



**PHOENIX CENTER FOR ADVANCED LEGAL
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Dr. George S. Ford, Chief Economist

10 September 2024

Hon. Alan Davidson
Assistant Secretary of Commerce for Communications and Information
National Telecommunications and Information Administration
1401 Constitution Avenue, NW
Washington, DC 20230

RE: Comments on Proposed BEAD Alternative Technology Guidance

Dear Director Davidson:

On August 26, 2024, NTIA released a notice seeking comment on its Proposed BEAD Alternative Broadband Technology Guidance.¹ In response, I offer the following thoughts:

My comments mainly focus on Appendix A of the *Draft Guidance* where NTIA is seeking input regarding Low Earth Orbit (“LEO”) Capacity Subgrants as part of the Broadband Equity, Access, and Deployment (“BEAD”) program. LEOs fall into the class of “Alternative Technologies,” which must meet the BEAD Program’s minimum technical requirements of speeds of not less than 100 Mbps for downloads and 20 Mbps for uploads and latency less than or equal to 100 milliseconds. In particular, NTIA is looking for suggestions on how to ensure adequate capacity on a LEO network to serve subsidized areas. My comments are a bit technical, but I think the analysis brings some clarity to the issues.

Let’s say there are N locations in a LEO’s service area. For LEO networks, a “service area” is larger than most (if not all) “local areas” that qualify for BEAD funding; a qualified BEAD area is a subset of a LEO “service area.” Let $N = Z + L$, where Z is the portion of N

¹ *Proposed BEAD Alternative Broadband Technology Guidance*, NTIA (August 26, 2024) (available at: <https://www.ntia.gov/other-publication/2024/proposed-bead-alternative-broadband-technology-guidance>).

that is in a non-BEAD area and L the portion of N within the BEAD local area. The total capacity of the LEO network in any service area is K . The adoption rate is λ in the service area so that total subscribers in the area is λN . To qualify for BEAD funding, the service must satisfy a minimum service requirement M (100/20 Mbps, 100ms Latency).²

The average capacity available to each location with LEO service in the service area is,

$$\bar{k} = K/\lambda N . \quad (1)$$

Meeting the minimum service constraint M requires k' capacity for each serviced location. Thus, to qualify for BEAD funding, it must be the case that $\bar{k} \geq k'$, indicating the available capacity is sufficient to satisfy M . A concern in the *Draft Guidance* is that the mean capacity might be at the boundary, $\bar{k} = k'$, which leaves no room for additional subscribers whilst still satisfying the constraint M .³ The NTIA suggests something along the lines of this,

$$\bar{k} = K/(\lambda + r)N \geq k' , \quad (2)$$

where r is some measure of reserve subscriber capacity that allows for additional subscribers while still meeting the constraint M . Two critical questions arise from this expression: (a) what should r be; and (b) what should k' should be? Appendix A outlines several proposals for r including setting r so it is sufficient to service all L customers ($r = L/N$), at least during the early years of deployment when λ is unknown, or imposing a tiered approach where capacity is reserved (and compensated) for some lumpy count of subscribers, n , where $r = n/N$ or $r = n/L$. As for k' , the *Draft Guidance* suggests a 5 Mbps reservation, but the recommendation has no apparent engineering support for LEO networks. LEO providers presumably know the proper level for k' to satisfy M . Also, over time, the LEO networks may increase their capacity, so capacity need not be fixed over time, and LEO networks may differ in capacity, both of which add further complexity.

The *Draft Guidance* recognizes the potential risks of choosing r and k' , observing,

Reserving LEO capacity is likely to result in substantial additional expenses for LEO providers. This problem is especially acute with LEO providers who could otherwise sell reserved capacity to other customers.⁴

Indeed, the choice of r and k' are consequential. If the values are too conservative, then the minimum service requirement M may not be satisfied. There are several dangers if the choice of r and k' are too aggressive, including, as NTIA recognizes, a disincentive to

² *Draft Guidance*, *supra* n. 1 at p. 5.

³ “The performance requirements of the BEAD program may necessitate that LEO providers reserve capacity for future customers in order to guarantee that those customers could be served within 10 business days if requested.” *Id.* at p. 18.

⁴ *Id.*

participate in the BEAD process, and, if the reserve is too large, then customers outside the BEAD-eligible area may be turned away and those revenues lost (which also may discourage participation) and households may go without broadband.

But there are other concerns. Consider the competitive bidding process for BEAD support. In this process, providers make offers to serve BEAD-eligible areas, and the lowest, quality-adjusted offer gets the subsidy. For LEO providers, the bid (the requested subsidy) of provider j for area k may be written as $S_{ik}(r, k', X)$, where r and k' are as before and X is a vector of other factors. It seems clear, as the *Draft Guidance* acknowledges, that $\partial S_{ik}/\partial r > 0$ and $\partial S_{ik}/\partial k' > 0$.⁵ That is, higher technical requirements will raise proposed subsidies in general. With a fixed subsidy budget B , an unnecessarily aggressive choice of r and k' will exhaust the fixed budget sooner and locations will remain “unserved,” at least through the subsidy mechanism. It is important not to lose sight of the supreme goal of the BEAD funding—broadband to all.

As the *Draft Guidance* recognizes, the central problem here is that NTIA lacks the information to properly set r and k' —it does not know λ ; it does not know the flow of new subscribers; and it does not know how much per-subscriber capacity is required, on average in a real-world setting, to satisfy M . In economics, this situation is one of asymmetric information. This is the common theme of incentive regulation and is of great interest to economists.

Fortunately, both circumstances and precedence provide a relatively straightforward solution to this problem which is feasible and has desirable efficiency properties. Competition among service providers for subsidies, combined with substantial private information on their costs of satisfying a given performance standard, suggests that rather than take the substantial risk of specifying r and k' ex ante, service quality testing can be applied ex post, as is routinely done in telecommunications today.⁶ Meaningful failure would result in some sort of enforcement action on the provider awarded the subsidy sufficient to induce truthful bidding.⁷ Realistically, one might expect the requested subsidies to be proportional to the provider’s internally estimated cost of providing service meeting the required benchmark. This would imply the lowest (“winning”) bid would be from the lowest cost provider, an efficient result. Second, areas receiving one or more bids would be those providers determined could be economically served to the given standard given the (minimum) subsidy proposed. Third, the limited budget to fund subsidized deployments would be used in its most efficient manner, a result not guaranteed by specifying technical constraints in an atmosphere of very poor information.

Successful implementation of a subsidy bidding process with later speed-testing requirements will require a regime of potential enforcement actions for non-compliance.

⁵ *Id.* at p. 18 (“Reserving LEO capacity is likely to result in substantial additional expenses for LEO providers.”).

⁶ See, e.g., <https://www.fcc.gov/general/measuring-broadband-america>.

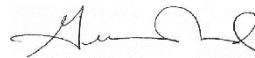
⁷ Enforcement actions are discussed in the *Notice of Funding Opportunity: Broadband Equity, Access, and Deployment Program*, NTIA (May 2022), at p. 95 (available at: <https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf>).

The magnitudes of these consequences need to be sufficient to dissuade providers from gaming the system by making low-ball bids, failing to deliver on service commitments, and benefitting from subsidies. Presumably, the consequences for non-performance should continue until the provider rectifies its shortcomings. The level of such enforcement actions should be linked to the size of the subsidy received, with larger subsidies entailing higher liability for violations.

I would also like to provide a brief comment on Section 3 of the *Draft Guidance*. BEAD funding by design is not available to areas that already have service meeting the minimum services requirement, an economically sensible constraint. What areas are “served” is addressed in the *Draft Guidance*. First, in Case 1, the Eligible Entities must ensure that no other subsidy programs have targeted the area, so that subsidies are not duplicated. This is certainly reasonable. Second, for Case 2, entities that were not included in the broadband map can demonstrate that they provide service in an area the map indicates is unserved or underserved. In effect, Case 2 creates yet one more challenge process, and these challenges can take months to complete. Today, we are two months away from the third anniversary of the IIJA’s passing. For each month the 6 million unserved locations do not have service, there is a loss of perhaps \$500 million in total surplus, in addition to surplus losses from underserved areas.⁸ Adding an additional challenge process only postpones the expansion of broadband availability and does so at great cost. I recommend that Case 2 be eliminated from the *Draft Guidance* and the broadband maps be used to determine eligible areas, once checked to ensure these areas are not already subsidized.

Thank you for your consideration.

Sincerely,



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⁸ See, e.g., G.S. Ford, *Assessing Broadband Policy Options: Empirical Evidence on Two Relationships of Primary Interest*, PHOENIX CENTER POLICY PERSPECTIVE 21-04 (2021) (available at: <https://www.phoenix-center.org/perspectives/Perspective21-04Final.pdf>); M. Conlow, *New National Broadband Map Update v4, Data as of December 2023*, mikeconlow.substack.com (May 29, 2024) (available at: <https://mikeconlow.substack.com/p/new-national-broadband-map-update>). The reservation price is determined using a linear demand curve with an own-price demand elasticity of -0.50, an adoption rate of 85%, and mean price of \$50.