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ABSTRACT

The goal of Section 254 of the Telecommunications Act of 1996 is the "equality of affordable, comparably priced access to telecommunication services by schools, libraries, and hospitals regardless of geographic location." The purposes of this study were to provide decision support information to the Joint Board and Federal Communications Commission as they seek to implement that intent; to determine the range of prices charged for telecommunications services within, and among, states; and to test the utility of a proposed discount methodology, utilizing actual tariffed rates for selected school districts across the entire rural-urban continuum. Tariff data was collected from eight states--Florida, West Virginia, Nebraska, Maine, Missouri, Nevada, Texas, and Illinois. Tariffs were collected for the three largest carriers in each state and for three small independent carriers for which tariffs existed. Reported data were limited to 56k, T1, and DS3 services, for which 55 tariffs were collected. The T1 service shows the least differential between metro and nonmetro prices, being somewhat more costly for nonmetro districts. For 56k service, the average installation plus annual tariffed price is more costly for nonmetro districts. DS3 service is the most costly and least available of the services investigated, and is substantially more costly for nonmetro districts. In all cases, the proposed discount methodology appears to further equalize prices across all districts regardless of rural/urban factors. Eight summary findings are presented, and an appendix explains the concepts and delineation of the proposed discount methodology. (TD)

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THE UTILITY OF A DISCOUNT METHODOLOGY FOR IMPLEMENTING CONGRESSIONAL INTENT REGARDING SECTION 254 OF THE TELECOMMUNICATIONS ACT OF 1996

PRELIMINARY FINDINGS AND EXECUTIVE SUMMARY

October 30, 1996

AN ANALYSIS JOINTLY SPONSORED

by

THE COUNCIL FOR EDUCATIONAL DEVELOPMENT AND RESEARCH (CEDaR)

and

THE RURAL POLICY RESEARCH INSTITUTE (RUPRI)

PREFACE

The Rural Policy Research Institute (RUPRI) has assembled a distinguished group of nationally renowned rural telecommunications policy analysts and practitioners, to serve as an ongoing research and decision support resource for Congressional and state legislators, federal and state regulators, to assure that the rural implications of the Telecommunications Act of 1996 are fully understood as this decision making process moves into implementation and evaluative phases.

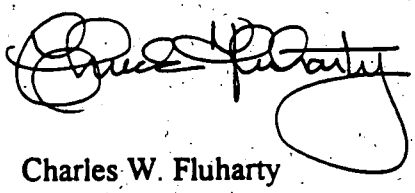
This Rural Telecommunications Expert Panel was chosen to reflect geographic, disciplinary, and organizational diversity. It is anticipated that membership on this panel will expand, as the scope of this work broadens to address the expanding challenges within this policy decision process. Members of the panel are listed below:

RUPRI Rural Telecommunications Expert Panel

John Allen, University of Nebraska - Lincoln
Don Dillman, Washington State University
Chuck Fluharty, Rural Policy Research Institute
Vicki Hobbs, Missouri Interactive Telecommunications Education Network
Craig Howley, ERIC Clearinghouse on Rural Education and Small Schools, Appalachia Educational Laboratory, Inc.
Paul Stapleton, Superintendent, Charlotte, Virginia County Schools

This document contains material submitted to the Federal Communications Commission, designed to inform decisions regarding implementation alternatives to address Congressional intent contained within Section 254 (h) of the Act. The letter of submission and study follow this preface. Vicki Hobbs provided leadership in development of this analysis and submission.

This study was a collaborative project between the Rural Policy Research Institute and the Center for Educational Development and Research (CEDaR). This support and scientific contribution is greatfully acknowledged and appreciated. We also received significant assistance from numerous individuals across the country, both within state agencies, and specifically, the state public service commissions which contributed data used in this study. While these collaborators are too numerous to mention, RUPRI sincerely appreciates this support, which assured this limited-scope study could be completed in the timely manner necessary to inform Joint Board and FCC decision making processes.



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October 30, 1996

Office of the Secretary
Federal Communications Commission
Room 222
1919 M Street
Washington, D.C. 20554

RE: FEDERAL-STATE JOINT BOARD ON UNIVERSAL SERVICES (CC DOCKET NO. 96-45)

Office of the Secretary:

The Rural Policy Research Institute (RUPRI) has assembled a distinguished national group of rural telecommunications policy experts and practitioners, to serve as an ongoing research and decision support resource for Congressional and state legislators and federal and state regulatory decision makers, to assure that the rural implications of the Telecommunications Act of 1996 are fully incorporated into implementation and evaluative processes. This Rural Telecommunications Expert Panel was chosen to reflect geographic, disciplinary, and organizational diversity.

As this Panel began its work, it became clear that Joint Board and FCC decisions to implement Congressional intent contained within Section 254 (h) of the Act would be more informed if quantitative analysis of the relative costs and pragmatic utility of a possible discount methodology were available. Ms. Vicki Hobbs, Director of the Missouri Interactive Telecommunications Education (MIT-E) Network, and a member of this RUPRI Panel, presented earlier testimony to the FCC regarding the possible utility of this approach.

However, without quantitative assessments of the relative costs of potential telecommunications services to actual rural and urban schools, or the actual impact on services pricing under a proposed discount methodology, the pragmatic relevance of this approach remained unclear. Such a methodology had to address both Congressional intent and realistic pricing concerns of public and private sector decision makers. To address this question, RUPRI and the Center for Educational Development and Research (CEDAR) jointly sponsored a limited-scope study designed to provide the Joint Board and the FCC with a preliminary assessment of these questions. Enclosed are Preliminary Findings and an

Executive Summary from this study, which reflect initial data analyses from eight states.

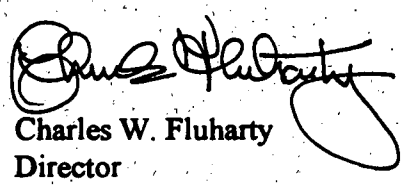
I would like to emphasize two critical issues regarding the enclosed study:

1. This study was undertaken to provide a quantitative assessment of the utility of this discount methodology. This study is limited in scope, and should not be interpreted to reflect an endorsement by this RUPRI Panel of this policy alternative over others currently under consideration. However, it is intended to provide an objective assessment of the realistic potential which this vehicle offers.

2. This study is limited in scope, due to time and resource constraints. This is appropriately noted wherever relevant within these preliminary findings. However, despite these constraints, we believe this study clearly indicates a more rigorous and systematic assessment of the potential for such a discount methodology is merited. RUPRI and CEDaR will continue to work with this data, and a full report will be published as expeditiously as possible. However, additional national resources should be directed toward the analytic issues raised within this study.

Thank you for your attention to these issues. We welcome further inquiries, if we can be of further assistance.

Sincerely,



Charles W. Fluharty
Director

CWF/lc

Enclosure

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THE UTILITY OF A DISCOUNT METHODOLOGY FOR IMPLEMENTING CONGRESSIONAL INTENT REGARDING SECTION 254 OF THE TELECOMMUNICATIONS ACT OF 1996

PURPOSES

The intent of this data collection and analysis was threefold:

(1) To provide decision support information to the Joint Board and Federal Communications Commission as they seek to implement the Congressional intent in Section 254 of the Telecommunications Act of 1996;

(2) To determine the degree of variance in the current prices charged for telecommunications services within, as well as, among states;

(3) To test the utility of a proposed discount methodology, utilizing actual tariffed rates for selected school districts across the entire rural-urban continuum.

METHODOLOGY

This analysis incorporates two methodologies, which are outlined below. These were employed to test the utility of a proposed discount methodology, designed to address Congressional intent criteria reflected in Section 254 of the Telecommunications Act of 1996.

State Tariff Data: Telecommunication Services Costs to Schools, by Location, Across a Rural/Urban Continuum

Tariff data was collected from State Public Utility Commissions in eight states-- Florida, West Virginia, Nebraska, Maine, Missouri, Nevada, Texas, and Illinois. Copies of tariffs were collected for the three largest carriers in each state and for three small independent carriers (as selected by the PUC informant) for which tariffs existed. The services for which tariffs were collected were limited to 56k, T1, Analog, DS3, and ATM for data and/or video purposes.

In order to be able to test the proposed discount methodology against schools of varying rurality/urbanity, one school district was selected within each Beale Code area for each local exchange carrier for which tariff information was collected. The Beale Code designations are as follows:

0	Metro Central
1	Metro Fringe
2	Metro, 250,000-1,000,000 population

3	Metro, < 250,000 population
4	Non-metro, adjacent, 20,000+ urban population
5	Non-metro, not adjacent, 20,000+ urban population
6	Non-metro, adjacent, 2500-19,999 urban population
7	non-metro, not adjacent, 2500-19,999 urban population
8	Non-metro, adjacent, < 2500 urban population
9	Non-metro, not adjacent, 2500 urban population

Because telephone company exchange areas do not most often correspond to county boundaries and Beale Codes are derived based on county data, districts were chosen based on their combination of county and exchange area location. Schools chosen are intended to be representative of other schools with similar Beale Codes and local exchange area location, but no attempt was made to control for other district variables.

Where multiple counties of the same Beale code were included in the service area of any local exchange carrier, one county was selected based, to the extent possible, on geographic distribution around the state. For consistency, the one district chosen was typically the largest school in the county being served by a particular carrier.

Texas presented unique problems in the selection of school districts, in that no map of telephone company service areas apparently exists. The researchers were therefore limited by having to work from a list of counties served by each telco. There may, in some instances, be multiple companies which serve parts of a single county. Verification of the carrier serving each district was not done with the district itself. For this reason, the price data for any specific district may not be perfectly accurate, but it would be representative of districts similarly located and of similar wealth.

In all other states the match between Beale Code, county, local exchange carrier, and school district was possible.

Seventy-one (71) tariffs were collected across the eight states. Although tariff data was collected on five different services, data reported here is limited to 56k, T1, and DS3 because of the very small numbers of tariffs covering other services and the inability to cost compare like services. The 56k, T1 and DS3 tariffs represent 55 of the 71 tariffs collected.

Proposed Discount Methodology

Please see Appendix I below for a fuller explication of the assumptions underlying the proposed discount methodology utilized in this study.

PRELIMINARY FINDINGS

Preliminary findings from this study are outlined below, in summary form. In comparing tariffed rates, every effort has been made to compare prices for equivalent services. Some variation will undoubtedly remain, however, given the complexities of pricing elements and the variability in services.

The data is not intended to focus on the local situation in any one state. Rather, the eight-state study is intended to be representative of the situation across the entire U.S. We recognize the limitations inherent in the limited scope of this study. However, by aggregating tariff data for a subset of representative states, we believe it is possible to make a more informed judgement regarding the national impacts of this methodology.

56K SERVICES

Mileage Rates

56K tariffs were available from all eight states--MO, WV, NE, TX, IL, NV, FL, and ME, including twenty-two tariffs/companies. For those charging a mileage rate, the average rate charged was $5.29 per mile. (Range: $1.50 - $30.00).

Timed Rates

For those charging a timed rate, the average price was $6.58 per hour. (Range: $2.40/hr - $13.50/hr). In addition to the mileage and timed rate, all but two tariffs also charged a one-time installation fee averaging $312.33. (Range: $50 - $755)

Scenario Pricing

The average price which would be paid by a school district under these tariffs would therefore be $235/month given a scenario of : (1) dedicated line lease for Internet, WAN, and/or video connectivity; (2) access charges to Internet provider or any bundled services excluded; and (3) assumption of 15 miles distance from school to telco central office or 40 hours service per month. The range of costs, however, is even more illustrative of the problem. Total per month costs under the same scenario vary from $63/month to $573/month.

Current Tariffed Pricing

Currently among the eight states and 22 carriers/tariffs studied, the average installation plus annual tariffed price for 56k service is more costly for non-metro districts. Among those metro districts (with Beale Codes of 0-3) the average annual price is $252 less than the mean price for all districts. Among non-metro districts (with Beale Codes of 4-9), the average price is $167 more than the mean price for all districts. This finding is important given that a common mileage factor, e.g., 15 miles, was used to compute all school district prices.

Beale Code	Avg. Installation + Annual Tariffed Price	Avg. Price Metro/ Non-Metro	
0	$ 3263	$ 3342	(- $ 252 Average Metro Diff from Mean)
1	$ 3182		
2	$ 3293		
3	$ 3630		
4	$ 3458	$ 3761	(+ $167 Average Non-Metro Diff from Mean)
5	$ 3238		
6	$ 3453		
7	$ 3550		
8	$ 4376		
9	$ 4493		
Avg	$ 3594		

Proposed Discounted Pricing

The average discounted price for installation plus annual tariffed price for 56k service among all districts included in the study was $1900. When broken down by Beale Code the difference between the **average** discounted annual price (including installation) for **each** Beale Code area and the **average** across **all** Beale Code areas is minimal. Annual 56K prices for those districts with Metro Beale Codes of 0-3 averaged $166 **more** than the mean; for those non-metro districts with Beale Codes of 4-9, the annual 56k price averaged $111 **less** than the mean. This minimal differential will help to offset (but not eliminate) the differential in telecommunications pricing based on distance sensitive factors. As long as prices are based on such distance sensitivity, those districts located farther from the telephone central office (or hub) will pay more than those in close proximity to it.

Beale Code	Average Discount Installation + Annual Tariff Price	Avg 1st Year Savings After Discount	Price + or - the Avg	
0	$2073	$1190	+ $173	+ $166 (Avg Metro Diff)
1	$1888	$1294	- $ 12	
2	$2053	$1240	+ $153	
3	$2251	$1380	+ $351	
4	$1977	$1481	+ $ 77	- $111(Avg Non-Metro Diff)
5	$1772	$1466	- $128	
6	$1588	$1865	- $312	
7	$1682	$1869	- $218	
8	$2012	$2364	+ $112	
9	$1702	$2791	- $198	
Avg	$1900	$1694		

Conclusion

The proposed discount methodology appears to further equalize the prices across all districts studied regardless of rural/urban factors. While the inclusion of actual mileage for each individual district was beyond the scope of this study, the small differential in discounted costs between metro and non-metro districts should help to offset (but will not eliminate) the increased costs of non-metro districts associated with remoteness.

T1 (1.45MB) SERVICES

T1 tariffs were available in seven of the eight states (Maine, Texas, Missouri, Nevada, Nebraska, Illinois, and Florida) involving 26 tariffs. The tariffs differed markedly as well with respect to mileage rates and overall costs.

Installation and Mileage Charges

The average per mile price for T1 service was $23.63 per mile; $686.40 was the average one-time cost for service installation. The range for mileage charges was $9.52 per mile to $65 per mile. The range for one-time costs was $0 - $3234.

Scenario Pricing

Total monthly costs according to the common scenario was $625.60. (Range: $200 - $1145)

Current Tariffed Pricing

Currently among the seven states and 26 carriers/tariffs studied, the average installation plus annual tariffed price for T1 service is somewhat more costly for non-metro districts. Among those metro districts (with Beale Codes of 0-3) the average annual price is $62 **less** than the mean price for all districts. Among non-metro districts (with Beale Codes of 4-9), the average price is $41 **more** than the mean price for all districts. Of the three telecommunications services analyzed, T1 service shows the least differential between metro and non-metro tariffed prices.

Beale Code	Avg Installation + Annual Tariffed Price	Avg Price Metro/ Non-Metro	
0	$ 7397	$ 7881	(- $ 62 Average Metro Diff from Mean)
1	$ 8291		
2	$ 7809		
3	$ 8027		
4	$ 6892	$ 7984	(+ $41 Average Non-Metro Diff from Mean)
5	$ 5864		
6	$ 8829		
7	$ 7767		
8	$ 9719		
9	$ 8744		
Avg	$ 7934		

Proposed Discounted Pricing

The average discounted price for installation plus annual tariffed price for T1 service among all districts included in the study was $4132. When broken down by Beale Code the difference between the **average** discounted annual price (including installation) for **each** Beale Code area and the **average** across **all** Beale Code areas is greater than the differential shown among current tariffed rates. Annual T1 prices for those districts with Metro Beale Codes of 0-3 averaged $541 **more** than the mean; for those non-metro districts with Beale Codes of 4-9, the annual T1 price averaged $360 **less** than the mean. It is anticipated that this differential will help to substantially offset the differential in telecommunications pricing based on distance sensitive factors. As long as prices are based on such distance sensitivity, those districts located farther from the telephone central office (or hub) will pay more than those in close proximity to it.

Beale Code	Average Discount Installation + Annual Tariff Price	Avg 1st Year Price Savings After Disc	+ or - the Avg	
0	$4648	$2749	+ $516	+ $541 (Avg Metro Diff)
1	$4653	$3638	+ $521	
2	$4733	$3076	+ $601	
3	$4657	$3370	+ $525	
4	$3919	$3063	- $213	- $360 (Avg Non-Metro Diff)
5	$3195	$2669	- $937	
6	$4147	$4682	+ $ 15	
7	$3587	$4180	- $545	
8	$4434	$5285	+ $302	
9	$3348	$5396	- $784	
Avg	$4132	$3811		

Conclusion

The proposed discount methodology will further equalize the T1 prices across all districts studied as actual mileage factors are used in the pricing formulas.

DS3 (45MB) SERVICES

Installation and Mileage Charges

When comparing DS3 costs across four states (Texas, Missouri, Nebraska, Illinois, and Florida) and seven tariffs, the distance-sensitive mileage rate averaged $66.02 per mile. The range varied from $34.50 per mile to $110.00 per mile.

One-time installation costs for DS3 service averaged $2039.71. (Range: $0 - $4100).
Total monthly charges averaged $2719.71 per month per site. (Range: $1683 - $4850).

Current Tariffed Pricing

Among the study's four states and seven carriers for whom DS-3 tariffs exist, the average installation plus annual tariffed price for DS3 service is substantially more costly for non-metro districts. Among those metro districts (with Beale Codes of 0-3) the average annual price is $1460 **less** than the mean price for all districts. Among non-metro districts (with Beale Codes of 4-9), the average price is $973 **more** than the mean price for all districts. DS3 service is the most costly and least available of the telecommunications services investigated.

Beale Code	Avg Installation + Annual Tariffed Price	Avg Price Metro/ Non-Metro	
0	$ 34,766	$ 30,975	(- $1460 Average Metro Diff from Mean)
1	$ 29,812		
2	$ 29,871		
3	$ 29,450		
4	$ 34,006	$ 33,408	(+ $973 Average Non-Metro Diff from Mean)
5	$ 39,168		
6	$ 39,961		
7	$ 35,019		
8	$ 27,647		
9	$ 27,647		
Avg	$ 32,435		

Proposed Discounted Pricing

The average discounted price for installation plus annual tariffed price for DS3 service among all districts included in the study was $16,089. When broken down by Beale Code the difference between the **average** discounted annual price (including installation) for **each** Beale Code area and the **average** across **all** Beale Code areas is somewhat greater than for lower bandwidth services. Under the proposed pricing methodology, metro districts would incur an average discounted price of $1234 above the mean, while non-metro districts would incur an average of $823 below the overall mean. This differential, however, should substantially equalize as actual mileage distance are used in the pricing computation.

Beale Code	Average Discount Installation + Annual Tariff Price	Avg 1st Year Savings After Discount	Price + or - the Avg	
0	$20,745	$14,021	+ $4656	+ $1234 (Avg Metro Diff)
1	$14,365	$15,447	- $1724	
2	$17,478	$12,393	+ $1389	
3	$16,705	$12,745	+ $ 616	
4	$18,012	$15,994	+ $1923	- $823 (Avg Non-Metro Diff)
5	$19,174	$19,994	+ $3085	
6	$15,747	$21,214	- $ 342	
7	$15,810	$19,209	- $ 279	
8	$12,002	$15,645	- $4087	
9	$10,848	$16,799	- $5241	
Avg	$16,089	$16,346		

Conclusion

The proposed discount methodology appears to further equalize DS3 prices across all districts studied given the inclusion of actual mileage rates in the pricing formula. The differential seen in discounted prices between metro and non-metro districts should be substantially offset by the increased costs of non-metro districts associated with remoteness.

Leveling Effect of the Proposed Discount Methodology

The variation is telecommunications prices charged to consumers (with respect to the services studied) is as great within states as it is between states. Not surprisingly, the variation increases with the bandwidth. The range of current prices spans $510 for 56k services, $945 for T1 services, and $3167 for DS3 services. This disparity should reinforce the value that competition will have on subsequent telecommunications pricing, however, some disparity in cost of service--and therefore in pricing--will likely remain because of the inherent differences in the cost of provision of services across all terrains, with varying distances involved, and varying customer density. The proposed discount methodology will reduce the disparity among prices paid for telecommunications services by school districts and libraries.

Implications of Mileage-Sensitive Tariffs

Only nine of the 71 tariffs collected were built on a per minute usage time, usually, but not exclusively indicating dial-up rather than dedicated capabilities. The vast majority (87%) were based on per-mile charges in addition to other standard rate elements. This distance-sensitive factor compounds the problem which more remote schools face in seeking affordable telecommunications services. As the distance from the exchange carrier's central office to the school increases, so does the cost of service. All mileage charges in this study were based on a 15-mile distance from the central office. In reality, especially in broadband distance learning applications in rural areas this distance may be significantly more. In urban areas, on the other hand, the distance is typically much less. Therefore, the differences that are seen among the average discounted prices by Beale Code area are taken as an affirmation of the feasibility of the proposed discount methodology. As the actual distance decreases for dense urban areas, it will also increase for remote, sparsely populated rural areas, thereby further leveling out the difference in prices paid for telecommunications services. Such determination of actual mileage distances is beyond the scope of this study. However, it is believed that collection of such data would verify this assumption.

SUMMARY FINDINGS

(1) Eighty-seven percent of the tariffs studied across eight states are based on distance-sensitive formulas, indicating widespread differentials in pricing for equivalent services in densely vs. sparsely populated areas.

(2) The current tariffed rates for telecommunications services are substantially higher in non-metro areas than in metro areas even when using a common mileage charge in the computation.

(3) The current range in telecommunications prices charged to school district consumers (with respect to the services studied) is as great within states as it is between states.

(4) As the telecommunications bandwidth increases, so generally does the pricing disparity between metro and non-metro districts. The differential between current 56k costs among metro and non-metro districts is $419; for DS3 service the differential extends to $2433.

(5) Where disparity exists in the provision of dedicated broad band services, remote areas served by small independent carriers are more likely to be underserved. Metro areas regardless of size of carrier are generally best served in terms of telecommunications options.

(6) Disparity in current telecommunications pricing exists both with respect to: (a) the higher base rates of telecommunications providers serving non-metropolitan America; and (b) the greater mileage involved in serving more remote geographic areas. That is, non-metropolitan America incurs both higher base rates for dedicated telecommunications services as well as additional costs associated with greater distances from central office or hub.

(7) The inclusion of both wealth and density factors in the discount methodology appears to further equalize the costs for telecommunications across districts of varying financial and locational circumstances.

(8) The small differential in discounted pricing between metro and non-metro districts should help to offset (but will not eliminate) the increased costs to non-metro districts, as actual mileage is included in tariff pricing formulas.

APPENDIX I: EXPLANATION OF CONCEPTS AND DELINEATION OF PROPOSED FCC SCHOOL/LIBRARY DISCOUNT METHODOLOGY

I. The goal of §254 of the Telecommunications Act of 1996 could be restated as:

"Equality of affordable. comparably priced access to telecommunication services by schools, libraries, and hospitals regardless of geographic location."

In this goal there are three separate issues or components:

(1) **Equality of access**
Any school, library, or hospital should have access to that telecommunications technology which they determine is necessary to enhance their educational or medical mission.

(2) **Affordable access**
Schools, libraries, and hospitals should have "affordable" access to telecommunications services

(3) **Comparably priced access**
The price of telecommunications access for schools, libraries, and hospitals should be substantially the same regardless of geographic location.

II. Three methods have been suggested to achieve the goal:

(1) Block grant program to schools, etc.

This system in which each entity would receive a fixed sum of money annually with which to purchase telecommunications hardware, software, training, wiring, or service falls outside the purview of the FCC and the Universal Service Fund. It is a system which is now in place to some extent in many states on an entitlement basis and in all states (through federal or state grant programs) on a competitive basis. The attempt to consolidate the various technology grant sources and to focus them on the nationwide support of telecommunications infrastructure development **within** schools, libraries, and hospitals is an admirable, but an entirely separate, goal.

(2) Voucher system

A voucher system whereby each entity would have access to a fixed sum of money with which to offset the costs of telecommunications has two major drawbacks:

(a) If equally applied to all school districts such a voucher system would do nothing to equalize access across high- and low-cost areas, that is, those

districts in high-cost areas may still not be able to "afford" the service and those in low-cost areas would be disproportionately "over"served. This would effectively **increase** the distance between the technological have's and have-not's.

(b) Where number of students is the basis for the voucher amount, small schools are placed at a distinct disadvantage, in that, unless narrowly defined as the number of computers available, telecommunications costs do not vary proportionately with the number of students. Many telecommunications costs are fixed, e.g., the cost of access to a DS-3 fiber line for two-way interactive television is the same whether that system involves 5 students or 500 students.

(3) Discount Methodology

A discount methodology is the only way in which each of the goal components (addressed above) can be realized. A discount methodology as proposed will:

(a) Allow each entity (schools, libraries, and hospitals) to access that technology which best meets its educational or medical needs because no entity will be denied access to a technology or its functional equivalent because of geographic location. Because a mechanism to reimburse the provider for their cost of service over and above the discounted rate paid by the school will exist, the eligible telecommunications carrier will be obligated to serve that customer.

(b) Allow each entity to affordably access the required telecommunications technology by linking the discount to each district's relative "ability to pay", e.g., district wealth, rather than using a single discount with all entities regardless of economic circumstances.

(c) Insure comparability of telecommunications pricing since the discount will be applied to a **median national benchmark price** for each service rather than the local price of each service. In this way, all entities will pay the same base price to which a discount factor is then applied.

(d) Enable the cost of technology to be size-neutral, that is, it will not penalize or reward any district because of its size or number of students enrolled.

III. Criteria Underlying the Construction of a Discount Methodology

In order to meet the goals as state above, a discount methodology must possess the following criteria:

(1) It must take the inequity of rural access to telecommunications into account.

(2) It must meet a standard of "affordability" such that those telecommunication services of choice (or their functional equivalents) are "affordable" to schools, libraries, and hospitals regardless of location or economic circumstances.

(3) It should be compatible with, and build upon, to the extent possible, those industry conventions and mechanisms now in place.

(4) It should be a straight-forward, easy-to-understand, and predictable process both to the telecommunications carrier and to the customer.

(5) It should extend the concept of universal service to include any technology (or its functional equivalent) which meets the educational or medical needs of schools, libraries, and hospitals wherever they are located.

(6) It must be applicable to all telecommunications services whether they are tariffed or non-tariffed services.

(7) It should maintain a federal-state partnership in terms of participation in and control of the process.

(8) It should be consistent with, and supportive of, a competitive economic environment.

IV. **Two separate factors must therefore be addressed in constructing a discount methodology:**

(1) Locational equity; and
(2) Economic equity

Insuring Locational Equity

An operational variable must be selected for each factor in order to construct a discount procedure. **Population density** is chosen as the variable on which "locational equity" is based not because of the correlation between cost of telecommunications service and sparsity of population, but because of a dramatically lower potential for provider cost recovery in sparsely populated areas. Indeed this is the premise on which the Universal Service Fund currently operates, that is, the price of basic service in rural, insulated, high-cost areas is offset by USF disbursements.

Insuring Economic Equity

Median Value of Owner Occupied Housing is chosen as one of two variables on which "economic equity" is based because it serves as the best indicator available of district wealth in non-inner city areas. Furthermore, it best explains the variance in per pupil expenditures, as

supported by a 1995 study conducted by the National Center for Educational Statistics. For other measures of wealth, e.g., percent of children in poverty or household income, the direct relationship with expenditure per pupil is only seen for those districts in the highest income categories or with the lowest poverty rates. For those districts falling in between, only "median value of owner-occupied housing" continues to predict expenditure per pupil.

Expenditure per pupil is not used as a direct measure of district wealth because it is a better indicator of "cost of education" in that locale than it is an indicator of "ability to pay". Expenditure per pupil is highly influenced by the state and federal equalization processes such that (theoretically) those districts with higher numbers of special needs populations, at-risk students, etc. receive greater amounts of funding. While one could argue that these earmarked funds might in some cases be allotted to telecommunications technology, it does not follow that those districts with greater expenditures per pupil necessarily have greater amounts of money to spend on telecommunications technology. It more reliably means that the cost of education is higher in those districts with greater expenditures per pupil.

Educational expenditures also vary considerably less than housing values across the country because of the efforts to "equalize" educational expenditures by state and federal entities. Per pupil expenditure is a less discriminating variable than is "value of owner-occupied housing".

Because persons in inner city districts are less likely to own their own home, it becomes necessary to add a second economic variable, **Median Household Income**, to more accurately measure the relative "ability to pay" for telecommunications services.

By choosing the lesser of the "median value of owner-occupied housing" or "median household income" as a measure of district wealth, we believe that the best indicator of district "ability to pay" is used, and that, because of its correlation with per pupil expenditure, for those areas where median value of owner-occupied housing is used as the wealth factor, it indirectly reflects the "cost of education" in that district.

V. Development of a Median National Benchmark Price

Key to development of this discount methodology is the determination of the median national benchmark price for *each* telecommunications service existing in a competitive environment. A national study, undertaken every 2- to 3-years, could yield the current price which is the median of all competitive prices paid by the private sector for each individual service.

The Median National Benchmark Price would then serve as the uniform base amount from which all discounts would be calculated. In this way, comparability of telecommunications pricing can be achieved. To avoid an increase in price for those services now implemented in low-cost areas, telecommunications providers would be held to the lower rate, that is, where the price of an existing service now falls below the computed discount price, the provider would be obligated to continue the service at the previously bid price.

VI. The Discount Methodology

A. The Need for Additive Factors

Locational and economic equity factors must independently be included in a discount procedure in order to avoid limiting the effect of either variable on the other.

B. Development of an Indexed Score for each District in the Country

Using a formula such as the one below, a "score" for each district within each state may be determined:

Value of Owner-Occupied Housing Rank	OR	Median House-hold Income Rank	+	Population Density Rank	=	Discount Score

The "Discount Score" will equal the composite rank of each district on each of the selected variables, with the lowest discount score equating to the highest discount.

It is necessary to allocate discounts **within** states rather than for the country as a whole, since it is politically unfeasible for discounts to vary so widely from state to state. Utilizing discount scores **within** states, it also becomes much less necessary to adjust economic variables for cost of living.

C. The Concept of "Base" Discount

A base discount may be utilized across all districts, after which an additional discount would be levied according to its indexed discount score. Such a base discount would be of the magnitude of 30%, roughly equivalent to that discount normally expected for commercial or government rates when customers are pooled or aggregated as in a statewide bid.

D. Calculating Discount Percentage

Each school district would be rank ordered within their own state based on the formula for calculating the discount score as explained above. That district which has the *highest* discount score, (meaning that district which will receive the least discount) will receive an automatic 30% discount. Similarly, that district within each state which has the *lowest* discount score, (meaning that district which will receive the greatest discount) will receive the maximum discount of 70%*. All districts falling between the highest and lowest discount score will receive a discount percentage proportional to their discount score.

It is assumed that all districts should be responsible for a cost equivalent to 30% of the median national benchmark price. In those cases where even a 70% discount fails to meet a

local standard of affordability, the option should exist to appeal to the state regulatory commission for an additional lifeline discount.

*Note: Technically, the district with the highest and lowest discount score will receive a discount proportional to the hypothetical minimum and maximum discount score. For example, the hypothetical minimum discount score in any state will be "2"--a rank of "1" on the lower of the two wealth factors and a rank of "1" on the density factor. However, in actuality the lowest ranked district may receive a score of "7"--a rank of "2" on the lower of the two wealth factors and a rank of "5" on the density factor. In this case, the lowest ranked district would receive a discount rate proportional to the difference between the hypothetical lowest discount score of "2" and the actual discount score of "7", e.g., 69.5789%

E. Applying the Discount Percentage

For those schools, libraries, and hospitals whose **lowest competitive bid for a requested service falls above the Median National Benchmark Price**, the discount price would be calculated by applying the net rate (100% - discount percentage) times the *median national benchmark price*.

Where the **lowest competitive bid for a requested service falls below the Median National Benchmark Price**, the discount price would be calculated by applying the net rate (100% - discount percentage) times the *bid price*.

Where only a **single provider submits a bid** for a requested service, the discount price would be calculated by applying the net rate (100% - discount percentage) times the *median national benchmark price.*

By differentiating between these three circumstances, several desirable ends can be achieved:

(1) Competition will be encouraged, i.e., the lowest bid will prevail.

(2) Infrastructural development will be spurred by the opportunity to recoup a level of costs through the Universal Service Fund.

(3) School districts, libraries, and hospitals in high cost areas will benefit from having a greater discount (because the discount percentage is applied to the lower national benchmark price rather than the higher bid price).

(4) Where legitimate cost of service exceeds the national benchmark price, the opportunity exists for providers to fully recoup costs through their state universal service fund, however, the incentive will be to bring costs as close to the national benchmark price as possible in order to forego the process of cost justification with the state regulatory agency.

(5) Providers not yet in a competitive situation will be discouraged from submitting

artificially high bids for service, because their reimbursement will be based on the national benchmark price unless they choose to apply for additional compensation through the state.

Where no provider submits a bid for a requested service (or its functional equivalent) to a school district, library or hospital, the concept of "carrier of last resort" should apply.

VII. The Issue of *Bona Fide* Request

It is important to maintain the competitive motivation associated with the bidding process, therefore a bona fide request will be considered as any request for bid which emanates from the chief administrative officer of the school district, library or hospital. Because discounts will not exceed 70%, customers will be required to contribute substantially to the price of the service, thereby negating the likelihood of "opportunistic requests" which may have resulted from the prospect of free or nearly free services.

VIII. The Process of Provider Reimbursement from the Universal Service Fund

Provider reimbursement through the Universal Service Fund must insure several key elements:

(1) It should encourage infrastructural development in high cost areas

(2) It should eliminate the incentive to artificially reduce the bid price in order to secure a service contract and collect Universal Service funds

Where the bid price falls below the national median benchmark price, the provider reimbursement from the USF would be the difference between the bid price and the discount price, e.g., \$800-\$480 = \$320 in the example below. The provider would then be compensated a total of \$320 from the USF + \$480 from the customer = \$800.

Where the bid price exceeds the median national benchmark price (NBP), the provider reimbursement from the USF would be calculated as the difference between the NBP and the discounted price, e.g., \$1200-\$840 = \$360 in the example below. The provider would then be compensated a total of \$360 from the USF + \$840 from the customer = \$1200. If the provider requires additional cost recovery, that is, to compensate for the difference between their TSLRIC or fully allocated cost (as determined by the state regulatory agency) and the total amount received for the service, the provider must demonstrate the shortfall between their total compensation for the service (discounted price + USF reimbursement) and their TSLRIC or fully allocated cost, with the applicable regulatory agency. Where additional compensation is deemed appropriate, that is, where the state regulatory agency agrees that a significant shortfall exists between the fully allocated cost/TSLRIC and the total compensation received by the provider, the USF would agree to share the cost with the state for additional compensation to the provider on the basis of \$2:\$1.

Example:

NBP	Bid Price	Discounted Price	Provider Receives
1200	1400	1400 x 60% = 840	840 + (1200-840) = 1200
1200	800	800 x 60% = 480	480 + (800-480) = 800

The difference in the compensation formula between those whose bid prices fall below and above the median national benchmark price is necessary in order to prevent any provider from artificially lowering the bid price in order to secure the bid and receive maximum USF reimbursement.

The use of fully allocated cost, rather than TSLRIC, as the methodology by which state regulatory agencies may determine actual cost of service, has three major implications:

(1) It provides a greater incentive to the provider to serve the customer.

(2) It covers the embedded costs of the provider.

(3) It increases the demand on the Universal Service Fund.

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