanisms to recover embedded investment associated with plant acquired since the adoption of price caps is totally inconsistent with price cap regulation.

For this reason, to the extent the Commission decides to adopt a date certain whereby all costs incurred after that date are “regarded as incurred under the new competitive paradigm established by the Act and thus entitled to no special treatment,”¹³ the date certain should be set no later than January 1, 1990. As described above, this date represents a reasonable break-point between historical rate of return regulation and competitive price cap operating environments for the ILECs. The Commission should reject arguments such as those made by BellSouth that a date certain method would be

10. In the NPRM, the Commission expressed concerns with “double recovery” and sought comments on how the Commission could best address this issue. NPRM at para. 244. The ILECs’ ability to earn excess earnings under price caps and also to seek special recovery mechanisms in this proceeding will (if the latter is granted) provide the ILECs with “double recovery” of their capital investment. Accordingly, to address the double recovery problem, the Commission must reject ILEC requests for special recovery mechanisms.

11. Bell Atlantic/NYNEX Comments, p.16.

12. Ironically, in another section of their comments addressing the issue of whether price cap indices should be reinitialized based on either the existing benchmark cost of capital of 11.25% or a newly calculated cost of capital, BA/NYNEX argue that a number of factors affect the cost of capital and appropriate rate of return, and that a “further proceeding to fully examine all these factors...would be administratively burdensome *and inconsistent with ongoing price cap regulation.*” See BA/NYNEX Comments at 24-27, emphasis added.

13. NPRM at para. 255.

appropriate only if the date set is “prospective in nature, e.g., the date of the order in this proceeding.”¹⁴

USTA/ILEC arguments assume that capacity, technology, and customer requirements driving ILEC investments are based on the provision of basic local exchange and exchange access service, when in fact a significant amount of ILEC investment must be explained by *other* than demand growth for basic service.

USTA asserts that the “regulatory contract between regulators and utilities obligates the regulator to provide the utility with a reasonable opportunity to recover all of its economic costs.”¹⁵ USTA further asserts that “[t]he existence of spare capacity does not infer imprudent investment. Spare capacity is necessary to accommodate new customers and growth of customer needs on a timely basis and pursuant to quality standards as required by regulation” and also “to facilitate the economic transition to a replacement technology.”¹⁶

Similar arguments are made by individual ILECs. For example, SWBT argues that “[t]he efficiency of LEC operations must be reviewed in light of the regulatory social contract under which the LECs operate ... The collective existing costs reflect regulatory policies and mandates for the industry to 1) provide network capacity for all U.S. residents, and 2) establish the most reliable network while meeting high service standards.”¹⁷ BellSouth invokes the Commission’s “public policy obligations to afford LECs the opportunity to recover the capital that they have prudently invested in facilities devoted to public use.”¹⁸

In making these types of arguments, USTA and the ILECs assume, without any substantiating evidence, that the requirements driving ILEC investments are linked to the provision of basic local exchange and exchange access service and hence are justified on the basis of regulatory compacts.

14. See BellSouth Comments at 58.

15. USTA Comments at 69.

16. *Id.* at 76.

17. SWBT Comments at 40. See also SNET at 43, and US West at 4.

18. BellSouth Comments at 53.

A substantial portion of ILEC historical book investment, some \$30-billion, corresponding to \$9-billion in estimated annual costs, cannot be explained by basic service demand growth over the 1990 to 1996 period.

As explained in ETI's study, *Assessing ILEC Claims*, the only embedded costs for which the ILECs should be even remotely justified in making a claim for special revenue recovery are those associated with the provision of basic telephony services that relate to a specific regulatory mandate under the traditional rate-of-return regulatory regime.¹⁹ ILECs are not entitled to recover embedded costs associated with strategic ILEC investments in modernized facilities designed to provide new non-basic services (e.g., advanced or broadband digital) or to acquire excess capacity over and above that explained by demand growth for basic service. As discussed in the preceding section, neither are ILECs entitled to recover embedded costs incurred in the period following adoption of price cap regulation, when they have enjoyed increased freedoms to earn excess returns and to make market-driven decisions.

In *Assessing ILEC Claims*, we present compelling empirical evidence showing that a substantial portion of ILEC historical book investment, some \$30-billion, corresponding to \$9-billion in estimated annual costs, cannot be explained by basic service demand growth over the 1990 to 1996 period (See Table 3).²⁰ These results indicate that a substantial portion of ILEC investment made in the period following adoption of price caps can be associated with the ILECs' pursuit of strategic business goals, i.e., positioning for other than basic exchange or exchange access lines of business (e.g., additional lines, custom calling) or for entry into new lines of business (e.g., other advanced digital and video services). In addition, in ETI's original "Gap" Study, we present other anecdotal evidence supporting the conclusion that capacity, technology, and customer requirements driving ILEC investments have been based in large part on ILEC provisioning of non-basic or competitive service offerings.²¹

We can conclude from the empirical and anecdotal evidence presented in the ETI studies that plant deployment, upgrades and improvements were motivated by ILEC competitive strategies as much or more so than the continuing provision of universal service, as USTA and the ILEC Comments would have the Commission believe. For this reason, it is critical that the alleged interstate reserve deficiency of \$4.48-billion and the

19. *Assessing ILEC Claims*, pp. 6-7.

20. *Assessing ILEC Claims*, pp. 13-14.

21. See, Lee L. Selwyn and Patricia D. Kravtin, *Analysis of Incumbent IEC Embedded Investment: An Empirical Perspective on the "Gap" Between Historic Costs and Forward-looking TSLRIC*, submitted as part of AT&T's Reply Comments, CC Docket 96-98, filed May 30, 1996, pp. 27-33.

USTA and ILEC Assertions Fail to Support Their Claims

\$14-billion in costs assigned to the interstate jurisdiction identified by USTA in its Comments²² be viewed in light of the results of ETI's "Gap" analyses, and rejected.²³

Investment data for Year End 1996 provided in ILEC comments provides validation for ETI's projections and serves to confirm the accuracy of ETI's study methodologies and the results derived therefrom.

Table 3		
<u>RBHCs</u>	Excess Net Book Inv. '90-'96 (Projected) (\$B)	Annual Costs '90-'96 (Projected) (\$B)
Ameritech	\$5.0	\$1.65
Bell Atlantic	5.3	1.65
BellSouth	3.8	1.04
Nynex	6.7	2.46
Pacific Telesis	3.7	1.03
Southwestern Bell	1.7	0.45
US West	3.5	0.92
Total - RBHCs	\$29.8	\$9.19

Source: ETI Study, *Assessing ILEC Claims*, Appendix B

A number of the ILECs provide estimates of Year End 1996 TPIS and depreciation reserve figures in their comments.²⁴ ILEC estimates of investment data for Year End 1996 was not available to ETI at the time we prepared the *Assessing ILEC Claims* study. As indicated in *Assessing ILEC Claims*, because actual ARMIS results for Year End 1996 were not yet available, ETI developed projections of ILEC historical net book investment for Year End 1996. To develop estimates of Year End 1996 figures, ETI applied the growth rate from the previous annual period (1994 to 1995) derived from ARMIS data for Net Telephone Plant In Service (TPIS) to the Year End 1995 TPIS results as presented in ETI's Original "Gap" Study.²⁵ As shown in Table 4 on the next page, there are only very small differences between the ILEC estimates of Year End 1996 investment figures and ETI's projected figures. Thus, the 1996 data that was provided in the ILEC comments

22. See USTA Comment at 78. 80

23. See Richard B. Lee, *Reply to Local Exchange Carrier Depreciation Reserve Arguments*, attached to AT&T Reply Comments, February 14, 1996.

24. See BellSouth Comments, Attachment 3; Southwestern Bell Comments, Appendix 2; Bell Atlantic/NYNEX Comments, Attachment CR; Declaration of Terry R. Orr in Support of Comments of Pacific Telesis Group; SNET Comments, Exhibit 4.

25. *Assessing ILEC Claims*, pp. 13-14.

USTA and ILEC Assertions Fail to Support Their Claims

provides validation for ETI's projections and serves to confirm the accuracy of ETI's study methodologies and the results derived therefrom.

USTA and the ILECs have not demonstrated a cost causative link to basic local exchange or exchange access services for plant currently on the ILECs' books.

USTA and ILEC assertions are thus refuted by ETI's empirical analysis, which shows that spare capacity added in the post-1990 time period can be largely associated with the deployment of plant for purposes other than the provisioning of local exchange and exchange access services and independent of standards required by regulation.

Absent a demonstrative showing of a cost causative link to basic local exchange or exchange access services for the ILEC plant currently on the books and which, according to USTA and the ILECs, is on the verge of replacement, no persuasive claim of special revenue recovery can be made. Demonstration of a cost causative link to basic local exchange service would require a showing by the ILECs that investments would have been made on the basis of cost savings or demand-related requirements driven strictly by basic local exchange service and without consideration of additional revenues from non-basic services. USTA and the ILECs have not come close to demonstrating the required cost causative link in their Comments in this proceeding. Once again, it is not a matter of imprudent investment from the standpoint of the ILEC as a firm, but whether the investment is properly recovered through special assessment on ILEC competitors and customers of basic noncompetitive services. As discussed in the next section, the ETI study, *Assessing ILEC Claims* shows that, from the standpoint of the totality of the firm, abundant revenue recovery opportunities exist.

	<u>ILEC</u>	<u>ETI</u>
BellSouth		
TPIS	44.456	44.926
Reserve	21.619	21.900
Digital Switch	6.425	6.069
Digital Switch Res	2.312	2.393
Bell Atlantic		
TPIS	33.087	33.212
Reserve	15.119	14.980
NYNEX		
TPIS	31.786	33.412
Reserve	15.750	16.497
SWBT		
TPIS	28.877	28.932
Reserve	13.527	13.904
PacTel		
Digital Switch	3.990	4.024

Source: ILEC Comments filed January 29, 1997;
ETI Study, *Assessing ILEC Claims*.

USTA/ILEC arguments ignore or discount other revenue sources available to the ILECs for recovery of embedded plant which must be taken into account in assessing the need for special recovery mechanisms.

USTA experts Schmalensee and Taylor argue that telephone utilities “must rely on investors to voluntarily provide them with capital” as rationale for the FCC to “stand by commitments made in prior regulatory regimes.”²⁶ Poitras and Vanston argue that “[d]iscontinuance of FAS 71 for financial reporting is material evidence of the scope and magnitude of [the capital recovery] problem” facing the ILECs.²⁷ Fischer *et al.* write that “[i]n enacting the Telecommunications Act of 1996, Congress sought to promote competition, not to deny the LECs the legal right to recover prudently incurred costs.”²⁸

In making these types of arguments, USTA’s experts conveniently ignore the *quid pro quo* of the Act (i.e., the opening up of the ILECs’ local exchange markets to competition in exchange for allowing the ILECs entry into new markets such as interLATA long distance and video) as well as other new revenue opportunities available to the ILECs in the new competitive market environment established pursuant to the Act. The Act specifically provides ILECs with the opportunity to develop new, potentially substantial, sources of revenues with which to offset any potential revenue losses due to competitive entry and restructuring of local exchange markets.

A recent quote from Jim Cullen, Vice Chairman of Bell Atlantic, highlights this very point in a most direct way. According to Mr. Cullen:

We have no delusions of 100% market share; we will experience share loss, but this effect on revenues will be more than offset by new opportunities. Fortunately, we’ve done our homework, and we’re ready to compete, ready to market aggressively, ready to bundle, to package, and to advertise - all to better meet - and, in fact, to stimulate - new customer requirements.²⁹

26. USTA Attachment 1, Schmalensee and Taylor, “Economic Aspects of Access Reform,” pp. 11-12.

27. USTA Attachment 12, Poitras and Vanston, “Implications of Technology Change and Competition on the Local Exchange Carriers”, Executive Summary at i; See also Pacific Comments at 46.

28. USTA Attachment 2. Fischer, Halprin, Rivera, and Weatherly, “Implications of the Separations Legacy for Implementation of the Telecommunications Act of 1996,” p. 3.

29. America’s Network, January 15, 1997. p. 46, “Sound bytes,” citing speech before a Yankee Group/Forbes executive symposium.

USTA and ILEC Assertions Fail to Support Their Claims

ETI's study, *Assessing ILEC Claims*, provides specific empirical evidence refuting the general assertions made by the various USTA experts.

Relatively high ILEC market-to-book values, premiums over book value in recent ILEC merger agreements, and estimates of new revenue opportunities all belie ILEC claims of capital recovery problems.

ETI's study *Assessing ILEC Claims* shows relatively high market-to-book values for the ILECs, with RBHC shares trading at about two to three times book value, levels substantially higher than those for other gas and electric utilities).³⁰ These high market-to-book values indicate investor assessment of the ILECs is extremely favorable. Indeed, ETI's analysis shows that even after adjustments are made to the ILEC book value to offset the write-offs made by ILECs pursuant to FAS 71, ILEC market to book values remain high.³¹ These adjusted market-to-book values provide further evidence that investors clearly do not believe (as the Commission should not) ILEC rhetoric about the potential financial impact of competition or the erosion of earnings or capital recovery opportunities in the current regulatory environment.

The high market-to-book ratios reflect the fact that investors take into account the *totality* of ILEC opportunities for revenue recovery from services which use ILEC local network facilities - not those isolated to a single service, i.e., interstate access. From a financial perspective, that the ILECs' market value far exceeds the book value of its investments indicates that investors perceive the ILECs to have sufficient revenue recovery opportunities from the *totality* of ILEC earnings to assure recovery of the ILECs' embedded investment.³²

ETI's study, *Assessing ILEC Claims*, also examines the premiums over book value offered by SBC and Bell Atlantic for the shares of Pacific Telesis and NYNEX, respectively in recent merger agreements. These premiums, estimated at as much as \$10.1-billion for Pacific Telesis and \$13.5-billion for NYNEX, provide further evidence that the acquiring RBHCs themselves (i.e., SBC and Bell Atlantic, respectively) expect the ILECs to be able to continue to keep prices high relative to cost and to maintain supranormal profits with respect to the totality of their service offerings.³³

30. *Assessing ILEC Claims*, pp. 18-19.

31. *Id.*, p. 19.

32. *Id.*, pp. 16-17.

33. *Id.*, pp. 18-20.

USTA and ILEC Assertions Fail to Support Their Claims

Further corroborating evidence of the abundant revenue recovery opportunities available to the ILECs is provided in *Assessing ILEC Claims*. We conservatively estimate in the range of \$19-billion to \$31-billion of revenue opportunities exist for the ILECs in the areas of interLATA long distance, second residential access lines, vertical services, advanced digital/broadband, and yellow pages directory advertising.³⁴ These revenue sources are properly taken into account in assessing ILEC claims for special revenue recovery mechanisms.

At least one ILEC - SNET - acknowledges that the correct economic framework for evaluating capital recovery includes consideration of revenue opportunities, but then inappropriately assumes away such opportunities in its own reserve deficiency analysis.

Comments from SNET provide further support for ETI's inclusion of offsetting revenue opportunities for the ILECs in assessing ILEC claims to special revenue recovery mechanisms.

First, SNET correctly observes that it is "full capital recovery, not full depreciation," that is the issue here, and that price cap regulation does not provide for a direct link between depreciation rates and charges to consumers:

Capital is not recovered unless the increased depreciation resulting from the shorter economic lives is matched by expense savings and/or revenue increases. Under price caps, depreciation increases are endogenous which does not insure [sic] capital recovery, and does not directly charge consumers for increases in technological utilization and resulting accelerated obsolescence.³⁵

However, having set out the correct economic framework, SNET proceeds in disjointed fashion to ignore it, and uses instead a narrowly framed depreciation reserve deficiency method that examines only economic lives and required reserves.³⁶ No consideration is given by SNET to revenue opportunities and cost savings, or to the risks SNET knowingly assumed under price caps regulation, despite SNET's explicit recognition of these factors. Indeed, SNET blatantly assumes away (without corroborating evidence) any increased revenue or cost-savings opportunities: "This method *makes the assumption*

34. *Id.*, p. 17. ETI's examination did not include all relevant sources of revenue recovery, e.g., intraLATA long distance, 800 and 900 calling services.

35. SNET Comments at 46.

36. SNET Comments at. 49-50, citing Exhibit 4.

that the level of capital recovery incorporated in the existing tariff rates cannot be increased because of market forces keeping down rate increases.”³⁷

Second, SNET agrees that the RBHCs will be able to offset any losses from reduced access charges with revenues from their future offering of long distance services (directly refuting assertions (identified below) by RBHCs to the contrary).³⁸ SNET goes on to argue, however, that unlike the RBHCs, it will not have sufficient revenue opportunities available from the long distance business.³⁹ SNET does not however back up its assertion with quantification of the long distance market and the share of the market it expects to be able to obtain. Industry reports indicate that SNET has already captured an impressive 29% of the long distance customers in Connecticut’s \$550-million interstate long distance market.⁴⁰ Nor does SNET take into consideration the other revenue opportunities available to SNET, which are quantified in ETI’s study *Assessing ILEC Claims*. Of particular relevance to SNET is the potential revenue opportunities from video and other broadband services, given that SNET has been among the most aggressive of the ILECs in pursuing these new market opportunities.

RBHC arguments that interLATA revenues should not be taken into account in offsetting access charge reductions are patently unreasonable, given the *quid pro quo* established in the Act and the realities of their new competitive operating environment.

A number of RBHCs argue that interLATA revenues should not be taken into account in offsetting reductions in access charges. Pacific, for example, cites the Commission’s structural safeguards order and competitive market condition.⁴¹ BellSouth argues the inclusion of interLATA revenues is “at best premature,” citing the Act’s three year restriction on Bell Operating Company (BOC) entry following market entry of its long distance affiliate.⁴² The Commission’s rules on structural and accounting safeguards,

37. SNET Exhibit 4 at 2.

38. SNET Comments at 7.

39. *Id.*

40. Merrill Lynch Report, *Telecom Services - RBOCs & GTE, Third Quarter Review: Competitive and Regulatory Cloud Still Looms: Meanwhile Another Double-Digit Growth Quarter*, November 13, 1996.

41. Pacific Comments at 51-52.

42. BellSouth Comments at 60.

USTA and ILEC Assertions Fail to Support Their Claims

however, allow the BOCs and their affiliates to share a wide array of services.⁴³ In addition, extensive opportunities exist for BOC cross-subsidization of its long distance affiliate through activities that may not be reflected as accounting transactions under the rules adopted by the Commission in CC Docket 96-150. Furthermore, it is only reasonable to examine changes for the RBHCs in a comprehensive fashion given the Act's explicit *quid pro quo* of allowing ILEC entry into long distance only upon the entry of other firms into the ILECs' local markets. Publicly, and to the financial community, Bell companies are acknowledging and welcoming the new operating environment precisely because they know that new revenues from the lucrative long distance market will be more than sufficient to offset revenue losses, if any, that may be experienced in the local market, and that they will enjoy a competitive advantage due to their ownership of local network facilities.⁴⁴ Only to the Commission do they argue these revenues are not relevant to their recovery of embedded plant. Accordingly, arguments such as those advanced by Pacific and BellSouth, which seek to build on the BOC/affiliate distinction, are without merit and should be rejected.

It is totally appropriate for the Commission, as have investors, to place high value on current and future ILEC revenue opportunities, including those associated with ILEC entry into the long distance market (estimated in the range of \$11-billion to \$18-billion annually over the next five years)⁴⁵ and to take those revenue opportunities into account as mitigating factors in assessing the ILECs' claimed entitlement to a "special" recovery mechanism.

43. *Structural Safeguards Order*, CC Docket 96-149, at paras. 178-183.

44. From Bell Atlantic's 1995 Annual Report:

In-region, every point of long distance market share represents \$100-million in revenue, capital expenses expected to be a very manageable \$200 to \$300-million over the next five years. *The in-region long distance business also will have attractive margins; since we will use our own network to carry the traffic, we won't have to pay another carrier for access.* Our plan is to capture at least 20 percent of the approximate \$10-billion in-region market within five years of entry. Since 80 percent of those revenues are in the consumer and small business markets where our brand name is strongest, we believe this is a very achievable goal. Bell Atlantic 1995 Annual Report, p. 9, emphasis added.

45. *Assessing ILEC Claims*, pp. 23-24.

ILEC statements that seek to diminish the significance of revenue opportunities associated with the sale of additional residential access lines are contradicted by ILEC marketing activities, investment reports, public statements by top ILEC officials, and ILEC outside plant provisioning practices.

Pacific argues that additional lines do not contribute to the recovery of Pacific's investment, because the costs of those second lines exceed the flat rates Pacific receives for those lines.⁴⁶ As presented in ETI's study *Assessing ILEC Claims*, a conservative calculation of ILEC revenues associated with second residential lines is in the vicinity of \$2.0-billion in 1995, with the proportion of customers purchasing second lines anticipated to grow to in excess of 20% a year.⁴⁷

Pacific offers no actual support for its assertion that the rates for second line are not compensatory. Moreover, as the Selwyn/Laszlo paper cited by Pacific observed, the ILECs' marketing efforts aimed at stimulating demand for additional residential lines,⁴⁸ including advertising specifically targeted at ESP customers, belie this assertion. It hardly makes business sense for Pacific to be actively marketing sales of a product that is supposedly losing money.

Pacific and other RBHCs have expressly attributed their recent good earnings performance to the growth in demand for additional residential access lines, which they have specifically attributed to the growth in demand for on-line services.⁴⁹ Pacific's claim of excessive costs due to Internet use is even flatly contradicted by statements of the Company's Chairman and CEO, Philip J. Quigley. In a January, 1997, interview, Mr. Quigley was asked, "Can Pacific Telesis make money from the Internet?" His response was:

We're already making money from the Internet, although many people may not realize it ... Internet connection creates a significantly stronger demand for a wide variety of ... services that Pacific Telesis provides, and that is where our long-term opportunity is...Believe me, it's no coincidence that our

46. Pacific Comments at 77.

47. *Assessing ILEC Claims* at 21.

48. Selwyn, Lee L., and Joseph W. Laszlo, *The Effect of Internet Use on the Nation's Telephone Network*, prepared for the Internet Access Coalition, January 22, 1997, at 33.

49. *Assessing ILEC Claims*, pp. 20-21.

USTA and ILEC Assertions Fail to Support Their Claims

voice mail product is doing so well or that 20 percent of our residential customers already have additional access lines.⁵⁰

In a recent paper on number portability submitted in CC Docket No. 95-116, US West readily acknowledges that while it will lose customers to competition, increased sales of additional lines will more than offset those losses:

USWC will lose customers to competition ... However, line growth remains strong given the population growth in the West and consumers' growing need for telecommunications (e.g., facsimile, Internet) which in turn often requires a second, third, or even fourth line. USWC therefore estimates that, notwithstanding the loss of some customers to facilities-based competition, that over the next five years it will experience a net increase in access lines.⁵¹

Pacific (and other ILECs) have followed a practice of building excessive distribution pairs into their outside plant construction for uses other than for basic service growth. While the ILECs have incurred the full costs of placing this excess capacity, they have up until recently realized very little revenue from it. However, the recent and ongoing surge in demand for additional residential access lines has transformed non-revenue-producing idle plant into a highly profitable asset.⁵² With it, the ILECs can accommodate the growth in demand for additional lines and realize substantial incremental revenues without incurring significant new costs. Thus, Pacific's denial of substantial revenue opportunities associated with the sale of additional lines must be turned aside by the Commission.

50. Interview with Philip J. Quigley, *Pacific Telesis — Inside Line*. Available from the Pacific Telesis home page, http://www.pactel.com/financial/inside_line/il98.html. Downloaded February 5, 1997.

51. *Impact of Number Portability on Networks: A Case Study of the Minneapolis MSA*, submitted *ex parte* by US West in CC Docket No. 95-116, Telephone Number Portability, Attachment A, December 4, 1996.

52. Raymond F. Smith, the CEO of Bell Atlantic, stated:

In 1995, sales of secondary lines at Bell Atlantic increased more than 50 percent, fueled by surging demand for Internet and telecommuting applications.

Unlike traditional horizontal line growth, which would have significantly added to our capital expenditures, the vertical growth we experienced in '95 brought most of the revenues down to the bottom line. *That's because we were able to provision new lines and services from idle capacity in an [sic] existing plant.* (emphasis added). March 19, 1996, Speech of Raymond F. Smith to a group of securities analysts at a Merrill Lynch Telecommunications CEO Conference.

USTA/ILEC arguments assume the ILEC embedded base of copper cable and digital switching plant is declining in value and rapidly becoming obsolete, despite documented technological advances demonstrating that these important categories of ILEC embedded plant are both useful and valuable, and will likely remain so into the foreseeable future.

TFI fails to tie its theories of technology substitution to the specific issues relating to ILEC claims of special revenue recovery raised in this proceeding.

USTA experts Poitras and Vanston (TFI) argue *inter alia* that LEC regulated depreciation rates and reserves are substantially below proper economic rates and reserves, that technology and competition pose serious cost recovery problems for LECs, and that the pace of technology change and competition have caused overstatement of regulated lives for key network assets.⁵³

As a general proposition, USTA's experts speak to the collection of technological and market conditions that are now (or will in the future) drive ILECs to replace older technology plant with feature-rich vintages. They fail however to tie their theories of technology substitution to the specific issues of revenue recovery raised in this proceeding. TFI, for example, portrays technology substitution as something of an autonomous process that exists independently of the underlying economics of the capital investment process. In TFI's view, the replacement of older technology with new, modern plant is inevitable, apparently both as to the absoluteness of its occurrence as well as with respect to the pace at which it takes place. While this may well be an interesting academic exercise in the abstract, it is at odds with the reality of how businesses actually make investment decisions and, for that matter, how new technologies are created and introduced onto the market.

If there were any merit to TFI's inevitability hypothesis, we would expect to see near uniformity in the pace of technological substitution across all sectors of the economy. That obviously is not the case. Certain industries — those confronted with both substantial demand and substantial (domestic and/or foreign) competition will tend to adopt new technologies more rapidly than those sectors in which competition is limited and/or demand is flat. For example, we don't see rapid adoption of new technology in airlines, education, mass transit, or air traffic control. We do see it in health care. It occurs at different rates in different manufacturing and service industries. It did not occur very rapidly in the telecommunications sector until the FCC initiated efforts at increasing competition. *And in*

53. USTA Attachment 12, Poitras and Vanston, "Implications of Technology Change and Competition on the Local Exchange Carriers," Executive Summary.

USTA and ILEC Assertions Fail to Support Their Claims

telecommunications, it is the expanding demand for competitive and discretionary services, not the stable demand for core local exchange and exchange access services, that is driving technology acquisition and substitution.

Businesses make capital investment decisions where the net present value (NPV) of the expected cash flow is positive. When considering *replacement* of existing plant, a firm evaluates the *differential cash flow* as between retaining the existing plant vs. replacing it with new facilities. Such a replacement typically involves the expenditure of a relatively large up-front amount to acquire the new asset, which is then offset by a combination of cost savings due to the increased efficiency of the new equipment relative to the old (e.g., lower ongoing maintenance costs, lower costs for accommodating growth), and additional revenues that may result from the increased capabilities and/or capacities of the new equipment (e.g., from the provision of new services that could not be supported with the older plant).

TFI and the other USTA experts make no distinction in the evaluation of the capital acquisition or replacement decision as between the ILECs's basic and non-basic service offerings. Instead, their arguments imply an underlying financial analysis that lumps together cost savings and revenue gains associated with basic and non-basic service categories and in which replacement decisions are made without concern as to which category of ILEC services are actually *driving* the replacement decision. It is noteworthy that USTA's experts do not provide any capital acquisition analysis (i.e., discounted cash flow or net present value analysis) in support of their qualitative arguments, they merely provide bald assertions that the investments were made prudently by the ILECs in satisfaction of regulatory requirements.

While it may well be entirely appropriate for the ILEC as a corporation to make decisions in an aggregate manner, it is an inappropriate construct in the context of deciding whether ILEC are entitled to special revenue recovery of the costs of stranded plant. To the extent that plant replacements ("technology substitutions" in TFI's terminology) driven by demand for non-basic services work to shrink service lives and thereby to increase depreciation rates on embedded plant, the allocation of any increased depreciation accruals attributable to such "substitutions" should be confined to the non-basic services causing those plant replacements.

In his solo affidavit, Vanston singles out SNET as a company that uses a depreciation life for buried metallic cable that is shorter than the TFI recommended range, and then asserts that SNET's "geographic and competitive situation, as well as specific network modernization plans justify these lives."⁵⁴ However, Vanston fails to acknowledge that

54. USTA Attachment 14, p.1.

the “specific modernization plans” which he notes are related to SNET’s aggressive pursuit of video markets. Thus the shorter lives and increased depreciation accruals attributable to those technology substitutions are not properly attributed to basic regulated services for which the ILEC might assert entitlement to revenue recovery. Vanston’s analysis completely ignores the import of the cost causative link between ILEC investment and ILEC pursuit of non-basic service markets.

The SPR Study’s reports of the death of the existing network infrastructure are greatly exaggerated.

The principal thesis of the SPR Study is that two of the largest and most significant categories of ILEC plant investment (i.e., copper cable and digital switching) are basically obsolete and should be treated as such in terms of regulatory depreciation rates. The authors of the Study claim to have examined the depreciation issue “in light of our knowledge of telecommunications technology and markets.”⁵⁵ Even a cursory examination of the issues raised, however, leads one to question precisely how much knowledge was entailed. Indeed, the crux of their argument is based upon a severely flawed understanding of the current state of the telecommunications infrastructure. The SPR Study examines the so-called obsolescence of the ILECs’ installed base of cable and wire, and digital ESS.⁵⁶

Any claim as to the usefulness or obsolescence of existing network plant and equipment must examine how that plant and equipment is used currently, and how it is likely to be used in the future. Although the industry consensus several years ago did indeed seem to predict that the convergence of data, voice, and video would require large amounts of bandwidth (and corresponding amounts of investment in entirely new plant and equipment), the explosion of the Internet, combined with continuing advances in data compression technology, have created a sea-change. Two interconnected, but distinct, networks are emerging: the existing voice network remains the standard for voice telephony, while data is migrating to packet networks (i.e., the Internet and a variety of private or other public digital networks connecting customers with ISPs and ESPs). This optimizes the use of available technologies, since differing network architectures are most efficient at handling different types of traffic. The Internet’s packet-switching protocols are ideal for transmitting data from one place to another. The existing telephone networks are, and will likely remain for the foreseeable future, the best technology for transmitting real-time live voice conversations. *The economics of the industry thus dictates that such an*

55. USTA Attachment 15, SPR Study, p. 10.

56. SPR Study, at 13.

overlay network be implemented, and that the voice telephone network be maintained in its present form. This economic reality of the future of the network means that the embedded base of copper cable and digital switches will remain both useful and valuable for the foreseeable future. And it is this reality that the SPR Study completely ignores.

The SPR Study's arguments that cable and wire (and in particular copper cable) are practically worthless totally ignores the current deployment of digital communications technology in the loop, which makes the continued use of copper cable viable in the long term.

The SPR Study's analysis of embedded copper investment centers primarily on copper in the local loop.⁵⁷ SPR argues that there exist "significant disparities between the regulatory and theoretical reserve" for all categories of copper cable,⁵⁸ and that "future customers are likely to demand capabilities that cannot be economically provided over copper cable."⁵⁹ The SPR Study does not clearly indicate what such capabilities might be, but it does mention high bandwidth services, such as high-speed Internet and other data connectivity, and video-on-demand.

Copper's value lies in its presence as the pre-installed distribution medium, which already provides nearly ubiquitous connections from homes and businesses to the local telephone network. Recently developed and deployed technological breakthroughs that utilize copper facilities mean that copper cannot be viewed as "dying technology," as asserted by the ILECs. Such technologies include, for example, analog modem advances that have allowed steadily higher data rates over copper *without any change in either distribution or central office equipment*. They also encompass digital technologies such as ISDN, which is becoming steadily more widespread in availability and in steadily higher demand, as well as entirely new technologies, such as Digital Subscriber Line (DSL), which allow order-of-magnitude increases in data rates over the existing copper distribution plant. These technologies, which will likely only improve in quality as competition increases over the next few years, will enable the ILECs and their competitors to introduce new, high-bandwidth services over the ILECs' installed base of copper wire. Far from being obsolete and valueless, that copper will generate steadily *increased* revenues, and thus become even more valuable than ever.

57. SPR Study, at 10.

58. *Id.*, at 10.

59. *Id.*, at 12.

USTA and ILEC Assertions Fail to Support Their Claims

The plant used to connect end users with the data and voice networks should be both economically feasible and technically adequate to carry the high bandwidth required to provide advanced services. The economics of the situation strongly argue against replacing all copper distribution plant with fiber. Such a total replacement would cost billions of dollars, and would require an enormous commitment of ILEC resources. With the emergence of local competition, it is highly unlikely that the ILECs would be able to provide services at competitive prices, given the cost and time involved. From an economic standpoint, then, it makes far more sense to make the best possible use of the existing copper plant, deploying fiber strategically, and only where it will do the most good.

As the rest of this section will demonstrate, the technology already exists that will allow that copper plant to provide advanced broadband services. *There is simply no reason whatsoever to replace the ILECs' existing copper distribution plant, because it is economically sound and technically feasible to use that plant to provide these services.* However, in relying exclusively upon theoretical substitution models and unsupported cliches like "copper cable is a 'dying technology'"⁶⁰ to support their conclusion, USTA and the ILECs would apparently have the Commission ignore the substantial body of technological evidence now available concerning the continued viability of ILEC embedded plant.

At the analog level, the technology available for transmitting data over copper has shown steady improvement. Analog modem speeds, the key measure of this technology, have increased approximately 10-fold in the last three years. Recent announcements by US Robotics and Lucent Technologies of modems capable of speeds of 56 kilobits per second (kbps), are only the latest in a long and remarkable series of improvements in modem speeds.⁶¹ Such high data rates would have been considered to be impossible as recently as a few years ago. The rapid evolution of analog modems is indicative of information technology in general, and strongly supports the conclusion that existing network hardware, and particularly the embedded copper loop, holds potential far beyond what today's state of the art would suggest.

- The 56 kbps standard would allow speeds nearly double those possible under the existing 28.8/33.6 kbps standard.

60. See US West Comments, p. 82.

61. See: "US Robotics Releases Preliminary Performance Data on its High-Speed x2 Modem Technology," US Robotics Press Release, January 2, 1997, <http://x2.usr.com/news/betatest.html> (downloaded January 9, 1997); and "K56flex(TM) Modem Technology," Lucent Technologies Microelectronics Group, Technical Note, January, 1997. <http://www.lucent.com/micro/K56flex/TN97007.html> (downloaded February 7, 1997).

USTA and ILEC Assertions Fail to Support Their Claims

- Both standards for 56 kbps modems take advantage of digital technologies already installed in the PSTN to achieve their high transfer rates.
- US Robotics, creator of the x2 standard, has already introduced this technology onto the market.⁶²
- Lucent Technologies has joined forces with Rockwell Semiconductor Systems to establish a joint standard for 56 kbps modems, called the K56flex. This recently-announced standard has the support of over 400 companies, including ISPs, remote server manufacturers, and modem manufacturers.⁶³

However, even the most advanced of analog technologies pale to insignificance when compared with the tremendous bandwidth that copper can support using digital technologies.

One such digital technology is already well-established. Integrated Services Digital Network (ISDN) is based on a standard over twenty years old. However, delays in deploying it, pricing problems, and its technical complexity have prevented ISDN from attaining its full potential as a broadband technology, at least until recently.⁶⁴ However, the growth of the Internet has led to an explosion in consumer demand for, and use of, ISDN lines. Moreover, many of the early provisioning and customer service problems have been solved, allowing ISDN to be deployed more widely (ISDN availability ranges from 70% for US West's region to 95% for Pacific Telesis, with an RBHC average of 84%⁶⁵). Pricing for ISDN has also improved, moving more in line with cost, and becoming more affordable. As a result, the RBHCs have cited annual growth rates of as high as 285% for ISDN penetration.⁶⁶ And this tremendous growth is for a technology that *requires* the "obsolete" copper infrastructure on which to run.

62. See US Robotics, *op. cit.* at footnote 61, *supra*.

63. Lucent Technologies, *op. cit.* at footnote 61, *supra*.

64. See, e.g., Kopf, David, "ISDN Turns Over a New Leaf," *America's Network*, October 1, 1996, at 34.

65. Morgan Stanley US Investment Research, Telecommunications Services, "RBOC Third Quarter Perspective," December 2, 1996, at 3.

66. For example, NYNEX experienced a doubling of ISDN lines in service in 1995, to over 90,000 (85% of all access lines in NYNEX's territory can potentially support ISDN). *NYNEX 1995 Profile & Statistics*, at 10. Ameritech experienced an 85% growth in revenues from ISDN lines in 1995. Ameritech, "1995 Fact Book," at 12. Pacific Telesis cites 1996 year-over-year growth for ISDN lines in service at 285%. David Dorman, "Telecom Deregulation and Internet," Speech, The Association for Corporate Growth, Los Angeles, January 15, 1997. Downloaded from http://www.pactel.com/about/mgmt_perspectives/dorm11597.html, January 27, 1997.

USTA and ILEC Assertions Fail to Support Their Claims

Still more exciting (and potentially vastly more fiscally rewarding for the ILECs) is the various types of Digital Subscriber Line (DSL) Technology. DSL, like ISDN, is designed to operate over copper. However, DSL (specifically ADSL) can provide connectivity at speeds increased by a factor of 10 to 50 compared with ISDN, and by a factor of 100 to 500 compared with conventional analog modem technologies. Moreover, ADSL is designed to provide huge data connectivity without any impact on voice traffic on the same conventional (i.e., copper) telephone lines.⁶⁷ And unlike ISDN, DSL is very flexible about the exact technical details of the plant over which it is used.

- ADSL is highly adaptable, with bit rates depending on factors such as loop length and line noise. Typically, however, an ADSL system will be able to transmit at bandwidths from 608 kbps to 8 Mbps downstream (to customers) and from 9.6 kbps to 944 kbps upstream (to the provider), while supporting POTS over the same loop.⁶⁸
- Nortel and Broadcom are jointly developing a new, ADSL single-chip transceiver, designed to facilitate services like Internet access, LAN extension, telecommuting, and videoconferencing.⁶⁹
- Another new Nortel product, the Interactive CopperAccess System, will provide the capability to deliver broadband services to homes and offices, “over the existing twisted-pair outside plant.” The system will provide DSL-based data services, initially with bit-rates up to 12 Mbps, using Asynchronous Transfer Mode (ATM) to the customer premises.⁷⁰
- “ADSL offers telcos the chance to utilize the existing copper infrastructure, minimizing the investment needed in the early stages of market penetration into existing neighborhoods, while the demand for video dial tone grows. If the “take rate” exceeds the economic threshold, a fiber-based solution can be deployed. In other words, ADSL can be used to upgrade service to an individual customer, instead of upgrading the entire area.”⁷¹

67. Cioffi, John M., “ADSL Answers the Need for Speed,” *Telephony*, August 12, 1996, at 32.

68. *DSL Technology for Internet Access: Vital to the Future of Telephone Companies*, Westell White Paper, August 18, 1996, Westell Technologies, Inc.

69. “Nortel and Broadcom Announce Collaboration to Develop Low-cost, Single-chip ADSL Technology,” Nortel News Release, August 22, 1996.

70. “Interactive Broadband CopperAccess System,” Nortel Product Portfolio, Nortel Home Page, http://www.nortel.com/broadband/Interactive_Broadband/CopperAccess.html, downloaded February 6, 1997.

71. “The Last Mile: Linking Fiber and Copper,” *Communications News*, January 1995.