NTCA
NATIONAL TELECOMMUNICATIONS COOPERATIVE ASSOCIATION
The Voice of Rural Telecommunications
www.ntca.org

November 20, 2009

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W., TW-A325
Washington, D.C. 20554

***Ex Parte* Notice**

***In the Matter of Comment Sought on the Impact of Middle and Second Mile Access on Broadband Availability and Deployment,* NBP Public Notice # 11, GN Docket Nos. 09-47, 09-51, 09-137**

Dear Ms. Dortch:

The National Telecommunications Cooperative Association (NTCA) files the attached *ex parte* Comments in response to the Commission's October 8, 2009 Public Notice (NBP Notice #11) seeking further information in order to understand more fully the cost and availability of middle and second mile transport services and how they relate to making broadband available to all Americans. In the comments, NTCA examines the Commission's proposed framework delineating middle mile, 2nd mile, and last mile and concludes that it does not precisely comport to the reality faced by rural carriers. NTCA urges the Commission to recognize that ubiquitous broadband deployment will require some form of middle mile cost recovery for rural providers. NTCA includes results from a recent data request of its membership that indicates that middle mile costs will rise dramatically as bandwidth demand increases.

In accordance with the Commission's rules, this letter is being electronically filed with the Secretary's Office. If you have any questions, please do not hesitate to contact me at 703-351-2016.

Sincerely,
/s/ Daniel Mitchell
Daniel Mitchell
Vice President, Legal and Industry

DM/rjs

Attachment: NTCA *Ex Parte* Comments on NBP Notice #11

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Comment Sought on Impact of Middle and	)	GN Docket Nos. 09-47, 09-51, 09-137
Second Mile Access on Broadband	)	
Availability and Deployment	)	

COMMENTS ON NBP NOTICE #11

The National Telecommunications Cooperative Association (NTCA)[1] hereby submits these comments in response to the Federal Communications Commission's (Commission or FCC) October 8, 2009 Public Notice seeking further information in order to understand more fully the cost and availability of middle and second mile transport services and how they relate to making broadband available to all Americans.[2]

[1] NTCA is a premier industry association representing rural telecommunications providers. Established in 1954 by eight rural telephone companies, today NTCA represents more than 585 rural rate-of-return regulated telecommunications providers. All of NTCA's members are full service rural local exchange carriers (LECs) and many of its members provide wireless, cable, Internet, satellite and long distance services to their communities. Each member is a "rural telephone company" as defined in the Communications Act of 1934, as amended (Act). NTCA's members are dedicated to providing competitive modern telecommunications services and ensuring the economic future of their rural communities.

[2] *Comment Sought on Impact of Middle and Second Mile Access on Broadband Availability and Deployment, NBP Public Notice #11*, GN Docket Nos. 09-47, 09-51, 09-137, Public Notice (Notice), (released on October 8, 2009).

I. INTRODUCTION

In order to better understand the challenges their members face in obtaining transport to the Internet backbone, NTCA in late October issued a data request to their members. The data request was conducted electronically, and an email message containing the data request's URL was sent to NTCA member company managers. NTCA compiled data from 162 unique responses from its member companies. All data was collected with the explicit understanding that only aggregated results would be published.

II. THE COMMMISSION'S NETWORK ARCHITECTURE AS PROPOSED IN THE PUBLIC NOTICE DOES NOT COMPORT WITH THE REALITIES OF RURAL CARRIERS.

In the Notice, the Commission offers a diagram that conceptually illustrates their delineation of middle mile, 2nd mile, and last mile.[3] In the diagram, the Commission imposes their framework upon three distinctly different networks: telephone (copper or fiber), cable (coax or fiber), and mobile wireless.

While the Commission's intent in developing this framework was to impose a common delineation across platforms the unfortunate reality is that network architectures are different. NTCA does not believe that the dichotomy used in the *Notice* comports with the way the network is planned or tracked. NTCA recognizes that it is convenient to assign common terms for all to use, but disagrees with the assignment used in the notice. NTCA's remarks are limited to the incumbent local exchange carrier (ILEC) network relative to the mobile wireless network. No representation is made relative to the best framework for cable.

[3] *Notice*, p. 2.

According to the Commission's chart, the last mile for an ILEC is comprised of the connection between the customer premise and the remote terminal/fiber splitter (for a copper or fiber network); the 2nd mile the connection between that point and the central office; and the middle mile the connection between the central office and the Internet gateway. However, ILECs consider the last mile to be exchange line facilities and to encompass everything from the customer premises to the central office, also known as the serving wire center (SWC). The concept of using a remote terminal or fiber splitter as the first point of concentration to differentiate between last mile and second mile is at odds with normal ILEC operations. The SWC is the logical demarcation between last mile and second mile. Using this classification all loop plant is last mile and all transport among central offices in a study area to aggregate all Internet traffic is second mile. For ILECs, last mile and second mile facilities are usually self-provisioned. On the other hand, the middle mile begins at the Internet aggregation point and ends at the Internet gateway. The middle mile facility is usually secured from a third party.

The National Exchange Carrier Association, in their comments on NBP Notice #11, note that "[s]mall rural telephone companies often use concentrator equipment in the last mile…to aggregate traffic and reduce costs. To avoid confusion between 'last mile' and 'second mile' facilities and conform with current rural rate-of-return cost classification rules, NECA…considers second mile facilities as 'transport from the serving wire center end office to the ISP premises.'"[4] NTCA agrees with NECA.

NTCA agrees with the last mile, second mile, middle mile dichotomy in the *Notice* for mobile wireless. The last mile is the wireless leg from a cellphone to the cell tower. The second mile, which is commonly called backhaul, extends from the cell site to the mobile switching

[4] Comments of NECA, p. 2.

center. For the wireless provider, backhaul is commonly procured via a local exchange carrier and backhaul facilities are used to aggregate traffic at the mobile switching center which is usually located in a point outside the service area of a rural ILEC. This is significantly different from an ILEC which typically self-provisions the second mile. Another major difference is the geographic scope of the LEC service area versus the mobile wireless provider's serving area. In general, wireless licenses encompass a much larger serving area than an ILEC and wireless second mile networks will be extensive.

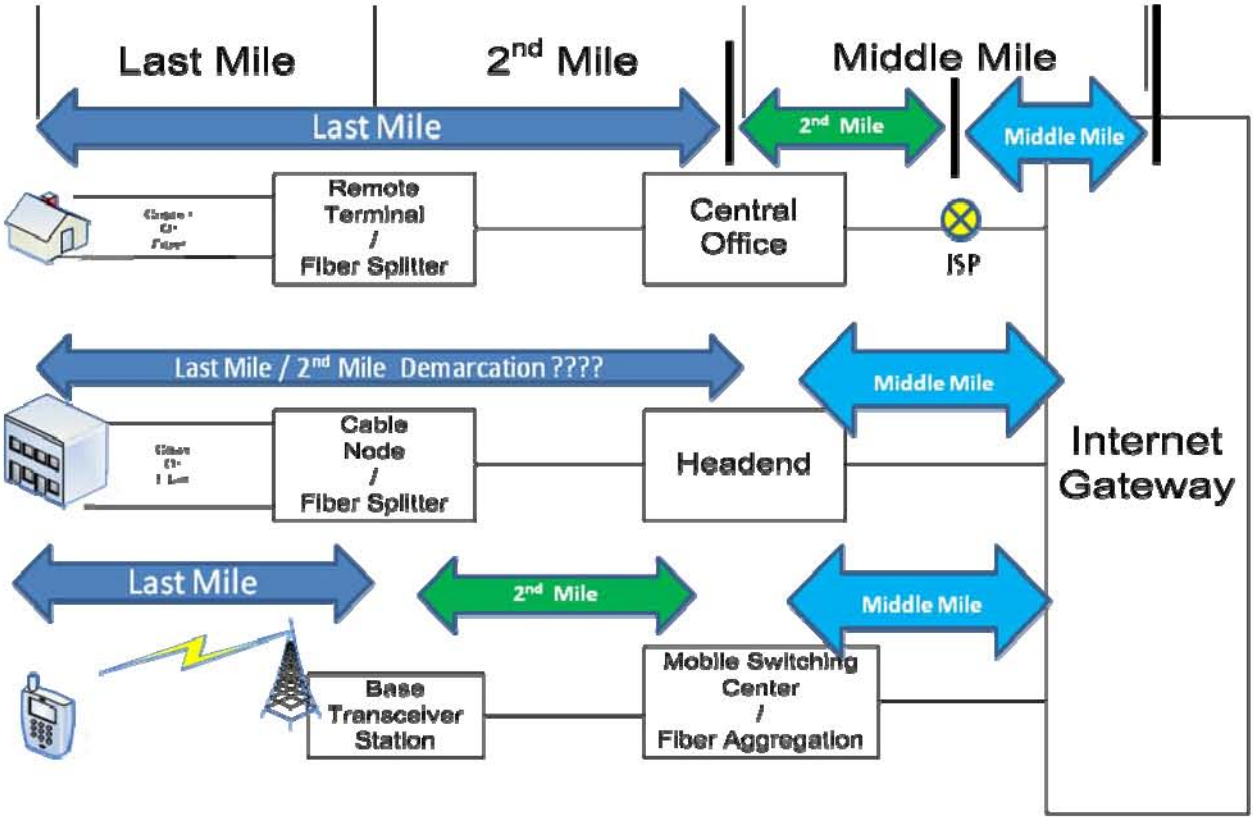

Figure on page 2, FCC: DA 09-2186, GN Docket Nos. 09-47, 09-51, 09-137, COMMENT SOUGHT ON IMPACT OF MIDDLE AND SECOND MILE ACCESS ON BROADBAND AVAILABILITY AND DEPLOYMENT, NBP Public Notice # 11

In these comments NTCA provides data for rural ILEC middle mile costs from the ILEC Internet aggregation point to the Internet gateway. We do not include any second mile information.

III. IF THE COMMISSION TRULY WISHES TO MEET ITS STATED GOAL OF UBIQUITOUS BROADBAND DEPLOYMENT, SOME FORM OF MIDDLE MILE COST RECOVERY FOR RURAL PROVIDERS WILL BE ESSENTIAL.

If the Commission truly wishes to achieve its stated goal of universal affordable broadband service for all Americans, it will be necessary to ensure that rural providers are able to recover the costs associated with access to middle mile transport services. Many of the respondents to the NTCA Middle Mile Data Request indicated just how important the issue of competitively-priced middle mile access was to them. For example:

> "The cost for backbone connectivity is a real problem for the rural companies."
>
> "With the demand for bandwidth increasing as such an amazing rate there must be some mechanism put into place to help with the rising cost."
>
> "Once over-the-top video becomes well established, Internet backbone connectivity cost will break the backs of rural providers and will have a major negative impact on all providers."
>
> "Cost of middle mile connectivity forces rural ILECs to provide needed customer broadband at a loss to the provider."

As illustrated in the following section, the quantitative responses to NTCA's data request indicate that the problems noted here by NTCA member companies will grow dramatically worse as consumer demand for broadband continues to grow.

IV. NTCA'S DATA REQUEST INDICATES THAT MIDDLE MILE COSTS WILL RISE DRAMATICALLY AS BANDWIDTH DEMAND INCREASES.

The one truly outstanding conclusion from the data request is that total middle mile cost will rise as Internet demand increases. A scatter diagram plotted on a logarithmic scale reveals a clear relationship between the size of a middle mile connection and the cost per Mbps.

An initial plot of data points (Figure 1) indicates that bigger connections are less expensive in cost per Mbps terms, but the relationship between cost and size of connection was

not readily apparent.

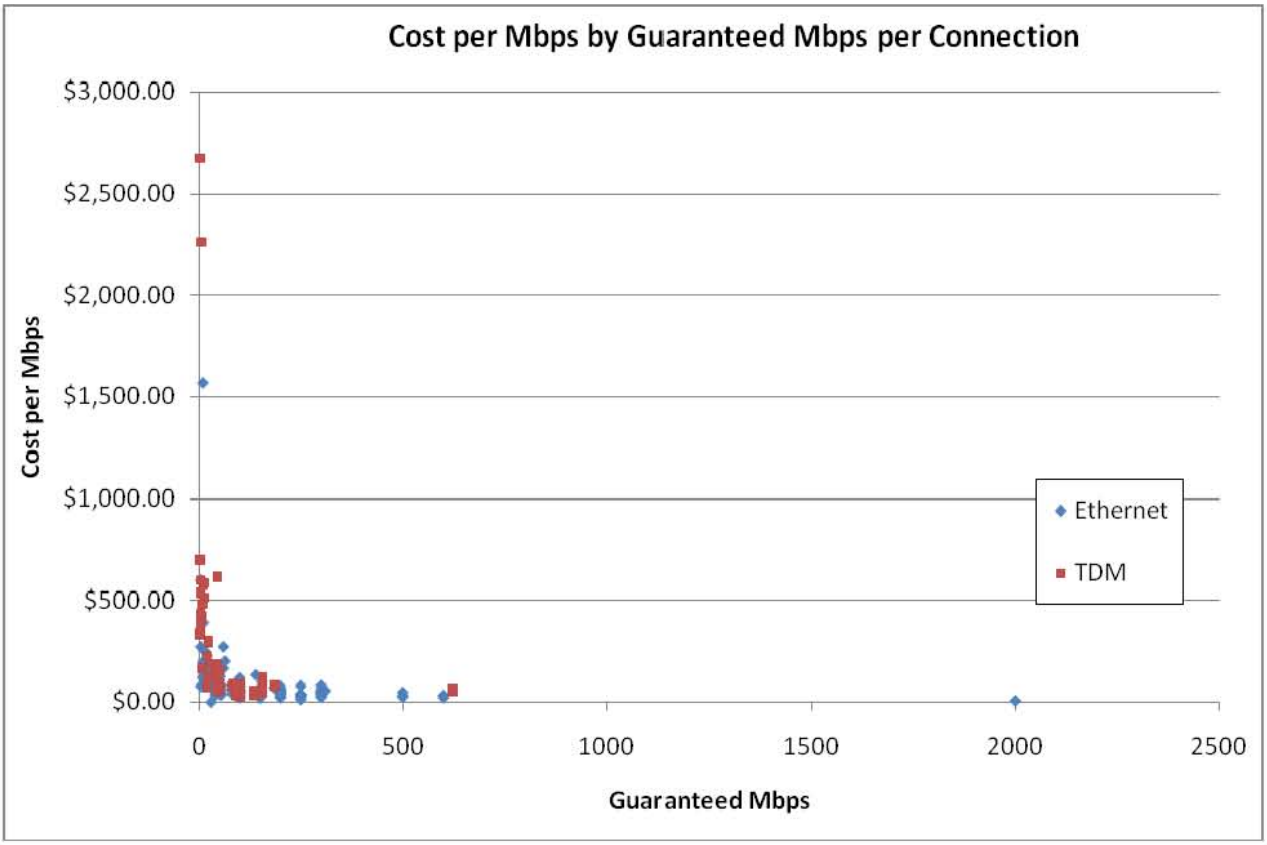

Figure 1

Figure 2, which is a chart of the same data with the vertical and horizontal scales reduced to focus on the bulk of the data points, is equally unrevealing. However, when the data is graphed on a logarithmic scale (Figure 3), the relationship between cost and size of connection is readily apparent.[5]

[5] Plotting data points on a logarithmic scale is a particularly useful tool for identifying relationships when there is a relatively large range in data points—such as in this case, where the data extends across several orders of magnitude.

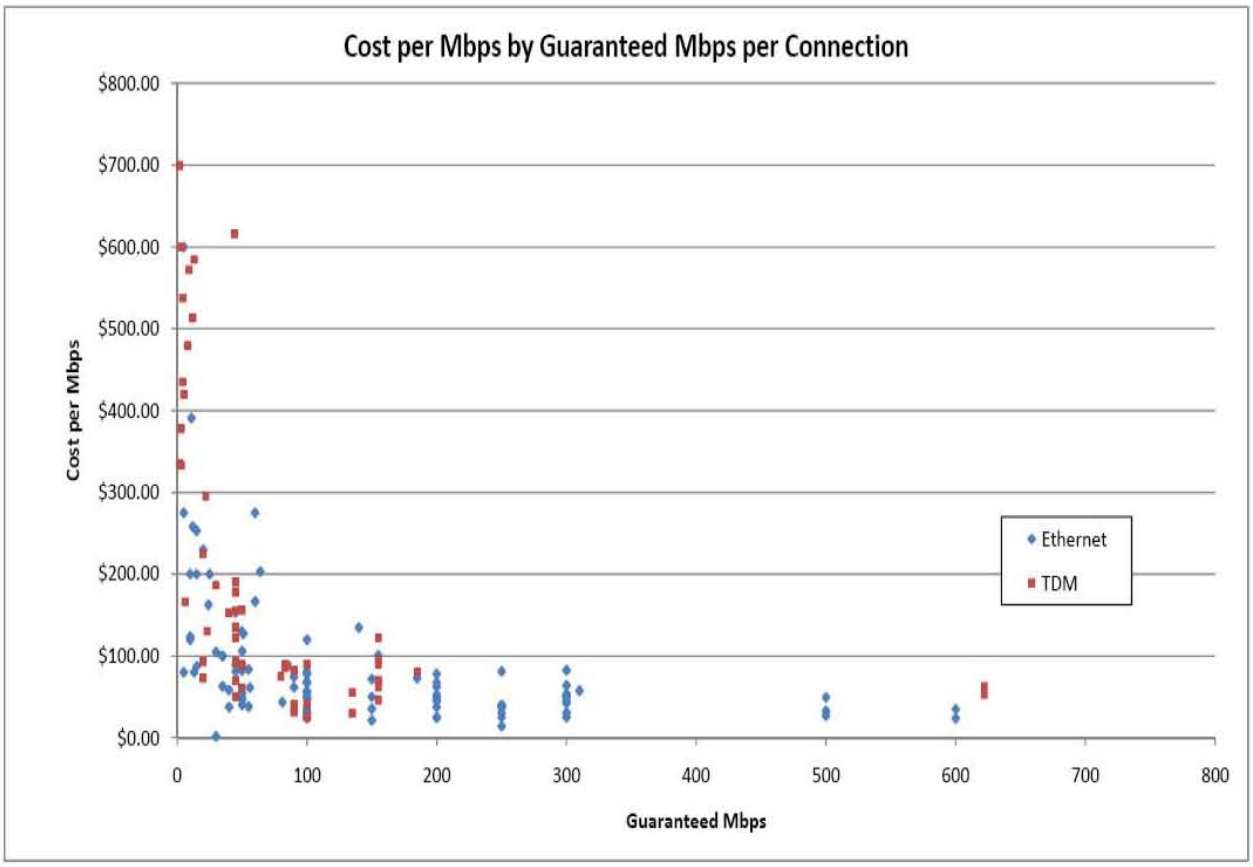

Figure 2

Figure 3 reveals that cost per Mbps is significantly lower when the size of the connection is significantly larger. The data shows that if size increases by orders of magnitude, then cost per Mbps drop by a predictable amount. For instance, for 10 Mbps connection the cost per Mbps varied from $120 to $1,570 while at 100 Mbps the low was $25 and the high was $120. The trend is clear at a macro level, while at the micro level there is a wide amount of variability in the cost of a specific connection of a given size. NTCA notes that the variability in cost for a given size is a common characteristic of telecommunications costs. This variability is the norm for rural ILECs. There are many reasons for such variability and attempts to model rural costs with specific algorithmns has been unsuccessful. At a macro level there is a clear relationship, but for predicting the cost of a specific operation we find a high degree of variablity. Thus, we can

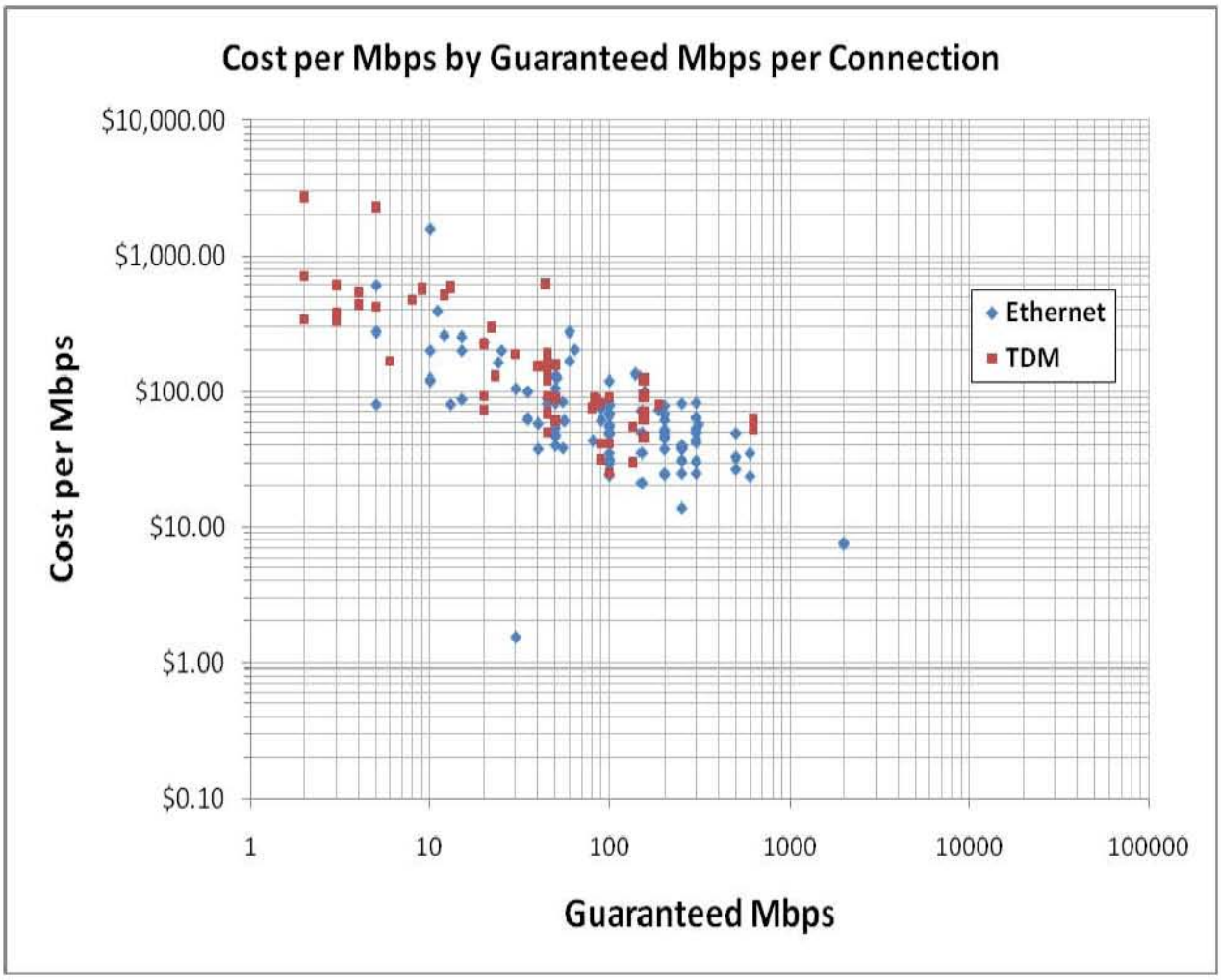

Figure 3

safely say that companies with connections of 1,000 Mbps pay much less per Mbps than companies with 10 Mbps connections. Yet it is possible that the lowest cost 10 Mbps connection will not be much greater than the highest cost 1,000 Mbps connection. One takeaway from this is that large providers operate at much lower cost per Mbps than small companies.

The average provider responding to NTCA's survey has 3,986 high speed subscribers and has a 132 Mbps middle mile connection and pays $57.97 per Mbps with a total cost of $7,652. The average cost per subscriber per month is $1.88 or in round numbers approximately $2.00. This includes both TDM and Ethernet connections. Data compiled from the request shows that

TDM is more expensive per Mbps than Ethernet. Average cost per Mbps for TDM was $90.80 and for Ethernet was $48.55. The charts in Figures 1, 2 and 3, shown above, show that as higher capacity connections are required, Ethernet becomes the preferred type of transport. Unfortunately, Ethernet connections are not always available. Undoubtedly, the demands of the market will move all transmission toward Ethernet. The Commission should encourage middle mile providers to make cost effective Ethernet facilities available for all middle mile connections.

The National Exchange Carrier Association (NECA) filed comments in this proceeding on November 4, 2009. Table 1 of NECA's filing contains data collected by NECA pursuant to NECA's 2009 Company Service Questionaire and NECA settlement data. As a check against the data, NTCA collected data points were plotted for Ethernet connections for each band on the table: under 10 Mbps, 10 to 50 Mbps, 50 to 100 Mbps, 100 to 1000 Mbps and over 1000 Mbps. Figure 4, below, captures these data points. They all fall well within the range of data collected separately by NTCA.

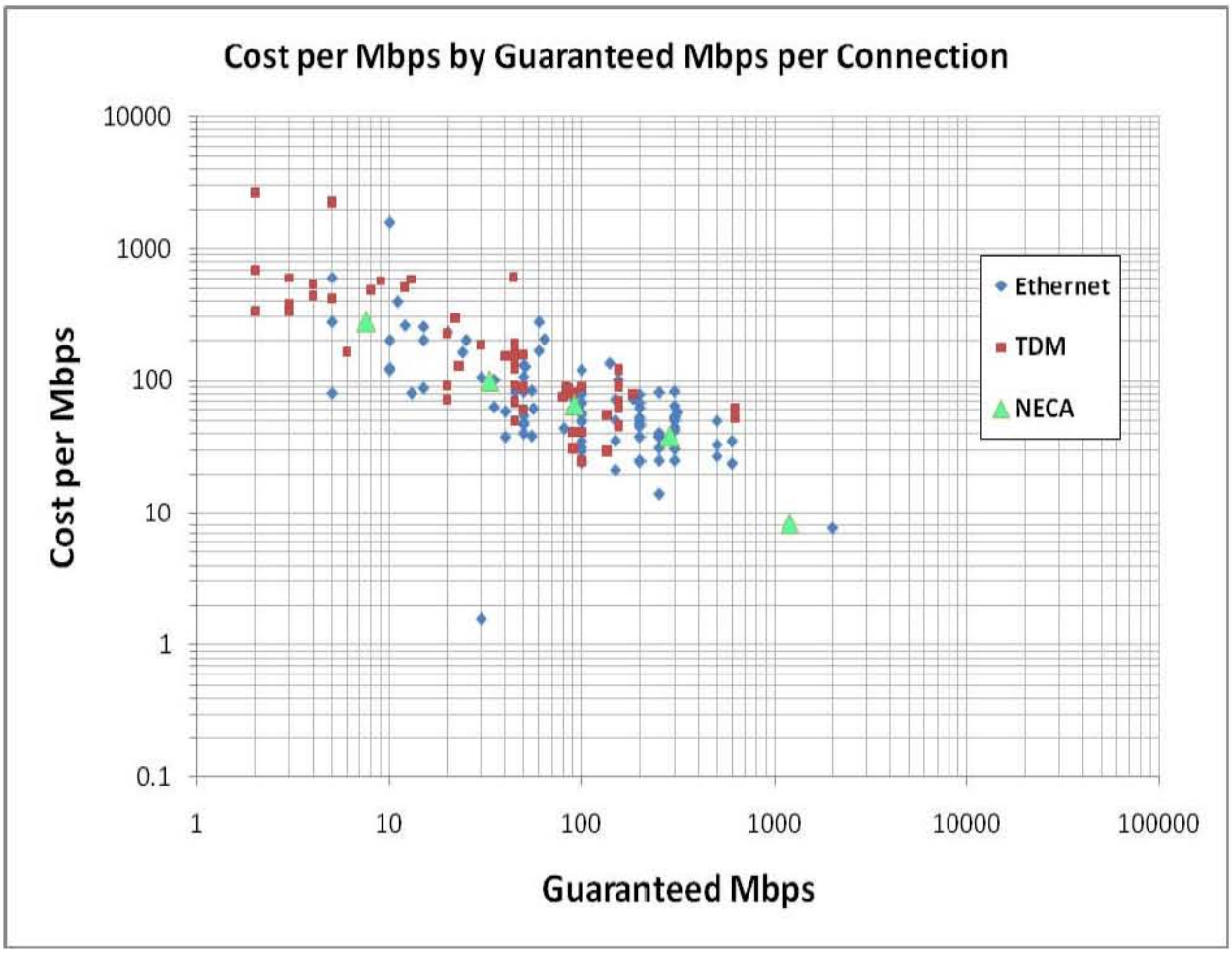

Figure 4

For purposes of considering the implications of this data, a line was drawn through the first and last data points from the NECA data are shown below in Figure 5. While this line is not necessarily a good predictor of cost per Mbps for any specific connection, it is a fair representation of the underlying cost/volume relationship over very large range in size.

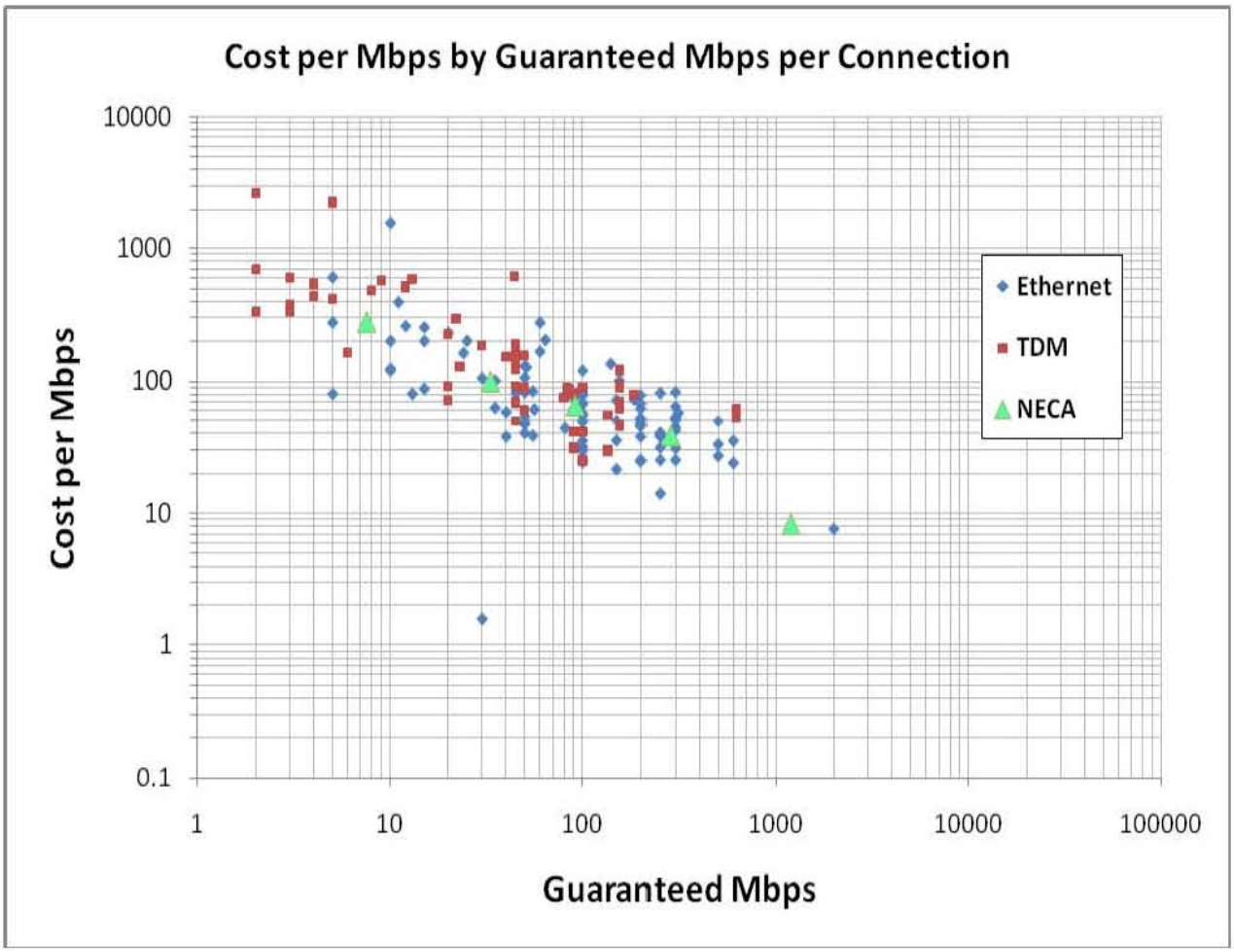

Figure 5

The dotted line strongly implies that large carriers, such as RBOCs, operating in major population centers enjoy vast economies of scale that cannot be matched by rural carriers serving small populations covering large land areas. In total, NTCA members, nearly 585 companies, average about 6500 lines versus Verizon and AT&T with 45,000,000 and 65,000,000 lines, respectively. Thus AT&T is 10,000 times bigger than the average NTCA member, that 10^4 or four orders of magnitude or the difference between operating at 10 Mbps or 100,000 Mbps. Middle mile prices at 10 Mbps are about $200 per Mbps and are approximately $0.40 at 100,000 Mbps. These numbers are illustrative of the type of cost differences that are real given vast

differences in scale. The implications are enormous, and the Commission needs to carefully consider what this means.

For instance, if one uses the underlying relationship between cost per Mbps and size of middle mile connection, middle mile cost will rise dramatically as consumers are offered much faster last mile connections. If usage per subscriber goes from 1Mbps to 100 Mbps with all else held constant (no new subscribers and no additional revenue) middle mile costs will rise. If we assume that a 2 order of magnitude increase in consumer capacity translates into a 2 order of magnitude increase in the amount of middle mile capacity, we can estimate the impact of this increase on total middle mile cost.

Using the NECA data points we estimate that the average cost per Mbps decreases approximate 78.34 % for each order of magnitude increase in size. The following table captures the effect:

Size of Middle Mile Connection Mbps	Cost per Mbps	Total Middle Mile Cost
1	$1,050.00	$1,050.00
10	$227.46	$2,274.60
100	$49.27	$4,927.43
1,000	$10.67	$10,674.21
10,000	$2.31	$23,123.38
100,000	$0.50	$50,091.82

For simplicity and illustrative purposes let's say capacity increases from 100 Mbps to 10,000 Mbps (2 orders of magnitude). The cost per Mbps then drops from $49.27 to $2.31, yet the total cost will increase from $4927.43 to $23,123.38--an increase of 369%. This means that the cost of just the middle mile would go from approximately $2.00 per subscriber to $9.38. Data from respondents indicates that cost variance around a specific connection size are large,

perhaps as much as an order of magnitude, which suggests that at 100 Mbps a per subscriber cost ranging from $5.00 to $50.00 may be anticipated. It is logical to assume that similar cost increases will be experienced in the Second Mile to aggregate the Internet traffic from SWC to the Internet access provider's aggregation server.

Based on the above analysis, NTCA asserts the following:

1. As Internet speeds increase, middle mile costs will become an increasing proportion of the cost of providing Internet Access service.

2. Rural providers experience costs that are much higher than the large providers. In other words, the economies of scale realized by the largest providers are real and permit large carriers to have middle mile costs that are probably 2 or more orders of magnitude below rural those of providers.[6]

The results of the data request make it readily apparent that small carriers will require some form of high cost universal service support for middle mile and second mile costs in response to increased consumer demand. Absent such support, it will be virtually impossible for small carriers to provide broadband at rates comparable to those offered by the large providers in non-rural areas. In determining future broadband USF requirements, it will be critical that the Commission take rural carriers' growing middle mile and second mile access costs into consideration and allow these providers a means of recovering their costs.

V. CONCLUSIONS

Based on the preceding, NTCA requests that the Commission recognize that ubiquitous broadband deployment will require some form of middle mile cost recovery for rural providers. As the results of NTCA's data request indicate, middle mile costs will rise dramatically as future

[6] It is interesting to note that this is not inconsistent with the Intercarrier Compensation proceeding with NECA access rates of approximately $0.02 versus unified access rates of $0.0007.

bandwidth demand increases. In achieving the goal of ubiquitous broadband deployment and rate comparability, it will therefore be critically important that the Commission take the necessary steps to ensure that rural broadband providers are able to recover the costs associated with access to middle mile and second mile transport services.

Respectfully submitted,

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