that could be eligible for discounted services under the Snowe-Rockefeller amendment to the Act is broken out where possible. In Section III we examine some "real-world" examples of schools in regional, inner city, or rural areas that received TIIAP grants for NII connections. Section IV presents some general implications from the cost data. Finally, Section V discusses more specific implications that pertain to the discounts to be accorded the schools and libraries under the Snowe-Rockefeller amendment to the Act.

II. Recent Studies on Costs of NII Connection

A. Public Schools

A comparison of two recent major studies yields some broad estimates of the costs of access to the NII for the nation's public schools. Again, we recognize that under the Snowe-Rockefeller amendment, discounts that may be covered by the universal service fund apply only to interconnection costs when telecommunications carriers provide certain services to the schools. It should be noted that where the data covers total costs, we have attempted to break out connection costs for purposes of discussion and debate on the costs of ultimately linking each classroom to the NII.

Rothstein Study. Building on his 1994 working paper for the Department of Education (ED), as well as a subsequent collaboration with Lee McKnight, Russell Rothstein developed five cost models of K-12 school networking.[4] Each of the models in his 1996 study encompasses five schools that are connected to a school

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4/ Under the auspices of the Department's Office of Educational Technology, Russell I. Rothstein authored the study, Connecting K-12 Schools to the NII: A Preliminary Assessment of Technology Models and Their Associated Costs, August 4, 1994. Analyst John C. Beachboard notes that the recurring charge estimate is "substantially" understated because it omits equipment maintenance charges. See Comments of Syracuse University School of Information Studies at 11, n. 39, NTIA Inquiry on Universal Service and Open Access (December 19, 1994). The following year, Rothstein and McKnight revised the study. See Technology and Cost Models of K-12 Schools on the National Information Infrastructure, Massachusetts Institute of Technology, February 10, 1995. Rothstein further developed the analysis in his Master's Thesis at MIT. See Networking K-12 Schools: Architecture Models and Evaluation of Costs and Benefits, submitted to the Sloan School of Management and the Technology & Policy Program (May 10, 1996) [hereinafter MIT Thesis].

district office, which is, in turn, linked to the Internet. The different models are briefly described below:

Model 1 features a single PC dialup connection to the school district office, hooked up to the Internet via a 56 Kbps line, with very limited training (two-to-four teachers) and limited support at the district office. For all public schools, Rothstein estimated one-time total costs of the full connection, hardware, training, and other costs would be $70 to $370 million, with ongoing costs of $110 to $430 million.[5]

Model 2 consists of a local area network (LAN) with a shared modem that supports only a few users at a time, with 56 Kbps Internet service at the district level, where five-to-twenty staff are trained per school, and one-to-two support staff provided per district. Total one-time costs for all schools were estimated at $2.01 to $6.08 billion, and on-going disbursements would be $1.18 to $2.68 billion.

Model 3, which builds on Model 2, includes a LAN that uses a router and assumes one PC per classroom in three-quarters or more of the rooms, with a 56 Kbps school hookup to the hub and to the Internet service at the district office. The construct assumes training of ten-to-twenty staff per school and one-to-two support staff provided per district. Total one-time costs for all schools would range from $4.13 to $10.49 billion, and ongoing expenditures would be $1.22 to $3.38 billion. Rothstein concluded that each of these first three models would fall short of meeting the vision of the NII initiative.[6] He indicated, however, that the remaining two models would be more consistent with the goal of providing access for every school classroom.

5/ Id. at 35-38.

6/ Id. at 35, 39-42, Table 3. Rothstein bases this conclusion on the Federal Information Infrastructure Task Force's (IITF) assessment that the NII:

> promises every...school...in the nation access anywhere to voice, data, full-motion video, and multimedia applications. Through the NII, students of all ages will use multimedia electronic libraries and museums containing text, images, video, music, simulations, and instructional software.

See MIT Thesis, supra note 4 at 44, fn. 14, citing IITF, NIST Special Pub. 857, Putting the Information Infrastructure to Work (Washington, D.C.: U.S. Government Printing Office 1994). Rothstein indicated that these three models would not provide access to such services, whereas Models 4 and 5 could.

Model 4, Rothstein's second most sophisticated model, is the one he regards as meeting the NII "baseline." He assumes that a PC is supplied for every eight students (three per classroom that averages 25 students), and that LANs, local file servers, and a 56 Kbps connection to the district office are installed. The level of training (40-50 staff per school) and support provided (two-to-three staff per district) exceeds the three models above but is less than in Model 5. One-time total charges for all schools under this scenario would be approximately $9.19 to $22.05 billion, and recurring charges would be an estimated $1.74 to $4.6 billion annually.[7]

Model 5 is Rothstein's most advanced scenario under which it is assumed that a PC is provided to every student, plus installation of LANs, local file servers and high-speed wideband (1.5 Mbps) connectivity for all public schools, and training for all teachers. For a system characterized by access to the full range of text, audio, graphical, and video applications available over the Internet and a well-staffed support team, he calculated that one-time (hardware, retrofitting, and initial training) charges would range from $49.25 to $112.67 billion, while annual recurring (connections, Internet service, support, training) charges would approximate $3.57 to $10.03 billion over a five-year timeframe.[8]

For at least Rothstein's NII models, the sum of PC purchases, initial training, and retrofitting would together comprise the largest one-time cost for launching a school's network, and support of the network represents the largest ongoing annual costs.[9] Support and training could account for a substantial proportion (e.g., 46 percent, or almost half, in Rothstein's NII baseline Model 4) of the total costs of networking schools. Telecommunications lines and services would be a significantly smaller cost element (e.g., 11 percent in Model 4) for both start-up and ongoing connection costs.[10]

7/ MIT Thesis, supra note 4 at Table 4, see generally Chpt. Two.

8/ Id. Table 5. The costs for educational software and applications were not included due to the need for further research. In the models, it was assumed that schools would be able to obtain free versions of educational software.

9/ Id. at 16-17.

10/ Id. at 43-46, Figure 7. The percentage is based on an average of low and high cost estimates, excluding PC purchases over the first five years of deployment. Rothstein argues that because the "value of PCs goes well beyond their use as networking devices... the costs should be allocated across other parts of the technology budget." Id. at 45.

McKinsey Study. A study completed by McKinsey & Company during mid-1995 on behalf of the U.S. Advisory Council on the National Information Infrastructure estimated the costs of accessing the NII by network element and also by deployment option. McKinsey determined that the largest up-front cost would involve the purchase and installation of hardware, while teacher training and support would account for most of the ongoing deployment cost. Connection costs would be a relatively small proportion (four to 15 percent) of either initial or recurring expenditures, regardless of the deployment plan.[11/] McKinsey presented four deployment "models," each of which would include a district server and local area network; one or more school servers, printers, and scanners; software, professional development, and support.[12] The results of the four models are described briefly below:

The Lab Model resulted in estimates for initial deployment ranging from $11 billion for a 25-computer lab using an Ethernet LAN and ten telephone lines. Annual operations and maintenance expenditures were estimated at $4 billion per year.

The Lab Plus Model added a computer and modem for the teacher to the Lab model, resulting in estimated costs of $22 billion in up-front expenditures. Annual operations and maintenance were estimated at $7 billion per year.

The Partial Classroom Model would provide one-half of all classrooms with one computer per five students, an Ethernet LAN across and within all classrooms, and a T-1 connection at a cost of $29 billion. Annual operations and maintenance expenditures were estimated at $8 billion over a five-year period.

The Classroom Model resulted in estimates of $47 billion to connect every public school classroom to the NII during a ten-year interval, assuming five students per computer, with a T-1 communications channel that transmits data, video, and voice at 1.5 Mbps. Annual operations and maintenance expenditures

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11/ U.S. Advisory Council on the National Information Infrastructure, KickStart Initiative: Connecting America's Communities to the Information Superhighway, 90-91 (Jan. 1996).

12/ McKinsey notes that the ED/MIT studies "informed [their] approach early on" but the Rothstein/McKnight analysis factored in less training and support, much longer hardware replacement cycles, and no packaged software or upgrades, and did not allow for either declining hardware prices over time or differing rural/urban connection requirements. McKinsey & Company, Connecting K-12 Schools to the Information Superhighway 63-64 (1995) [hereinafter McKinsey Study].

were estimated at $10 billion during a ten year period.[13] McKinsey concluded that this model most closely meets the Administration's vision of connecting every classroom to the NII.

B. Public Libraries

As with schools, the data from these studies go beyond the connection portion that might be funded under the Snowe-Rockefeller amendment to the Act. Realizing that the subsidies would apply to interconnection costs, it is nevertheless useful to examine broader cost data and gain some perspective on total costs for bringing the NII to the public libraries.[14]

In reviewing the results of the studies, it is important to realize that rural libraries have special needs attributable to their relative remoteness. In New York State's "Project GAIN" initiative, researchers determined that a "reasonable" start-up cost for basic computing equipment, connections, and support (including training) for a rural library was $8,000 to $10,000.[15] Long distance calling -- a necessity for many rural libraries because there is often no nearby interexchange carrier "point-of-presence" -- can average $175-350 per month (without preferential rates).[16] A 1995 study sponsored by the National Commission on Libraries and Information Science (NCLIS) reached similar conclusions. This study, which was performed by McClure, Bertot, and Beachboard, estimated that a rural library using a single work station and text-only access could achieve a minimal level of Internet connectivity for $1,475 in one-time costs and $12,635 in annual recurring costs. Telephone toll charges and Internet provider connection and usage

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13/ Kickstart Initiative, supra note 11 at 92-95. McKinsey also considered a Desktop model that would place a networked PC on each student's desk, but the consultant abandoned an in-depth examination because of the perceived high costs of implementation. For example, initial installation costs were estimated to be 3.5 times greater, and ongoing costs 2.5 times greater, than the figures calculated for the Classroom model. McKinsey Study, at 24.

14/ While the studies discussed present a mix of per-institution and aggregate library costs, the insights provided tend to outweigh any incongruities.

15/ Hearings on Internet Access Before the Subcomm. on Science of the House Comm. of Science Space and Technology, 103rd Cong., 2nd Sess. 8 (1994) (statement of Charles R. McClure, School of Information Studies, Syracuse Univ.); see also NYSERNet, The Project GAIN Report: Connecting Rural Public Libraries to the Internet 8 (Feb. 15, 1994).

16/ NYSERNet at 29.

fees would account for more than 80 percent of the total outlays for one-time and annual recurring costs, taken together.[17] Thus, a first-year expenditure on a single-work-station, text-based Internet access for a rural library would average less than $15,000.

If telephone toll charges -- the biggest ongoing cost factor identified in rural environs -- are largely removed from the calculation, the corresponding expenditure for a city library could be less than $10,000, on average.[18] Accommodating five simultaneous users (i.e., five terminals) in a city library, however, would increase the required first-year outlay to an average of $42,290 -- $13,040 in one-time costs and $29,250 in annual recurring costs for basic Internet access.[19] For a single workstation in a single urban library with multimedia capabilities, the first-year cost for Internet access capability would be $6,570, including $4,615 for one-time costs and $1,955 for annual recurring charges.[20] A more complex and sophisticated level -- adding multimedia capabilities at multiple work stations at a main city library with four branches and much more network management -- would raise costs to an estimated $434,595 for Internet access and $568,495 if Internet service provision is included.[21]

McKinsey developed cost estimates for public libraries on the basis of a scenario assuming the deployment of 25 networked computers with ten simultaneous users and a local area network. The analysis divided libraries into two general categories based on type of connection. Under the selected scenario, those serving populations of more than 25,000 would use T-1 (1.5 Mbps) lines, while the smaller libraries split 60-40% between ISDN (56 to 128 Kbps) and POTS (14.4 to 34 Kbps). Initial deployment costs to connect libraries to the NII -- including hardware, software, training and support, connections, and system integration -- were estimated at $1.6 billion, while ongoing costs -- using the same categories as initial deployment plus content/resource development -- were estimated as exceeding $1.3 billion per year. Similar to the schools, connections to the NII for libraries would constitute a relatively low proportion of total costs: four percent of initial deployment and nine percent of on-going costs, with another

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17/ Charles R. McClure, John Carlo Bertot, and John C. Beachboard, National Commission on Libraries and Information Science, Internet Costs and Cost Models for Public Libraries, Final Report at 15, Figure 6 (June 1995).

18/ Id.

19/ Id. at 15-16, Figure 10.

20/ Id. at 15, Figure 8.

21/ Id. at 19, Figure 14.

23 percent of annually recurring costs disbursed mainly for information services.[22]

III. Cost Data from Some TIIAP Grants

Examination of three illustrative school projects funded through NTIA's TIIAP program sheds light on real-life cost experiences. As with the presentation of data from the studies discussed above, while we recognize that the Snowe-Rockefeller amendment applies only to the connection portion of costs, we present the data in the broad context of costs for accessing and using services offered over the NII. Examples from regional, inner city, and rural cases, respectively, are as follows:

Rockbridge Project, located in Lexington, Virginia, involves a regional grant to 17 K-12 schools that includes a central computer, routers, and a multi-media workstation for each school, as well as Internet access through a Wide Area Network (WAN), training, and maintenance. Hardware represents the largest one-time cost element (65.0%, $144,040), followed by maintenance (18.9%, $41,820) and communications (9.5%, $21,139). Among annual costs, communications represents the largest component (63.9%, $58,824). More specifically, an Internet service provider (ISP) will provide both 56 Kbps service at $1,000 setup plus $350 per month, and T-1 service at $2,400 plus $1,400 per month. Connections from the ISP to each central site include standard ($120 setup and $28 per month) and foreign exchange ($120 plus $140 per month) dialup; 56 Kbps local ($443 and $156 per month) and inter-office ($450 plus $250 per month) lines; and frame relay to the ISP, both 56 Kbps ($1,305 and $363 per month) and T-1 ($2,110 and $897 per month). Besides Internet access, these connections permit store-and-forward e-mail, network news discussion groups, and information access to the World Wide Web, Gopher, and File Transfer Protocol (FTP) services. Electronic document delivery and dialup ports for home access are other capabilities.

Harlem Environmental Access Project (HEAP), an inner city setting in New York City, received a TIIAP grant for six schools. Based on the average estimated cost per school, hardware ranked first (60.6%, $10,266), followed by training (21.7%, $3,666) and connection (17.7%, $3,000). Connection also contributes $5,600 annually to expenses. Each school received four computers and printers, a T-1 line, Internet access, and training. Through this connection, Columbia University and the Environmental Defense Fund are collaborating with local schools to bring computer equipment and infrastructure, Internet access, technology

22/ KickStart Initiative, supra note 11 at 94-98.

assistance, and environmental information and curriculum development to an underserved community in a New York City Empowerment Zone.

Green Valley High School, a rural suburb of Las Vegas, received matching grants to install three computers, a fiber optic backbone and related cabling to three classrooms, a T-1 link, teacher training, and technical maintenance and support. Total up-front costs equaled $85,500, of which connections (installation, switching, and service) accounted for 58.3% ($50,000). Connections incurred $9,840 in annual recurring costs. Initially, the T-1 line cost was $795 per month, but as the number of computers increases by 75, the link costs will rise to $1875-2000 per month. Services subscribed to include Internet access and "unlimited use" for $25 per month.

IV. General Implications of the Cost Data

The limited data available on the cost of bringing the NII to schools and libraries provides a starting point for determining the potential connection costs for these institutions and, more specifically, the extent of any subsidy that might occur pursuant to the Snowe-Rockefeller provision of the Act. Accordingly, we must stress that the following implications are meant to commence a dialogue rather than serve as final conclusions on the cost issue.

Under McKinsey's assumption of a relatively high-end deployment, such as wideband (T-1) capability, connectivity to virtually all classrooms, and one computer for every five students as the norm, the total costs for connecting schools would be an estimated $109 billion for connections, hardware, software, training, and support over a ten-year time period. This would translate into about $11 billion per year.[23] Under a scenario with less support and training, a somewhat higher ratio of students (eight) per computer, longer hardware replacement cycles, and no packaged software or upgrades (as in Rothstein's Model 4), the total cost over a five-year span falls into a range: the low end may reach $20 billion, or $4 billion per year, and the high could approach $50 billion, or $10 billion per year. For libraries, assuming a Lab scenario (i.e., single-room deployment, 25 computers, ten simultaneous users), the McKinsey study projected

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23/ Gauged by another measure, implementing the above scenario would require an expenditure of an estimated four to five percent of the budget for K-12 public schools in the peak (tenth) year -- compared to the current proportion of 1.3 percent. Id. at 90. For Rothstein's Model 4, with eight students per computer and 56 Kbps connection to a school district office with a T-1 link over a five-year period, the percentage would be three to seven percent of national educational expenditures. MIT Thesis, supra note 4 at 49.

a much lower total outlay: initial deployment at $1.6 billion, with $1.3 billion in annual recurring costs, or apparently less than $10 billion over five years, or less than $2 billion per year. The cost of connections -- including up-front and recurring costs -- appears to be a relatively small proportion of the overall cost, on average, for K-12 schools with all classrooms linked to the NII, perhaps on the order of ten percent of the total described above.[24]

The resulting costs for public libraries is less clear from the analyses but point to moderate albeit somewhat higher percentages with respect to connection costs than for the schools. In one study, for libraries providing World Wide Web services and supporting multiple, multimedia workstations with Internet access at T-1 speeds, "communications hardware and fees" accounted for about eight percent of one-time costs and 29 percent of ongoing costs, or roughly 20 percent of total deployment costs.[25] A second analysis would appear to yield results that are not dissimilar: a small up-front cost of four percent for T-1, ISDN, or POTS connections, but ongoing costs of nine percent for connectivity plus 23 percent for primarily information services ("content").[26]

The differing percentages between schools and libraries may reflect several factors. One plausible explanation may be the much greater volume of hardware (e.g., PCs) needed to equip all the classrooms at a given school relative to a typical library. The libraries' figure may also reflect the cost of additional educational

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24/ For example, McKinsey estimated such costs under the Classroom scenario to be four percent of all initial deployment costs and seven percent of all recurring costs. KickStart Initiative, supra note 11 at 90-91. McKinsey cautioned, however, that usage costs could go up over time, and that one strategy to mitigate this effect would be to install greater-capacity connections up front. Id. at 92. Rothstein estimated that costs for telecommunications lines and services would account for 11 percent of the total costs of networking schools, which is "...lower than the costs assumed by much of the technology community, including the telecommunications service and equipment providers." R.I. Rothstein, *Connecting K-12 Schools to the NII: A Preliminary Assessment of Technology Models and Their Associated Costs*, Technical Horizons in Education Journal 2 (Oct. 1995).

25/ See Comments of the American Library Association, CC Docket No. 96-45 at 14 (April 10, 1996) citing NCLIS, Internet Costs and Cost Models for Public Libraries, Final Report (June 1995). The 20 percent figure is not provided in the NCLIS report, but represents a very approximate averaging of one-time and ongoing costs (where the weighting for the recurring costs increases as more years are assumed, resulting in a communications/total cost percentage of, e.g., 17.2 percent for one year, 24.9 percent for five years).

26/ KickStart Initiative, supra note 11 at 96-98.

software and subscription to on-line services. An important factor potentially influencing the magnitude of the cost for a given institution (besides hardware, software, technical support, and training) could be the type of service required to reach the serving long-distance carrier's "point-of-presence" (POP) for Internet access. For many rural libraries and schools, this would require long-distance calling, which may be difficult to control.[27/]

Thus, the estimates derived from the data reviewed above afford -- at best -- a rough estimate of the average annual costs that could be incurred for connecting and sustaining schools' and libraries' use of the NII. If the per-annum cost of deployment for public schools were roughly $4-11 billion, and for public libraries $2 billion, the aggregated figure would be roughly $6-13 billion.[28/] If the connectivity percentage were estimated at ten percent for schools and 20 percent for libraries -- admittedly very tentative figures based on the limited data available -- the annual aggregated amount for connections would be roughly $.8-1.5 billion. Any provision of discounted services under the Snowe-Rockefeller provision would reduce the latter figure by the extent of any subsidy from the appropriate universal service mechanism. The impact of the Act's provision according discounts for schools and libraries under Section 254(h)(1) will depend on the actual network configurations selected by those institutions.

Again, the data from the models reviewed serves only as a starting point for exploring this issue. The above-mentioned TIIAP grants help illustrate the variability of an institution's telecommunications outlays or "connection" costs as a proportion of total expenditures needed for access to the NII. In the case of rural Green Valley High School, communications expenses ranked first in both up-front costs and annual recurring costs. On the other hand, up-front connections or communications registered the lowest ranking for both Harlem, an inner city

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27/ For documented problems of controlling such "variable" costs in households, see, e.g., Lyndon B. Johnson School of Public Affairs, The University of Texas, The Evolution of Universal Service Policy in Texas (1995); and Milton Mueller and Jorge Schement, Rutgers University School of Communication, Universal Service From the Bottom up: A Profile of Telecommunications Access in Camden, New Jersey (1995).

28/ It should be kept in mind that this broad estimate represents a calculation based on models, not a detailed inventory of every school and library. In practice, existing stocks of networking equipment or software, or levels of training and support, could differ from those assumed in the models, and actual deployment could differ from institution to institution as a result of varying needs and budgets. More importantly, a public-private sector partnership has already begun building the infrastructure of schools and libraries at nominal charges or for free through, for example, contributions of new or surplus PCs or software, or training or support.

school, and Rockbridge, a regional cluster of schools. In Harlem and Rockbridge -- similar to Green Valley -- annual connections or communications disbursements ranked number one among recurring-cost categories, but the amounts per school ranged from less than $1000 (Harlem) to more than $9,800 (Green Valley) for varying capabilities. In each case, networking centered in a lab or media room -- in lieu of connectivity for all classrooms -- tended to reduce hardware, training, and support costs for both one-time and recurring expenditures relative to more extensive networking systems.

V. Specific Implications for the Snowe-Rockefeller Amendment

Importantly, "connections" represents the portion of the NII costs for schools and libraries that come under the Snowe-Rockefeller amendment to the Act, permitting these institutions to obtain, upon bona fide request, FCC-authorized "special services" to be used for "educational purposes" at rates less than the amounts charged for similar services to other parties. If the costs are relatively small, the burden to fund the discounts may not be substantial; if relatively high, however, a significant contribution to the fund may be required.

In view of the above data, the connections portion of total deployment costs would seem to be relatively low for libraries and schools. The discounted connections services which may draw support from the universal service mechanism would tend to represent only a fraction of the expenditures incurred by the schools and libraries. Based on the foregoing data, implementation of the preferential rate scheme in the Act is likely to cost significantly less than achieving the remainder of the task of connecting and sustaining schools and libraries -- obtaining and deploying hardware, software, training, and technical support.

Thus, the demands placed on the new universal service mechanism may be a relatively modest proportion of the total costs of bringing schools and libraries into the Information Age. The specific outlays relating to telecommunications will vary according to the needs of a given institution but, generally speaking, will be of a much lesser magnitude than those for PCs, technical support, and training where all classrooms are connected to the NII. Exceptions may occur where network usage rises relative to up-front costs, and rapid technological change could put pressure on institutions to upgrade their hardware and associated training and technical support. For schools or libraries in rural, often higher-cost or lower-income areas, outlays may be higher because of the greater need for long-distance calling in order to reach the Internet or other destinations, or perhaps due to requirements for substantially longer local loops.

In conclusion, the goal of connecting and sustaining access for schools and libraries to the NII requires the integration of a number of elements. Preferential rates under the Snowe-Rockefeller amendment to the Act represent only one ingredient -- albeit an important one -- in the mix. Other key elements include computers, educational software, trainers and training programs, and support such as maintenance and repair. A critical part of the process will be for those in the educational community to integrate the information afforded by the NII into a meaningful curriculum for students. Library administrators can also contribute to this goal by providing user-friendly capabilities and technical assistance to those using their facilities.

Thus, the Act's preferential rate scheme for schools and libraries is an important linchpin for full realization of the benefits offered by the NII. The Snowe-Rockefeller provision presents an unusual opportunity to help ensure that our nation's schools and libraries are able to fully participate in the burgeoning Information Age. Based on an analysis designed to catalyze a needed debate on this issue, NTIA has found that the cost of connections as a proportion of total expenditures required to permit schools and libraries to become active partners in the NII appears to be moderately low. Concomitantly, the demands that would be placed on the universal service fund in recovering the discounted portion of connections costs for these institutions would not be extreme, as feared by some.

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FEDERAL COMMUNICATIONS COMMISSION
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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of Amendment of the Commission's Rules and Regulations to Increase Subscribership and Usage of the Public Switched Network	)	CC Docket No. 95-115

REPLY COMMENTS OF THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

Larry Irving
Assistant Secretary for
Communications & Information

Bernadette McGuire-Rivera
Acting Deputy Assistant
Secretary

Kathryn C. Brown
Associate Administrator
Tim Sloan
Jim McConnaughey
Laverne James
Office of Policy Analysis
and Development

Barbara S. Wellbery
Chief Counsel

Phyllis Hartsock
Deputy Chief Counsel

Lisa Sockett
Attorney-Advisor

National Telecommunications
and Information Administration
U.S. Department of Commerce
Room 4717
14th Street and Constitution Ave., N.W.
Washington, D.C. 20230
(202) 482-1816

March 29, 1996

TABLE OF CONTENTS

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In the Matter of Amendment of the Commission's Rules and Regulations to Increase Subscribership and Usage of the Public Switched Network	))))))	CC Docket No. 95-115

REPLY COMMENTS OF THE
NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

The National Telecommunications and Information Administration (NTIA), which is part of the Department of Commerce, is the Executive Branch agency responsible for the development of domestic and international telecommunications and information policy on behalf of the President. NTIA respectfully replies to comments submitted in response to the Commission's Notice of Proposed Rulemaking (Notice) in the above-captioned proceeding.[1/]

I. INTRODUCTION AND SUMMARY OF POSITION

For more than six decades, the United States has been committed to universal service -- the idea that every American household that desires it should have telephone service. As the Commission points out, however, "universal service policies may now have greater societal consequences than in the past."[2/]

1/ Amendment of the Commission's Rules and Policies to Increase Subscribership and Usage of the Public Switched Network, 10 FCC Rcd 13003 (1995) (Notice). Unless otherwise noted, all subsequent citations to "Comments" shall refer to pleadings filed on September 27, 1995 in the foregoing docket.

2/ Id. at 13004, ¶ 4.

Today, a telephone line does not merely connect an individual to neighbors and loved ones; with the addition of a computer and a modem, it furnishes a pathway to the Information Age, offering enhanced employment and educational opportunities, promising more effective delivery of health care and other social services, and improving communication between citizens and their governments. In this environment, households without telephone service will not only be denied access to valuable information, services, and products that can improve their lives, they may be relegated to an "information ghetto," out of the mainstream of American culture and commerce, and walled off still further from economic and social advancement. For these reasons, the Commission and the States should place a high priority on devising programs and strategies to increase telephone penetration.

NTIA has conducted two empirical studies that bear on two aspects of the subscribership debate. First, in a July 1995 report entitled Falling Through the Net: A Survey of the "Have Nots" in Rural and Urban America, NTIA used November 1994 Census data to construct an expansive profile of universal service in America that includes not only telephone subscribership, but computer and modem ownership as well. NTIA found, among other things, that despite the nation's high level of telephone penetration in the aggregate, subscribership levels among certain parts of American society -- particularly among the poor and minority groups -- are substantially below the national average.

Second, an econometric analysis of that Census data reveals a positive and significant relationship between telephone penetration and a State's adoption of a "no-disconnect" policy, which bars local exchange carriers from disconnecting local telephone service for nonpayment of long distance charges. This relationship is particularly pronounced among low-income households.

Because universal service policies implicate interstate services that are subject to regulation by the Commission, as well as intrastate services that are subject to regulation by the States, development of those policies should be a collaborative effort between the Commission and the States. NTIA urges Federal and State regulators to take the following steps:

- First, the Commission should set as a national goal that within each State by the year 2000 average telephone penetration rates for all households, including in particular several designated economic, racial, ethnic, and geographic categories, will be at or above the national average that existed as of November 1996.

- Second, the Commission and the States should promote cost effective ways to increase telephone subscribership. States need to have broad latitude in developing and implementing policies and programs designed to meet the national subscribership goal. If the national subscribership goal has not been achieved by the turn of the century, the Commission should reopen this proceeding and determine whether Federal action is necessary to accomplish that objective.

- Third, among the many possible ways to expand telephone penetration, two policies should be given particular attention:
  - The Commission and the Joint Board should encourage all States to bar local exchange carriers from disconnecting local telephone service for nonpayment of interstate long distance charges.
  - The Commission, in conjunction with the States, should explore changes in the Link-Up program that would make subsidized connection available to low-income households more frequently.
- Fourth, the Commission and the Joint Board should address, in the context of subscribership, issues concerning access to advanced services, such as the extent to which under-represented groups have access to computers and modems, and the ability of all Americans to connect to critical information sources via Community Access Centers.

II. THE COMMISSION SHOULD ESTABLISH A NATIONAL SUBSCRIBERSHIP GOAL TO BE ACHIEVED BY THE YEAR 2000

As of November 1995, approximately 94 percent of all U.S. households had a telephone in their home, one of the highest penetration rates in the world.[3/] Though impressive, the nation's overall rate of telephone penetration masks a number of troubling disparities among certain groups in American society. Those disparities were highlighted in NTIA's July 1995 report Falling Through the Net: A Survey of the "Have Nots" in Rural and Urban America (Falling Through the Net),[4/] which provided an

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3/ See Alexander Belinfante, Federal Communications Commission, Telephone Subscribership in the United States at 5, Table 1 (FCC Industry Analysis Div., Feb. 1996) (data as of November 1995) (Telephone Subscribership).

4/ Jim McConnaughey, Cynthia Nila, and Tim Sloan, National Telecommunications and Information Administration, Falling Through the Net: A Survey of the "Have Nots" in Rural and Urban America (July 1995) (Falling Through the Net) (A copy of this expansive profile of universal service in America of not only telephone subscribership, but also computer and modem penetration.[5/] By cross-tabulating subscribership data collected in the Census Bureau's November 1994 Current Population Survey ("CPS") according to several demographic variables (i.e., income, race, ethnicity, age, educational attainment, and region) and three geographic categories (rural, urban, and central city), NTIA confirmed and more specifically pinpointed the discrepancy among geographic, economic, and racial groups in this country with respect to telephone subscribership.[6/]

As detailed in Falling Through the Net, households without telephones are found disproportionately among the poor and minorities, and within those groups, in rural areas and central cities in particular. For example, measured against the nationwide average for telephone penetration of 93.9 percent, large differentials exist on the basis of income and race/ethnic origin by area. As a group, the very poor in central cities trail the U.S. average by 14 percentage points and those in rural areas are more than a dozen points behind. Even rural and

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report is attached hereto as Appendix A).

5/ The report's findings with respect to computer and modem penetration and their policy implications are discussed below in Section V.

6/ NTIA also conducted field hearings on universal service in Albuquerque, New Mexico (December 16, 1993); Los Angeles, California (February 16, 1994); Durham, North Carolina (April 27, 1994); Sunnyvale, California (May 13, 1994); and Indianapolis, Indiana (July 12, 1994).

central-city households with earnings in excess of $20,000 fall below the national figure, on average. (See Chart 1, Appendix B.)

When the profile is developed by race/ethnic origin and area, the data reveal that several groups are significantly disadvantaged. In rural areas, almost one-quarter of American Indians, Aleuts, and Eskimos as a group are without phones, and approximately one-fifth of Hispanics and Black non-Hispanics are similarly phoneless. And their central city counterparts are also well below the national average. (See Chart 2, Appendix B.)

Using age as the metric, the single most disadvantaged group consists of the youngest households (under 25 years), particularly in rural areas. Not surprisingly, the least educated households have the lowest telephone penetration rates; for a given level of education, central city households generally rank last. Among regions, households in Northeast central cities have the lowest penetration rates.

These discrepancies in subscribership across geographic areas, income levels, and racial and ethnic groups threaten more than ever the economic, cultural, and educational cohesiveness of the nation. Not only do more than 6 million American households lack a telephone for basic needs such as 911 emergency services, access to the workplace, commerce, and each other, they are increasingly in danger of being cut off from the numerous social and economic benefits promised by access to the Information Superhighway.

For this reason, NTIA urges the Commission to establish the following "National Subscribership Goal": By the end of the year 2000, in each State, the average level of telephone penetration among households meeting certain designated demographic and geographic characteristics should be no less than the nationwide average that exists as of November 1996. In our view, the National Subscribership Goal would provide a lodestar for the Commission and the States as they develop policies and programs to increase subscribership and lend urgency to that task. As importantly, such a goal will establish a well-defined benchmark for assessing the success of those initiatives in achieving their intended objectives.

The Commission should determine which characteristics should be used to identify the U.S. households that will be the focus of government efforts to increase subscribership. NTIA believes, however, that the designated characteristics should include, at a minimum: income, educational attainment, race/ethnic origin, age, household ownership (i.e., home owners versus renters), and geographic location (i.e., rural, urban, central city). CPS data regularly gathered by the Census Bureau can be used to calculate average telephone penetration among households satisfying any one of the designated categories, or any combination thereof, as well as to track the movements in those levels over time.

III. THE COMMISSION AND THE STATES SHOULD WORK JOINTLY TO DEVELOP PROGRAMS AND POLICIES TO ACHIEVE THE NATIONAL SUBSCRIBERSHIP GOAL

The recently enacted Telecommunications Act of 1996 (the "1996 Act") evinces Congress' intent that the development of universal service policy should be a collaborative effort between Federal and State regulators.[7] Although the 1996 Act does not specifically address the subscribership issues raised in this Notice, it provides that universal service issues should initially be considered by a Federal-State Joint Board. The 1996 Act directs the Board to give the Commission specific recommendations, which, in turn, may form the basis for Commission decisions on the definition and funding of universal service. The 1996 Act authorizes States to adopt their own universal service rules so long as those rules do not conflict with or burden the Commission's new rules.

The 1996 Act recognizes that universal service policies are most often implemented and affected positively or negatively at the State level. Being closer to telephone subscribers and the companies that serve them, as well as more familiar with local market conditions, State commissions often have better knowledge

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7/ See Telecommunications Act of 1996, Pub. L. No. 104-104 (the 1996 Act), § 101, 110 Stat. 56 (1996) (to be codified at 47 U.S.C. § 254).

about which policies are most effective in raising subscribership levels. In addition, States are often effective "laboratories" for testing out new subscribership programs and policies. The record in this Notice demonstrates that many State commissions, together with the companies they regulate, have developed forward-looking programs and service offerings to help vulnerable households in American society obtain and retain telephone service.

For these reasons, NTIA believes that the Commission should work jointly with the States, both through the Joint Board and other means, to find the most effective ways to achieve a universally-accepted goal -- making telephone service available and affordable to all Americans. As part of that process, the Commission should encourage States to implement already tested policies and programs that appear especially promising in their effect on subscribership, but it should also afford States latitude to pursue other innovative solutions.

As noted above, the National Subscribership Goal should be the standard by which we measure the success of this collaborative Federal-State process. The Commission should first try to achieve that goal without detailed national rules and mandates. On the other hand, if the goal has not been reached by the year 2000, the Commission should determine whether Federallymandated regulations are needed to raise telephone subscribership to the desired levels.

IV. AMONG THE MANY WAYS TO INCREASE TELEPHONE SUBSCRIBERSHIP, TWO APPROACHES MERIT PARTICULAR ATTENTION

Although the Commission, the States, and the Joint Board should explore the full range of alternatives for increasing telephone subscribership, NTIA believes that they should give particular attention to two approaches that could have a significantly positive impact on subscribership. First, the Commission should encourage all States to adopt a no-disconnect policy, which would bar local exchange carriers (LECs) from terminating local telephone service because of a subscriber's failure to pay interstate long distance charges. Second, the Commission and the States should explore changes in the Link-Up program that would make subsidized connections available to low-income households more frequently.

A. A No-Disconnect Policy Can Boost Subscribership

Of the issues raised in the Notice, none sparked more controversy than the Commission's questions concerning the adoption of a nationwide no-disconnect policy.[8/] Many LECs and long distance companies strenuously oppose such a policy, arguing

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8/ According to the Commission, at least 10 States have adopted a no-disconnect policy. Notice, 10 FCC Rcd at 13005 n.12. We note, however, that while the Commission identifies the State of Nevada as adopting a no-disconnect policy, Pacific Telesis asserts that Nevada has never had such a prohibition. See Comments of Pacific Telesis at 16 n.24.

that its implementation will not significantly improve subscribership levels.[9] NTIA believes, based on an analysis of data from the Census Bureau's November 1994 CPS, that the opposite is true. As indicated in Tables 1 through 3, telephone subscribership appears to be consistently higher in States with a no-disconnect policy, even after controlling for such important factors as income, race/ethnicity, home ownership, and employment status. The positive relationship between that policy and penetration is especially prominent at lower income levels and dissipates at the higher income levels. In other words, the benefits of a no-disconnect policy appear to be concentrated among the low-income households that would likely have the most difficulty obtaining and retaining telephone service.

9/ See, e.g., Comments of BellSouth Telecommunications, Inc. at 3; Comments of Southwestern Bell Telephone Company at 15. Those objections are not universally shared among LECs, however. US West, for instance, "does not generally disconnect for non-payment of interexchange carrier charges in any of its states," Comments of US West at 4-5, even though only five of the commissions in the States in which the company operates have enacted a no-disconnect policy. Similarly, a group of small, rural LECs that commented in this proceeding did not object to a no-disconnect policy. See Comments of Montana Independent Telecommunications Systems, Inc. at 7.