

**BEAD and Beyond: An Assessment of the Restructured Program, its Early
Implementation, and Metrics to Guide States Forward**

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Abstract

As of August 25, 2026, the National Telecommunication and Information Administration (NTIA) has approved the final plans for all states and territories except Illinois for closing the broadband Internet access gaps. After the program changes in June 2025, the BEAD program is more narrowly focused on network deployment. The modifications have created some benefits but also new challenges for states. In this paper, we critically examine the current state of BEAD and paths forward. The work is organized around two main research questions. First, the paper analyzes how the long planning process has affected the baselines from which states are now starting to close the remaining access gaps. Second, it explores the requirements of a system of empirical metrics that can assist researchers and State Broadband Offices (SBOs) in reliably assessing progress toward BEAD goals and sustainable broadband universal service. Our findings show that the number of locations eligible for BEAD funding has declined by more than 60% since the program was created. Some of this decline is due to revised BEAD rules, but the majority reflects other broadband programs and private sector investment. Findings also show the tremendous heterogeneity of conditions and solutions across states. Given concerns about the scalability of some of the deployed access technologies, the wide range of technology mixes may cause subsequent universal access challenges. A high-level analysis of BEAD restructuring suggests that its incremental welfare effects are likely modest and negative under some assumptions.

Keywords

Broadband, BEAD, Assessment, Indicators, Benchmarking, Learning System

JEL Codes

L86, L88, L96, L98

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1. Introduction

When the U.S. Congress passed the massive \$42.45 billion Broadband Equity, Access, and Deployment (BEAD) Program as part of the Infrastructure, Investment, and Jobs Act (IIJA) 2021, it sought to avoid shortcomings that had plagued three earlier large-scale broadband initiatives. The 2009 Broadband Telecommunications Opportunities Program (BTOP) had to be designed with a coarse broadband map and under enormous time pressure. The Connect America Fund II, initiated in 2011, faced criticism because by the time the program took effect, the required capacity of 10/1 Mbps was already below the then active federal standard of 25/3 Mbps. In case of the Rural Digital Opportunities Fund (RDOF), created in 2020, the reverse auction design provided insufficient safeguards against subsequent defaults and left many unserved locations stranded.

Provisions in IIJA to avoid these failure modes included authorizing the FCC to create a more accurate broadband map, a stretch goal for broadband download and upload capacity of 100/20 Mbps¹, and extensive provider vetting early in the process. However, the political dynamics surrounding BEAD introduced new shortcomings. The decision to delegate program implementation to states and territories was a reasonable response to the heterogeneity of conditions for connecting the remaining locations. However, the benefits of applying local knowledge were offset by tight federal controls and approvals that created numerous tensions and delays. The fixation of the allocation formula by Congress in 2021 and the locking-in of funding based on preliminary FCC broadband map data contributed to significant deviations between state needs and available resources.

Moreover, the need to serve highly dispersed locations and avoid overlaps with a plethora of other subsidy programs further complicated the planning process. The original goals of BEAD were multifaceted and reflected a holistic understanding of the complementarity of network deployment and measures that support adoption and use by improving digital skills. They were further broadened by the pursuit of equity and environmental goals that were important for the Biden Administration. Although this ambitious vision focused states on the development of a clear understanding of the magnitude of the problem and longer-term horizons for advancing digital connectivity and equity, it required considerable upfront planning. By the end of 2024, only three states (Delaware, Louisiana, and Nevada) had developed final plans for closing the remaining broadband connectivity gap.

The change in government and the new political priorities of the Trump Administration resulted in major changes to BEAD. Digital equity funding was cancelled² and the network deployment components restructured (NTIA, 2025). The changes focused the BEAD program more narrowly on network deployment, sought to increase competition in broadband deployment, and stripped away complementary policy goals. For example, restructuring broadened the technologies eligible for program subsidies to include unlicensed fixed wireless (ULFW) and satellite broadband. A second

¹ When IIJA was passed in 2021, the FCC threshold for broadband was 25/3 Mbps. The FCC increased the threshold to 100/20 Mbps in 2024, see FCC (2024).

² The National Digital Inclusion Alliance challenged the cancellation of the program in court. On July 15, 2026, in *National Digital Inclusion Alliance (NDIA) v. Trump* (Civil Action No. 25-3606) the U.S. District Court for the District of Columbia ruled against a motion to dismiss the case that the administration had filed, and further legal action is pending. See Court Rules the Digital Equity Act's Race Provision Is Unconstitutional—But Severable. Benton Institute for Broadband & Society, July 16, 2026, <https://www.benton.org/blog/court-rules-digital-equity-acts-race-provision-unconstitutional-severable>.

notable change is the elimination of socio-economic provisions (e.g. workforce development, climate change provisions). Moreover, as of August 1, 2026, NTIA has not provided guidance on how non-deployment funds, the portion of the original BEAD allocation that is not needed to support network rollout due to the decreased number of eligible locations, can be used by the states and territories. These changes of direction have created some benefits but also increased uncertainty and created new challenges for states.

In this paper, we critically examine the current state of BEAD and paths forward. Given the implications of program changes, the overarching goal of this paper is threefold. One, the paper discusses the changes to BEAD and assesses the effects of the differences between the original and the restructured program. Two, to discuss what these changes mean for program implementation and long-term success. In doing so, the paper discusses the problems and prospects of the former and current program design and their implications for long-term success. Third, the paper outlines considerations for monitoring and evaluation of the restructured program, which is critical to determining program success and to inform forward-looking policy development. This section of the piece describes the types of data that are critical to collect, as well as the entities responsible for collecting and making the data available to the public.

Lastly, the paper reflects on how innovations in telecommunications (e.g., 6G, artificial intelligence (AI), quantum computing) could impact the prospects of success for BEAD, particularly if speed needs are greater in the future, new and old locations may require initiatives to improve the level and quality of connectivity. AI-enabled services may require further adjustments in the data center infrastructure and in the associated middle mile and end-user network infrastructures. The speed with which AI-related innovations underscores the need to finish BEAD-related network updates lest the program become obsolete before it is completed.

2. An evolving policy model

2.1 The original BEAD approach

The \$42.45 billion Broadband Equity and Deployment (BEAD) program is by far the largest initiative created in the aftermath of the COVID pandemic, and it is also the largest one-time federal investment in the history of broadband. Administered by the National Telecommunications and Information Administration (NTIA). BEAD seeks to extend high-speed Internet access, defined as at least 100 Mbps download and 20 Mbps upload speeds (100/20 Mbps), to all previously unserved and underserved locations.

The initial state broadband goals and plans for allocating program funds were structured in line with statutory requirements in the Infrastructure Act (Public Law 117-58, §60102) and the additional guidance provided by NTIA for Volumes I and II of BEAD planning and for the state Digital Equity Plans (NTIA, 2022a). In the original program guidelines, NTIA established twenty requirements that add specificity to the general statutory goals, covering a wide range of project dimensions, from a reiteration of the overall program goals to procedural aspects such as environmental assessment and guidelines for certain affordability goals. For example, the requirements of BEAD asked states to develop both low-cost and middle-class affordability plans. States were also required to

formulate goals for infrastructure deployment, digital equity, and a vision for broader community outcomes. Within that framework, states were given some degree of freedom to develop state-specific key performance indicators (KPIs), metrics, and implementation plans. Statutory and state-selected goals then became yardsticks for implementation and assessment of progress.

NTIA developed a multi-phase planning timeline in its initial Notice of Funding Opportunity (NOFO), released in May 2022 (NTIA, 2022b). Each eligible entities' funding allocation was determined using the multi-part formula that was established by U.S. Congress in the Infrastructure Act. Each state received a \$100 million baseline allocation and each U.S. territory a \$25 million baseline allocation. Ten percent of the funding was awarded based on the estimated share of a state in the total number of high-cost locations in the country. The remainder of funding was calculated based on the number of unserved locations in each state divided by the nationwide total of unserved locations.³

The allocation of funds was fixed in June 2023, using broadband map data for December 2022. This data did not yet reflect the revisions from the multi-stage challenge process that had to be conducted by each eligible entity (states, territories, and D.C.). Only units of local government, Tribal governments, nonprofit organizations, and broadband service providers were deemed "eligible challengers" for purposes of this BEAD-specific challenge process (NTIA, 2023, pp. 13-21).⁴ The Infrastructure Act did not give NTIA the authority to adjust the allocation after map data were revised or in response to market developments. Given the Form 477 experience relying on broadband data submitted by providers and the known flaws of this process, a more cautious approach would have been preferable to match allocations with state needs. As a result of this process and dynamic developments in broadband access markets, the BEAD allocations and state funding needs were less well aligned in 2024 than in 2023.

After the conclusion of the challenge process, states were entrusted with conducting a fair and rigorous assessment of potential sub-grantees before making awards to secure that every underserved and unserved location would be serviced at the BEAD threshold. States needed to outline their plans to conduct a fair and competitive grant process, including collecting information on subgrantees' and their capacity to effectively manage, monitor, and assess progress. States had to describe their plans on documentation and subgrantee guidance before any awards would be made, on recordkeeping and evaluation during the award selection, and on post-award terms, including conditions to revise or reclaim awards. As part of this process, states had to implement important requirements and recommendations established by the NTIA BEAD NOFO. Important program features included the requirement that providers offer low-income and middle-class

³ See National Telecommunications and Information Administration, *BEAD Allocation Methodology*. BroadbandUSA, <https://broadbandusa.ntia.gov/bead-allocation-methodology> (last visited February 26, 2026).

⁴ Individuals and businesses could submit challenge evidence to these "eligible challengers" who then could submit them on their behalf as bulk challenges. See Pew, *How to Challenge State Broadband Service Maps*, retrieved on April 29, 2026, from <https://www.pew.org/en/research-and-analysis/speeches-and-testimony/2023/12/14/how-to-challenge-state-broadband-service-maps>.

pricing plans that would secure affordable service, fair labor practices, speed to deployment, local coordination, workforce development efforts, and plans for open access.

Initially, BEAD aimed at bringing fiber to all unserved and underserved locations. During the planning process, it became clear that not all states had sufficient funding to achieve that goal. In response, NTIA modified the preference for fiber late in 2024, allowing alternative technologies, such as unlicensed fixed wireless services and broadband provided via low-earth orbiting satellites (LEOs) to be used in limited circumstances (NTIA, 2024). With the greater flexibility to rely on fixed wireless and possibly satellite broadband, states were now in a position to start the selection of sub-awardees. Given the different cost characteristics of access technologies, the guidance on alternative technologies assured that each state could find a technology mix that would allow serving all unserved and underserved locations within the BEAD funding constraint. By the end of 2024, three states (Louisiana, Nevada, Delaware) had completed the selection of sub-awardees, and many other states were in the process of selecting sub-awardees. As ISPs were gearing up to start investing, the change in government brought the process to a halt.

2.2 The restructured BEAD program

In January 2026, the new administration suspended the original BEAD program to revise the original program requirements. These were published in the BEAD Restructuring Policy Notice of June 6, 2025 (PN)(NTIA, 2025). The original approach recognized that digital equity and complementary policy measures, such as workforce development programs, boost the social and economic benefits of high-speed Internet access. In stark contrast, the revised PN focused narrowly on infrastructure deployment, aiming at minimizing BEAD program outlays needed to support access to broadband.

The BEAD Restructuring PN, congruent with the Infrastructure Act, keeps the definition of reliable broadband (“Priority Broadband Project”) as “a project that provides broadband service at speeds of no less than 100 megabits per second for downloads and 20 megabits per second for uploads, has a latency less than or equal to 100 milliseconds, and can easily scale speeds over time to meet the evolving connectivity needs of households and businesses and support the deployment of 5G, successor wireless technologies, and other advanced services” (PN, p. 9). However, it made considerable changes to the original approach to broadband policy. Important changes were (NTIA, 2025b):

Table 1: Summary features of the BEAD Restructuring Policy Notice of June 2025

Measure	Description	Page in PN
Technological Neutrality	Broadening the range of eligible technologies to include unlicensed fixed wireless (ULFW) and satellite broadband. This	p. 10

	requires reviewing BEAD eligible locations to eliminate those already served by ULFW.	
Final “Benefit-for-the-Bargain” Round	Implementation of at least one more bidding round open to new competitors. States must rescind existing final offers. Bidders are permitted to drop locations during this round.	pp. 10-11
New Two-Tier Scoring Rubric for Subgrantees	Primary: Lowest BEAD program outlays and costs per location. Secondary (for bids within 15% of the lowest): Time to deployment, network speed/technical capabilities, and preliminary selection status.	pp. 12-13
Elimination of Socio-Economic Provisions	The PN removes provisions related to labor, workforce development, climate change, net neutrality, and non-traditional providers (minority/municipal) to reduce costs and expedite deployment.	pp. 4-6
Minimization of Affordability Mandates	Prohibits the requirement of middle-class affordability plans and limits low-cost service options to voluntary offers from providers.	pp. 6-8
Non-Deployment Funding	Policies for non-deployment funding are not yet established, creating uncertainty for states and potential inefficiencies.	p. 14

Overall, whereas the restructured BEAD program has some desirable features, such as a stronger reliance on competition and the use of a stronger bidding process, it also created ambiguous incentives. For example, the rubric used for project scoring was not necessarily compatible with long-term scalability and could create renewed broadband access challenges in the future. Moreover, the lack of clarity regarding non-deployment funds may have made states more willing to accept riskier low-cost bids. Although states conducted due diligence on providers in advance, the incentive structure of the Benefit of the Bargain round could result in a higher default rate of subawards.

2.3 Ongoing adaptations

A few months into implementation, but before the first state annual reports (SARs) are publicly available, anecdotal evidence of adaptations to the NTIA-approved plans and their consequences is emerging from states. For example, Wisconsin reports that 31,000 locations remain unfunded by

BEAD, and that a \$60 million Broadband Expansion Grant program will be used to fill the gap.⁵ NTIA is reported to have reached out to states to remove satellite locations that received BEAD funding but are reported as served in the latest release of the FCC broadband map.⁶ South Carolina reduced reliance on BEAD by using resources saved by prudent use of American Rescue Plan Act funds to support eight of the planned 16 projects under BEAD. Consequently, only 19,022 Broadband Serviceable Locations (BSLs) remain in the BEAD program, reducing the total BEAD funding to \$35.8 million.⁷ Several states, including Nebraska and Oregon, had to reopen bidding after several providers backed out of their initial offers.⁸ All these are first indications that BEAD is evolving dynamically and that the decentralized implementation structure can find workable solutions as challenges arise.

3. Slow diligence, restructuring, and the transformation of BEAD⁹

3.1 Changes in the number of BEAD-eligible locations

The first version of the FCC broadband map in December 2022 showed that nearly 8.5 million locations were unserved (no broadband or access speed below 25/3 Mbps), and nearly 3.6 million were underserved (access speed between 25/3 Mbps and 100.20 Mbps). Whereas the initial allocation of BEAD funds was based on unserved locations only, the total number of locations approved by NTIA for support includes both unserved and underserved locations. Table 2 shows both the change from unserved (as this gives an indication of the changes from the number on which fund allocation was based) and from the total number of unserved and underserved lines in December 2022 (to show the change based on the approach used by NTIA in 2025). We use official NTIA data but notice that deviations exist for some eligible entities between the NTIA data, state data, and other data sources.

⁵ See Abby Larkin, Wisconsin Continues to Report \$60 Million Gap in BEAD Funding, Broadband Breakfast, July 16, 2026, <https://broadbandbreakfast.com/wisconsin-continues-to-report-60-million-gap-in-bead-funding/>.

⁶ See Jake Neenan, Satellite BEAD Awards to be Reduced, Broadband Breakfast, July 14, 2026, <https://broadbandbreakfast.com/satellite-bead-awards-to-be-reduced/>. It must be kept in mind that the FCC broadband map is based on provider-reported data that is subject to challenges.

⁷ See BEAD | Scope Reduced =, 50% Agreements Signed, <https://ors.sc.gov/news/bead-scope-reduced-50-agreements-signed>, South Carolina Office of Regulatory Staff, June 30, 2026.

⁸ See Nicole Ferraro, Nebraska to reopen BEAD bids after providers drop out, LightReading, May 26, 2026, <https://www.lightreading.com/broadband/nebraska-to-reopen-bead-bids-after-providers-drop-out>; Business Oregon, Oregon Broadband Office, Oregon Broadband Office Announces Preliminary Awardees for Reassigned BEAD Projects, Preserving Broadband Expansion Across the State, July 8, 2026, <https://biznews.oregon.gov/acton/rif/14786/s-09bc-2607/-/l-0007:5417/l-0007/showPreparedMessage?sid=TV2:gdVo0islm>.

⁹ The discussion in this section follows Bauer et al. (2026) closely.

Table 2: Unserved and underserved locations by state (2022-2025/26)

	Number of unserved and underserved locations (FCC 2022 Broadband Map data, base for BEAD allocation)			NTIA approved (2025-2026)	Change from 2022 FCC data			
State, Territory	Unserved locations	Under-served	Unserved and under-served	Total	Change from 2022 unserved	Change in %	Change from 2022 total	Change in %
AL	331,206	96,640	427,846	94,555	-236,651	-71.5	-333,291	-77.9
AK	88,182	17,381	105,563	46,508	-41,674	-47.3	-59,055	-55.9
AR	215,621	93,920	309,541	79,293	-136,328	-63.2	-230,248	-74.4
AZ	177,325	141,416	318,741	161,648	-15,677	-8.8	-157,093	-49.3
CA	306,910	154,689	461,599	270,571	-36,339	-11.8	-191,028	-41.4
CO	147,484	89,025	236,509	96,065	-51,419	-34.9	-140,444	-59.4
CT	11,693	4,065	15,758	1,782	-9,911	-84.8	-13,976	-88.7
DC	184	30	214	101	-83	-45.1	-113	-52.8
DE	2,052	12,904	14,956	4,739	2,687	130.9	-10,217	-68.3
FL	272,961	135,371	408,332	73,944	-199,017	-72.9	-334,388	-81.9
GA	315,780	95,845	411,625	119,814	-195,966	-62.1	-291,811	-70.9
HI	11,671	1,071	12,742	7,033	-4,638	-39.7	-5,709	-44.8
IA	83,509	70,506	154,015	37,634	-45,875	-54.9	-116,381	-75.6
ID	85,902	52,094	137,996	91,341	5,439	6.3	-46,655	-33.8
IL ¹	239,687	128,388	368,075	142,546	-97,141	-40.5	-225,529	-61.3
IN	202,020	106,583	308,603	122,847	-79,173	-39.2	-185,756	-60.2
KS	87,489	57,313	144,802	26,613	-60,876	-69.6	-118,189	-81.6
KY	259,258	60,955	320,213	87,160	-172,098	-66.4	-233,053	-72.8
LA	296,777	78,938	375,715	127,108	-169,669	-57.2	-248,607	-66.2
MA	12,522	7,602	20,124	3,808	-8,714	-69.6	-16,316	-81.1
MD	44,411	23,032	67,443	9,771	-34,640	-78.0	-57,672	-85.5
ME	42,264	50,289	92,553	22,513	-19,751	-46.7	-70,040	-75.7
MI	368,388	123,935	492,323	197,964	-170,424	-46.3	-294,359	-59.8
MN	135,984	76,778	212,762	74,739	-61,245	-45.0	-138,023	-64.9
MO	337,484	107,211	444,695	204,366	-133,118	-39.4	-240,329	-54.0
MS	268,365	39,397	307,762	93,283	-175,082	-65.2	-214,479	-69.7
MT	104,534	49,499	154,033	68,498	-36,036	-34.5	-85,535	-55.5
NC	376,037	127,391	503,428	93,437	-282,600	-75.2	-409,991	-81.4

ND	7,988	1,858	9,846	279	-7,709	-96.5	-9,567	-97.2
NE	70,478	38,123	108,601	14,064	-56,414	-80.0	-94,537	-87.0
NH	25,572	10,704	36,276	5,135	-20,437	-79.9	-31,141	-85.8
NJ	43,324	29,212	72,536	11,479	-31,845	-73.5	-61,057	-84.2
NM	114,997	76,705	191,702	42,651	-72,346	-62.9	-149,051	-77.8
NV	51,689	8,985	60,674	26,236	-25,453	-49.2	-34,438	-56.8
NY	149,368	36,659	186,027	52,982	-96,386	-64.5	-133,045	-71.5
OH	183,709	108,611	292,320	83,992	-99,717	-54.3	-208,328	-71.3
OK	150,718	147,042	297,760	40,509	-110,209	-73.1	-257,251	-86.4
OR	122,382	62,188	184,570	104,654	-17,728	-14.5	-79,916	-43.3
PA	278,535	51,154	329,689	129,356	-149,179	-53.6	-200,333	-60.8
RI	2,309	586	2,895	2,622	313	13.6	-273	-9.4
SC	119,580	78,733	198,313	20,480	-99,100	-82.9	-177,833	-89.7
SD	28,397	14,196	42,593	7,060	-21,337	-75.1	-35,533	-83.4
TN	186,394	57,323	243,717	43,871	-142,523	-76.5	-199,846	-82.0
TX	779,377	362,878	1,142,255	242,903	-536,474	-68.8	-899,352	-78.7
UT	41,535	28,107	69,642	30,215	-11,320	-27.3	-39,427	-56.6
VA	364,155	59,718	423,873	85,069	-279,086	-76.6	-338,804	-79.9
VT	33,646	27,953	61,599	15,299	-18,347	-54.5	-46,300	-75.2
WA	236,535	85,029	321,564	166,564	-69,971	-29.6	-155,000	-48.2
WI	253,097	210,952	464,049	175,464	-77,633	-30.7	-288,585	-62.2
WV	271,623	40,428	312,051	73,091	-198,532	-73.1	-238,960	-76.6
WY	39,215	20,403	59,618	38,558	-657	-1.7	-21,060	-35.3
AS	1,782	--	1,782	6,962	5,180	290.7	5,180	290.7
GU	34,251	--	34,251	1,542	-32,709	-95.5	-32,709	-95.5
NMI	10,088	--	10,088	9,568	-520	-5.2	-520	-5.2
PR	61,871	--	61,871	N/R	N/R	N/R	N/R	N/R
VI	557	--	557	N/R	N/R	N/R	N/R	N/R
US	8,488,872	3,559,815	12,048,687	3,790,286	-4,525,949	-53.7 ¹	-7,938,722	-66.2 ¹

Notes: ¹ The percentage is calculated without the numbers for PR and VI. N/R ... not reported at the time this report was revised even though NTIA approved the plan. -- ... data not available. Sources: NTIA, state final plans, own calculations.

The number of unserved and underserved locations that need to be connected or upgraded to at least 100/20 Mbps is an important initial baseline for BEAD. Table 2 depicts the number of unserved

and underserved locations in December 2022, and the NTIA approved final numbers, which includes unserved and underserved locations. The table also includes the difference between those two points in time. Because the final NTIA approved number includes unserved and underserved locations, we show the change from the number of unserved locations used for the allocation and from the total number of (unserved plus underserved) locations. Nationwide, the number of BEAD eligible locations at the time of final plan approvals was 53.7%¹⁰ lower than the number of unserved locations in 2022. Compared with the total of unserved and underserved locations in December 2022, the final NTIA approved number was 66.2% lower.

These numbers reflect that broadband is a dynamic market, even in difficult to serve locations. Several factors contributed to the decrease in locations without or with insufficient connectivity. Most importantly, they include network deployment supported by other federal and state programs, such as the \$10B Capital Projects Fund (CPF), various pandemic relief programs that facilitated network investment, continued private sector investment, changes in the BEAD program rules such as the inclusion of ULFW, and socio-economic changes.¹¹ Moreover, the December 2022 data were based on a preliminary broadband map developed by the FCC, which was expected to be corrected. The restructured BEAD program required states to consider locations where unlicensed wireless service at 100/20 threshold or better was available as served and excluded from BEAD eligibility. Finally, several of the NTIA-approved final plans may fall short of serving all BEAD-eligible locations.¹²

At the level of individual states, there is considerable variation, with both reductions in the number of eligible locations and increases in a few cases. Relative to the number of unserved locations in 2022, the number of BEAD eligible locations has declined in 49 of the 54 states and territories for which official numbers are available. The declines range from 1.7% in Wyoming to 96.5% in North Dakota. The number of BEAD eligible locations is higher in five eligible entities, with the increase ranging from 6.3% in Idaho to 290.7% in American Samoa (the latter from a small base). The change in BEAD-eligible locations due to the factors discussed above is higher in comparison with the total number of unserved and underserved locations in 2022. Relative to that starting point, BEAD-eligible locations were lower in 53 of the 54 eligible entities for which official data is available. The decline ranges from 5.2% in Northern Mariana Islands to 97.2% in North Dakota. The count has increased only in American Samoa. In some eligible entities, such as Delaware, Washington, D.C. or Rhode Island, the absolute number of eligible locations is low, so the changes should be interpreted jointly with the total number of locations that are affected.

Continued private sector investment in broadband contributed to the reduced number of unserved and underserved locations. Studies of the drivers of broadband investment show that it is influenced by economic and social factors, such as cost conditions and household income (e.g.,

¹⁰ See note 1 to Table 2 above.

¹¹ A detailed and rigorous analysis of these changes is in progress.

¹² Accurate data on the number of locations that may remain unserved are not available. Preliminary estimates have to be used with caution but suggest that up to 1 million locations might be affected (see <https://broadbandexpanded.com/posts/unservedafterbeadfeb2026>, retrieved on April 18, 2026).

(Prado & Bauer 2022). Because these factors differ across states, broadband connections were added at varying rates. Data from state planning efforts show that the cost of serving the remaining locations increases rapidly for the most difficult to reach locations. Empirical data is difficult to come by, but the economic logic of broadband investment suggests that the additional investment most likely went to locations that were relatively cheaper to serve. Consequently, the remaining locations will likely be increasingly costly to connect.

One consequence of this uneven pattern of investment across the country is that the initial BEAD allocations are increasingly misaligned with remaining state needs. Our statistical analysis of the BEAD funding revealed that the three-part formula adopted by Congress to determine state allocations resulted in an outcome that was not well aligned with the cost conditions in states (Mack et al., 2025). The differential investment pattern since the BEAD allocation was made has aggravated this misalignment in many cases. One mitigating factor is that the overall lower number of eligible locations helps states whose BEAD funding fell short of actual needs, such as Colorado.

3.2 BEAD subsidies, provider matches, and non-deployment funding

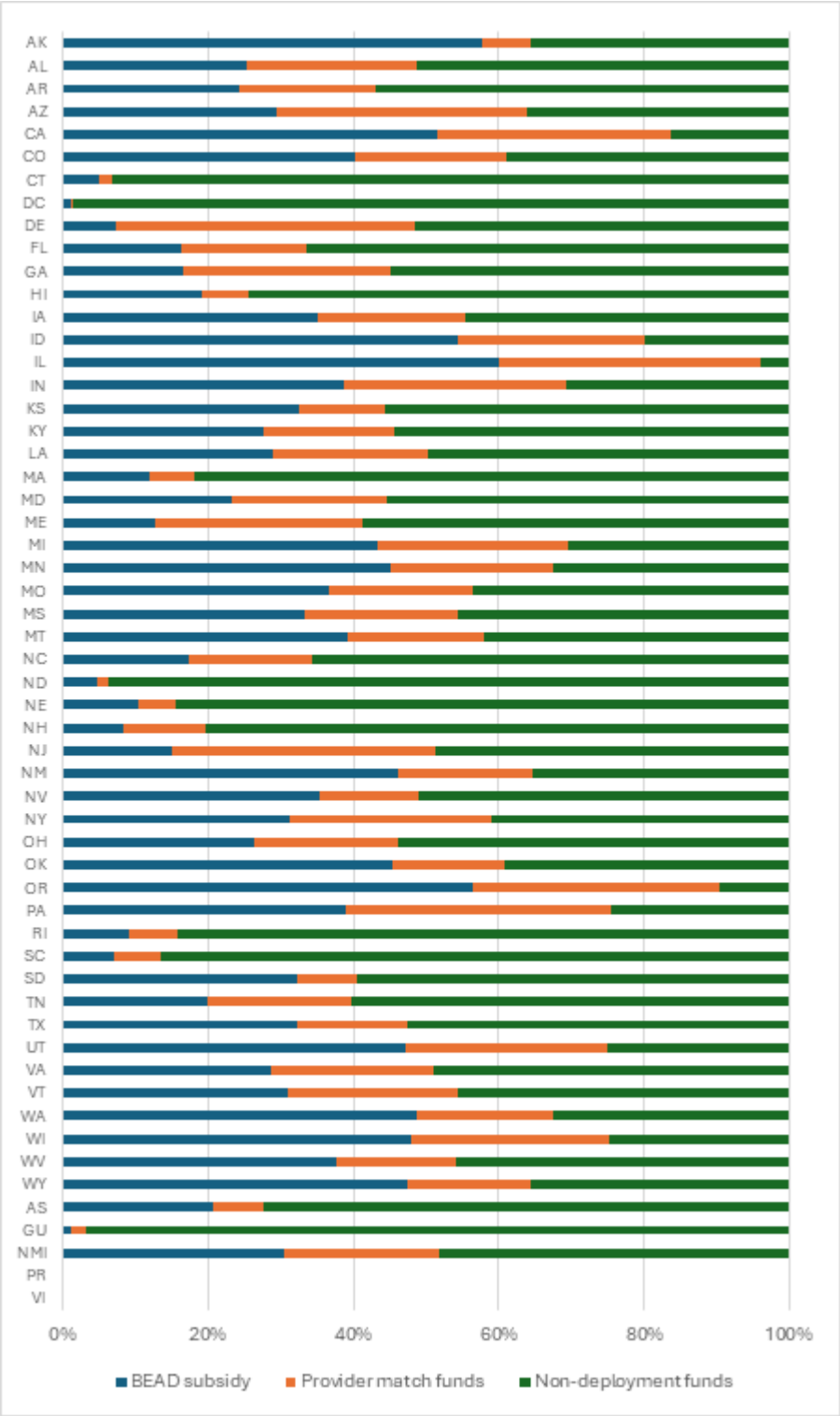
The restructured BEAD program required states to minimize subsidy costs when selecting subgrantees.¹³ The data depicted in Figure 1 reflects a higher share of wireless and satellite technologies than preliminary data available from the original BEAD program. However, the substitution of wireless and satellite unfolded unevenly across states. This contributed to widely varying shares of non-deployment funds (BEAD allocation from June 2023 minus required subsidies).¹⁴ How these funds may be used awaits clarification from the Department of Commerce. Several states would likely have realized significant non-deployment savings under the original BEAD rules because the number of BEAD eligible locations in most states and territories in 2025 was lower than the number upon which the 2023 BEAD allocation was based.¹⁵

¹³ Because the program left open whether or how funds that were not used could be used, it created ambiguous incentives for the states. Trying to minimize costs could result in less robust connectivity with uncertainty about non-deployment funds. Pushing fiber further out to more expensive locations, as was the original BEAD plan, could increase subsidy costs and result in top-down cuts imposed by NTIA.

¹⁴ The non-deployment funds presented here are NTIA-based numbers. The actual amounts received by the states may vary from this number and will be known once the Department of Commerce releases its guidance.

¹⁵ For example, Louisiana's original BEAD plan filed in 2024 (but never approved by NTIA) anticipated \$450M in non-deployment funds. The final, NTIA approved plan in 2025 shows anticipated non-deployment funds of \$856M,

Figure 1: BEAD subsidy, provider match, and non-deployment funds by state (% of initial BEAD allocation) (Source: NTIA, state final plans, own calculations, as of August 25, 2026)

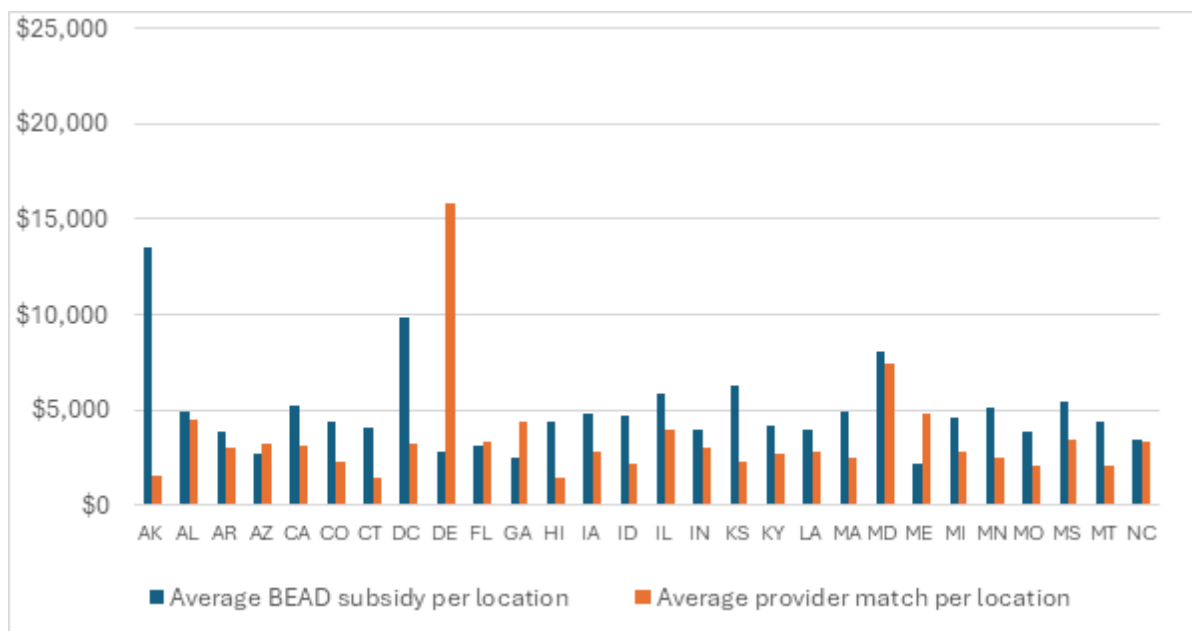


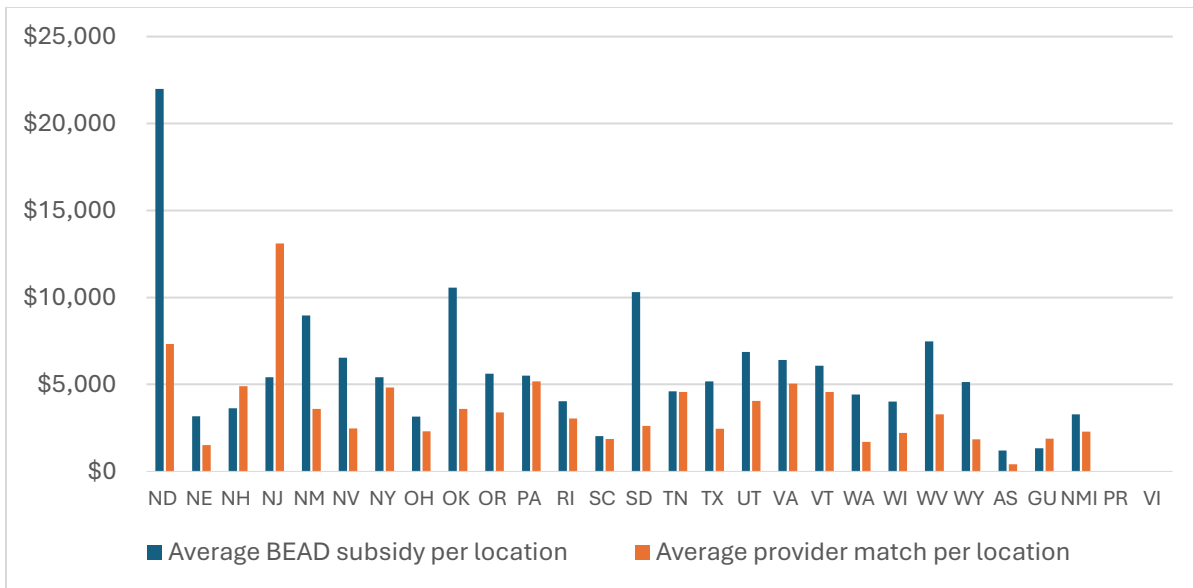
3.3 Average funding per location

Figure 2 shows the average BEAD subsidy required per location across the states and territories, and the average provider matches committed during the benefit-of-the-bargain round. Across all eligible entities for which data is available, the median BEAD subsidy per location is \$4,648, and the median match contributed by providers is \$3,023. With \$4,800 the national average BEAD subsidy is slightly above the median, and the national average provider match of \$3,098 is slightly above the median provider match. The median of total funding per location across the eligible entities for which data is available is \$7,530 and the national average total funding is \$7,898 (see Bauer et al. (2026, Appendix A) for more details).

As Figure 2 shows, in most states the average providers' match is lower than the average BEAD subsidy, but the numbers are often close. In several states, including Alaska, the District of Columbia, North Dakota, New Mexico, Nevada, South Dakota, West Virginia, and Wyoming the average BEAD subsidy is more than twice the average providers' match. In Delaware and New Jersey, the average subgrantee match is substantially higher than the average BEAD subsidy. These numbers illustrate the diversity of conditions and the varying willingness of providers to match public funds.

Figure 2: Average BEAD subsidy and provider match, per location in US \$ (Source: NTIA, state final plans, own calculations, as of August 25, 2026)





The differences reflect several interacting factors. Cost conditions for serving the remaining locations vary greatly across states. For example, population density in Delaware is about 520 people per square mile, but only 12 in North Dakota. Population dispersion as well as topological conditions vary greatly between these states. There are also demand-side differences in state median incomes that affect how far the network will be extended without a need for a subsidy. Finally, the market structure of service providers varies between states.

Using a ranking of national median and average values to classify states from the “most efficient” to the “least efficient” may be tempting, but it has important caveats. It does not correct confounding factors, such as varying cost conditions that are often in play, and therefore can easily be misleading.

3.4 Planned technology mix

The original BEAD program envisioned deploying fiber to as many locations as possible within the funding constraints imposed by the available subsidies and the willingness and ability of providers to generate the required matching funds. The restructured BEAD program changed this goal to serving the remaining locations with the minimum required subsidy. Figure 3 shows the planned technology mix that resulted from the Benefit of the Bargain round. The restructured program rules constrained the ability of states to choose a technology mix. However, both the original and the restructured approach have strengths and weaknesses. Restructuring may affect the likelihood that access gaps will be closed in a sustainable way, the scalability of the deployed infrastructure, the intensity of competition in future local broadband markets, and the quality and prices of service.

The share of satellite broadband increased significantly in the revised technology mix. Satellite broadband has the potential to provide resilient service to remote locations. At the same time, foliage, topography, and weather conditions can interfere with the quality of the connectivity. There is a shorter record to assess whether satellite broadband can deliver the required minimum service

quality of 100/20 Mbps on a sustained basis and whether it can scale to meet future demands. Moreover, Amazon's Kuiper has faced several setbacks in launch technology. It will be important to assess the quality of satellite connections as locations go online.

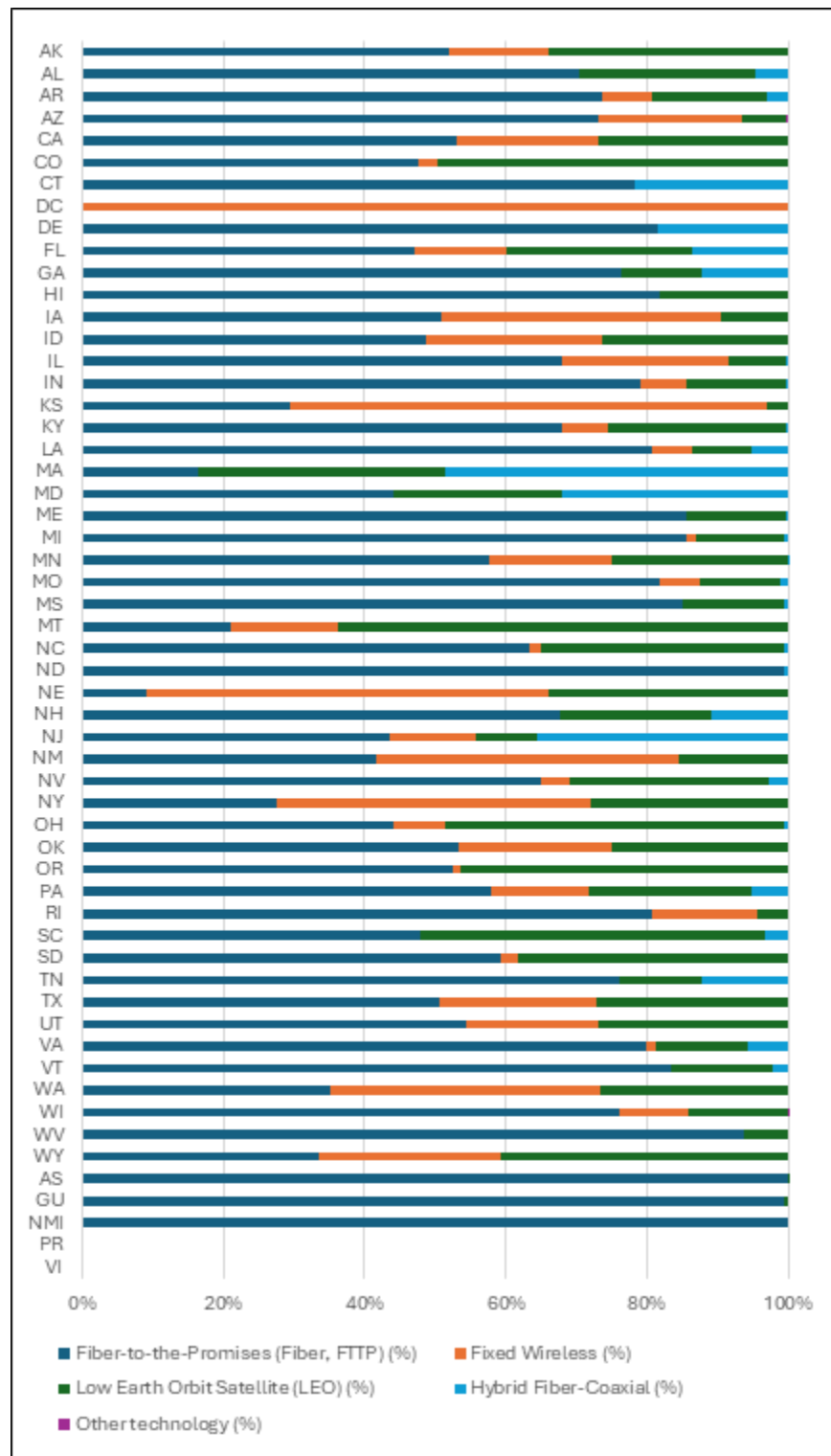
Prioritizing fiber would have provided stronger confidence that the network could be scaled to meet increasing capacity needs. Although unlicensed wireless and satellite technology might allow comparable scalability, they are less tested. They are also dependent on other policy choices, such as spectrum allocation. Thus, they are afflicted with a higher risk that locations may again suffer from subpar connectivity in the future. Some experts also are concerned that the lifecycle cost of terrestrial wireless and satellite technologies is higher (Afflerbach, 2022).

Scalability, an important feature retained in the restructured BEAD program, is a critical feature when looking forward to AI-enabled services and applications, but it is not the only one. The technical requirements of a next-generation information infrastructure are evolving. Ubiquitous availability, not just at fixed locations, will likely be more important. If 6G wireless services are introduced and gain traction, new demands on the backhaul and middle-mile infrastructure will arise. Moreover, if quantum computing is successful, existing middle mile and access technologies, including fiber, may require significant upgrades to support the transmission of quantum information based on photons.

Of the 3,790,286 BEAD eligible locations nationwide, NTIA-approved plans show that subgrantees plan to extend fiber to 63.0%, hybrid fiber-coaxial to 2.0%, fixed wireless to 13.2%, satellite to 21.9%. However, the case of California, where the NTIA-approved final plan reduced the number of satellite locations, illustrates that changes can go either way. Nonetheless, the new planned technology mix is a considerable change from the initial goals of BEAD to deploy fiber deep to the edges of the network. One of the immediate benefits may be a shortening of the wait time of users to be connected, given that non-wired technologies can be deployed faster in many locations. Given cost differences between technologies, the restructured BEAD program contributed to a reduction in the required short-term subsidies. Although the details are heavily dependent on local conditions, in general fiber has the highest initial investment cost, and FWA and ULFW are cheaper to deploy but have higher maintenance and upgrade cost. Costs for LEO satellites are difficult to compare, given their unique cost structure. LEOs have very high fixed costs of providing capacity but low incremental costs of adding an additional location within capacity limits (Calabrese et al., 2025).

Bauer et al. (2026, p. 59-68) provide additional econometric analyses that further substantiate that the variation between states is only partially explained by the topological conditions of the locations to be served. Among the states, the share of BEAD eligible locations for which fiber to the home service is planned ranges from 0% in the District of Columbia to 99.3% in North Dakota in the continental U.S. (and 100% in the New Mariana Islands). The share of hybrid-fiber coaxial cable ranges from 0% to 48.6% in Massachusetts. Fixed wireless access ranges from 0% to 100% in the District of Columbia. The share of satellite broadband service ranges from 0% in Connecticut, Delaware, the District of Columbia, and North Dakota to 63.7% in Montana.

Figure 3: Planned technology mix for BEAD-eligible locations by state, in % of all BEAD-eligible locations (Source: NTIA, state final plans, own calculations, as of August 25, 2026)



Whether the added locations will experience robust and sustained service exceeding the 100/20 Mbps threshold remains to be seen. In principle, fiber is best positioned to meet this expectation but, like other technologies, fiber is subject to interruptions. For unlicensed wireless and satellite, concerns about the scalability to meet growing demand are also relevant. It will therefore be important to build robust measurement frameworks to assess the quality of the future, heterogeneous access infrastructure.

4. Assessment of network deployment

In addition to establishing a baseline, program monitoring and assessment requires indicators that are periodically updated to document progress toward program goals. This includes two types of information: (1) indicators that can be measured at a point in time (e.g., the number of BEAD-eligible locations) (also called “stocks”) and (2) variables that are measured over time (e.g., the number of connections added during an observation period) (also called “flows”). In many cases, flows measure the change in the value of stocks between two reporting dates.

The starting point at the time of NTIA approval and before BEAD network rollout starts can serve as a pragmatic baseline for the subsequent assessment of progress toward the goal of connecting all locations and the broader community outcome goals envisioned in the Infrastructure Act. This includes investment data (e.g., the number of locations connected), financial data (e.g., the amount of funds spent), technical specifications of the connections (e.g., supported speed, latency), and information on project timelines (e.g., progress toward milestones).

4.1 Indicators documenting BEAD rollout

4.1.1 Essential indicators

A logical starting point for documenting network deployment is the data reported as part of compliance requirements. From this information, a first set of indicators can be generated to gain insights into progress toward closing access gaps. However, comprehensive assessment of the effects of the investment will require curation and possibly collection of additional data, as will be discussed below.

Given the focus of the restructured BEAD program on network deployment, this will yield initial indicators focusing on the number of BEAD-eligible unserved and underserved locations. States should also collect data on the technologies envisioned to serve locations, financial information such as the use of the subsidies and matching funds that were committed, and the timeline for completion, all essential for the assessment of progress. Data should be curated in ways that allow calculating essential network deployment indicators for subgrantees, project areas, and for the entire state or territory.

Good stewardship and public policy require that data be made available in the public domain after they are approved by the eligible entities and NTIA. Failure to do so would greatly complicate any

assessment and deviate from best practices that have evolved during the past few years among SBOs. The data should be collected at the lowest level of granularity, ideally the location level, and in ways that allows aggregating to higher levels, such as project areas, subgrantees, and census geographies. A prudent set of indicators to document network deployment should contain the following information:

- The number of unserved locations as approved by NTIA
- Number of locations that will not be connected by BEAD
- BEAD funds and matching funds committed to connect these locations
- Technologies planned to serve the BEAD-eligible locations
- Technical capabilities of the connections
- Financial performance metrics
- The anticipated time to completion

Table 3: Indicators for the assessment of BEAD network rollout

	Priority	Indicator	Measurement, data sources	Timing of data collection
Number of unserved, underserved locations				
☐	High	Unserved locations	Number of unserved BSLs as approved by NTIA	Sub-award, semi-annual thereafter
☐	High	Number of locations that will remain unserved	Benefit-of-the bargain round data	N/A
☐	High	Community anchor institutions (CAIs)	Number of CAIs	Sub-award, semi-annual thereafter
BEAD funds and matching funds				
☐	High	BEAD allocation	NTIA announcement, June 3, 2023	BEAD announcement, June 2022
☐	High	BEAD subsidy	NTIA approved state final plans	Approval date of state final plans
☐	High	Provider matching funds	NTIA approved state final plans	Approval date of state final plans
☐	High	Non-deployment funds	NTIA approved state final plans	Approval date of state final plans
Technologies planned to connect BEAD-eligible locations				
☐	High	Number and share of fiber	NTIA	BEAD announcement, June 2022
☐	High	Number and share of coaxial cable	NTIA approved state final plans	Approval date of state final plans
☐	High	Number and share of fixed wireless	NTIA approved state final plans	Approval date of state final plans

☐	High	Number and share of satellite	NTIA approved state final plans	Approval date of state final plans
Technical capabilities of the connections				
☐	High	Type of connection	Sub-grantee agreements and reports	Signing of agreement, semi-annual reports
☐	High	Upload/download capacity	Sub-grantee agreements and reports	Signing of agreement, semi-annual reports
☐	High	Latency	Sub-grantee agreements and reports	Signing of agreement, semi-annual reports
☐	High	Scalability	Sub-grantee agreements and reports	Signing of agreement, semi-annual reports
☐	High	Resilience	Sub-grantee agreements and reports	Signing of agreement, semi-annual reports
Timeline to completion				
☐	High	Initial time to completion	Sub-grantee agreement	Signing of agreement, semi-annually
☐	High	Remaining time to completion	Sub-grantee semi-annual reports	Semi-annually
☐	High	Completion data	Sub-grantee semi-annual reports	Semi-annually

Given that Community Anchor Institutions (CAIs) are identified separately in NTIA guidance and given their role to facilitate digital access (Strover et al., 2020), states should consider documenting them separately. Following the same format, a prudent set of indicators would include:

- The number of unserved and underserved CAIs
- BEAD funds and matching funds committed to connect these locations
- Technologies planned to serve the locations (fiber, hybrid fiber-coax, fixed wireless, satellite)
- Technical capabilities of the connections (as required by NTIA)
- The anticipated time to completion

4.1.2 Additional indicators not required in SARs

The essential indicators discussed in subsection 4.1.1 will allow a robust assessment of network rollout. However, they are insufficient for a more comprehensive assessment of the immediate impacts of BEAD investment on individuals and businesses. Because participation in the society and economy of the United States is an important goal, we highly recommend that states collect information on adoption as well as the prices and service conditions of low-cost broadband service options (LCSO). Both adoption and prices are influenced by other factors and are not a narrow metric for BEAD implementation in a narrow sense. However, like the broader community

outcomes discussed in the next section, they reflect the overall goals of network rollout in a broader sense. Price and adoption data could be collected as part of the subgrantee reporting process or it could be collected via a separate mechanism:

- Adoption of broadband across BEAD-supported locations
- Prices and service conditions for low-cost broadband service options (LCSO) at BEAD-supported locations

Data collection from subgrantees will eventually be replaced by and integration of the information into broader reporting systems, such as data from the ACS, the U.S. Census, and the FCC broadband maps. Continued monitoring of the broader connectivity landscape of the state will assist in forward-looking broadband policy development and facilitate the assessment of broader community impacts. To monitor the state of broadband beyond BEAD, states should develop reliable inventories of the state of connectivity to document the status of broadband across areas that are considered served and new locations that may or may not be served.¹⁶

Many states already have developed accurate broadband maps. These or other publicly available sources (each with their own advantages and disadvantages) are natural building blocks of state-wide documentation of digital connectivity. However, additional data points that are critical for an assessment of broadband connectivity are missing and will require additional effort. Broadband prices are currently not comprehensively documented. A limited set of broadband prices is collected by the FCC for urban areas, but information for non-urban areas is missing or patchy. Adoption data is available with delays from the ACS and from the NTIA Internet use surveys, even though connecting broadband data with socio-economic variables such as income can only be done indirectly from these sources.

In support of comprehensive assessment of the state of broadband connectivity, states should document and assess the following indicators on a state-wide basis (the list of suggested metrics includes fewer indicators than Table 3 as the purpose is slightly different):

- Total number of locations served in the state (if possible synchronized with the annual BEAD reporting requirements)
- Technologies used to serve these locations (fiber, hybrid fiber-coax, fixed wireless, satellite)
- Technical capabilities/metrics for served locations (if available, by technology)
- Adoption of broadband across the state
- Broadband prices and service conditions

¹⁶ The number of Broadband Serviceable Locations (BSL) changes continuously as existing locations may be retired, and new construction may generate additional locations. For example, CostQuest Associates reported in February 2026 that the number of 12.3% of counties experienced an increase in the number of unserved BSLs between Version 6 and Version 7 of CostQuest's Location Fabric. See Broadband in America Report: Analysis of Broadband Coverage Changes—February 2026 Edition, <https://www.costquest.com/resources/articles/broadband-in-america/broadband-in-america-report-analysis-broadband-coverage-changes-2026-02/>, retrieved on April 20, 2026.

4.1.3 Granularity of reporting and analysis

BEAD aims to overcome a complicated problem: connecting dispersed and often remote locations to broadband. Whereas states have to follow federal guidelines, there is flexibility in how to establish project areas. Some states use pre-existing area boundaries, such as census blocks, census block groups, or ZIP codes. Other states have created custom maps that applicants for BEAD funding have to adhere to. Ideally, information for monitoring and assessment purposes would be publicly available at a high level of granularity and for areas that can be compared across states.

The achievable level of granularity is likely constrained by concerns about proprietary information that SBOs must navigate. It would be desirable to have crosswalks from project areas to census geographies, which then would allow more systematic comparisons across areas within a state and across states. It would also facilitate linking BEAD observations with the broader connectivity ecosystem that is documented in already existing broadband statistics (e.g., the American Community Survey) and socio-demographic data.

All the indicators discussed in the following sections can be generated for various geographic areas, including project areas, census block groups, counties, and states (provided there are crosswalks between these geographic areas that allow attributing the information appropriately). They can also be generated for subgrantees. For the purposes of this report, we present information at the state level. Adapting the indicators to other levels of granularity would be straightforward if the data is collected at the location level and with appropriate spatial and provider identifiers, which we highly recommend.

The appropriate level of analysis will depend on the type of assessment. Initially, as the focus is on BEAD-eligible locations, data documenting progress at that level would be desirable. For financial analyses, such as the amount of funds expended, such granularity would not be needed, and either project areas or subgrantees would be appropriate. Later in the development of BEAD, states may be interested in broader community outcomes. This requires linking network rollout data with socio-demographic and other variables, which may only be available at the level of census tracts or even the county level.

4.2 Assessing progress over time

4.2.1 Progress to universal connectivity

BEAD program guidelines require that State Broadband Offices (SBOs) regularly engage with subgrantees to discuss progress toward the established goals. The required semi-annual reports allow systematic comparisons of progress over time for project areas, subgrantees, and states. If subgrantee data are mapped to census geographies, progress can also be monitored for other geographic areas (e.g., census tracts, counties). BEAD rules do not require states to make detailed information public, nor do they require the release of data documenting progress over time.

However, good stewardship and transparency imply that the data is made available. A semi-annual release of data would allow better tracking changes than an annual release.

- Progress in connecting eligible BSLs
 - Number (or percentage) of eligible BSLs added during the past reporting period (since the start of BEAD implementation)
 - Number (or percentage) of eligible BSLs that remain to be served
- Technical performance characteristics of newly connected locations
- Financial indicators (funds uses, funds remaining, comparisons between planned expenses and actual expenses)
- Adoption of broadband at newly served locations
- Pricing of low-cost service options at the newly served locations

Given that the BEAD locations are the final remaining locations in a state, a simple before-and-after comparison is an acceptable starting point. Data points at half-year intervals can easily be compared to the baseline at the beginning of the implementation to assess the rate of progress. Alternatively, they can be assessed against the state's BEAD goals, in which case they would document progress in reducing the gap.

The starting point at the beginning of the program is not the only yardstick for comparison. An SBO might be interested in how the network rollout compares relative to the growth in the number of connections in prior years. To do this, SBOs could simply calculate the average growth rate of broadband connections that meet the 100/20 Mbps standard. This would provide initial insights into the acceleration (or deceleration) associated with the BEAD program relative to a multi-year network rollout trend.

4.2.2 Comparisons of areas within states and across states

States have historically shared information about policies that worked and their experiences of initiatives that did not meet the expectations. Broadband connectivity is no different. The indicators generated by single states as part of their monitoring and assessment efforts can also be used for comparisons of areas within a state and for comparisons of entire states. In principle, all indicators discussed in Section 3 can be used in comparisons and can provide additional insights into the efficiency of program implementation.

However, comparisons must adjust for factors, such as varying supply, demand, and demographic conditions, which affect BEAD implementations. For example, cost conditions such as the ruggedness of terrain and distance to locations influence how quickly locations can be connected and the cost of doing so. One method to avoid these problems is to make comparisons only between similarly situated areas or states. Another method is to use statistical tools to control such confounding factors. Both approaches are discussed in the following two sections and illustrated using comparisons between states.

Several options exist to compare progress indicators for a specific geographic area with other areas. It may often be useful to compare project areas within one state. Another option may be to compare indicators with neighboring states or territories. If the conditions affecting cost drivers are similar, it might be appropriate to compare areas without correcting differences and confounding factors. Another more reliable option is to use clustering techniques to identify areas with similar conditions. Clustering could be done at the level of states, but if more granular data is available, it could also be accomplished for smaller areas down to individual project areas or subgrantees.

Cluster 1

Cluster 2

Cluster 3

¹⁷ See U.S. Department of Agriculture, Economic Research Service, Area and Ruggedness Scales, <https://www.ers.usda.gov/data-products/area-and-road-ruggedness-scales> (last visited February 17, 2026).

multiple K-means models were estimated and compared using silhouette scores, a standard metric for evaluating clustering quality (Shahapure & Nicholas, 2020).¹⁸

Table 4: List of states by cluster (50 states plus DC) (Source: Mack et al. (2025).

Cluster 1 – Lower challenges (23 states)	Cluster 2 – Medium challenges (16 states)	Cluster 3 - High challenges (12 states)
AL	AZ	AK
AR	CA	CO
CT	HI	ID
DE	IA	KS
DC	MI	ME
FL	MN	MT
GA	MO	NE
IL	NV	ND
IN	NH	OR
KY	NM	SD
LA	NY	VT
MD	OK	WY
MA	TX	
MS	UT	
NJ	WA	
NC	WI	
OH		
PA		
RI		
SC		
TN		
VA		
WV		

States in Cluster 1 are not very rural ($M=11.06$) and have minimal terrain-related challenges (ARS 6: $M = 0.52$, RRS5: $M = 1.62$). These states also report a moderate number of unserved and underserved locations ($M = 10.89$, log-transformed), suggesting relatively favorable conditions for broadband infrastructure expansion. As such, states in Cluster 1 are likely to experience fewer logistical and financial constraints in deploying broadband infrastructure using BEAD funds.

States in Cluster 2 tend to be more rural than states in cluster one ($M = 37.57$) with moderate terrain ruggedness (ARS 6: $M = 1.26$, RRS 5: $M = 1.76$). These characteristics mean that high-speed internet service provision presents a unique challenge. Effective deployment in these states will likely depend on strategic resource allocation, streamlined permitting processes, and potentially phased rollouts of infrastructure.

¹⁸ Silhouette scores range from -1 to +1; scores closer to +1 indicate better clustering results.

States in Cluster 3 are some of the most rural states in the country (M=65.08) that also have substantial terrain-related barriers (ARS 6: M = 2.53, RRS 5: M = 1.92). Thus, although the states in this cluster have a lower average number of unserved and underserved locations compared to Cluster 2 (M = 10.85), the geographic dispersion and topographic difficulty create substantial obstacles to conventional broadband deployment. States categorized as Cluster 3 pose the highest challenges to achieve the BEAD-defined service goals, assuming all other factors are equal.

Bauer et al. (2026, Appendix, Table A.2.5) presents average and median costs per connection within clusters, which are a more meaningful comparison standard for how well states did. Clusters are a first, high-level step of controlling for similar circumstances. One would expect that the subsidy costs increase as conditions in the states belonging to different clusters make deployment more challenging. One would also expect provider matches to decrease as cost conditions become more challenging and the conditions to earn a return more difficult. At the same time, there is significant heterogeneity of conditions within the clusters and within states. Both effects are visible, as average and median subsidy costs are higher for more challenging clusters, and provider matches lower, but the pattern is uneven.

4.2.2.2 Statistical benchmarking

Benchmarking compares the outcomes of one geographic area of interest with one or more other areas, possibly considered “best practice” models. Such comparisons may use statistical analysis or qualitative assessment methods. Given the complexity of factors in play in broadband development, detailed case studies that build on ethnographic work, perhaps complemented with quantitative comparisons, may be especially useful. This approach allows us to gain deeper insights into which policy designs might be particularly effective. It also facilitates additional forms of learning from the experience of others.

The analysis of the residuals reveals that the cost drivers included in the statistical analysis only explain part of the variation. Moreover, states from each of the clusters are above and below the hypothetical benchmark constituted by the regression line. This shows that local conditions vary greatly and that future observations will have to be analyzed at a higher level of granularity. It also could indicate varying efficiency of the benefit of the bargain process, but there is insufficient information available to make such a judgment with confidence.

Statistical benchmarking can use parametric or non-parametric techniques to assess the effectiveness of a policy measure in a geography relative to other geographies that are considered “best practice” performers. These methods allow us to consider variations in the conditions of broadband deployment. For example, they consider the effects of the ruggedness of terrain on deployment costs. In addition to geographic areas, statistical benchmarking may be applied to comparing subgrantees with “best practice” operators. These methods can help develop a deeper understanding of the effectiveness of implementation measures in a wide range of circumstances, but their data requirements may be difficult to meet (Grubestic, 2010).

We applied multiple methods to assess how well individual states did. Here we present findings from multivariate regression analysis used to estimate how the cost per location and the provider

match per location are related to cost drivers, such as terrain ruggedness and population density. We then analyzed the deviations between the cost predicted by the regression model and cost per location that resulted from the benefit-of-the bargain round in each state with the regression line.

Observations above the 45°-line indicate higher cost than would be expected from the factors included in the statistical analysis. This does not necessarily suggest a less efficient process, as it could be caused by factors that were not included in the statistical model. Likewise, states whose cost per location is below the 45°-line have costs below the value predicted by the model. This does not necessarily signal higher efficiency, as they may have benefited from unique conditions that are not reflected in the model. Thus, it does not necessarily suggest that these states were particularly effective in conducting the bidding process.

Figure 5: Variation of expected total funding per location from predicted values (own calculations, see Bauer et al. (2026, Appendix B) for more details).

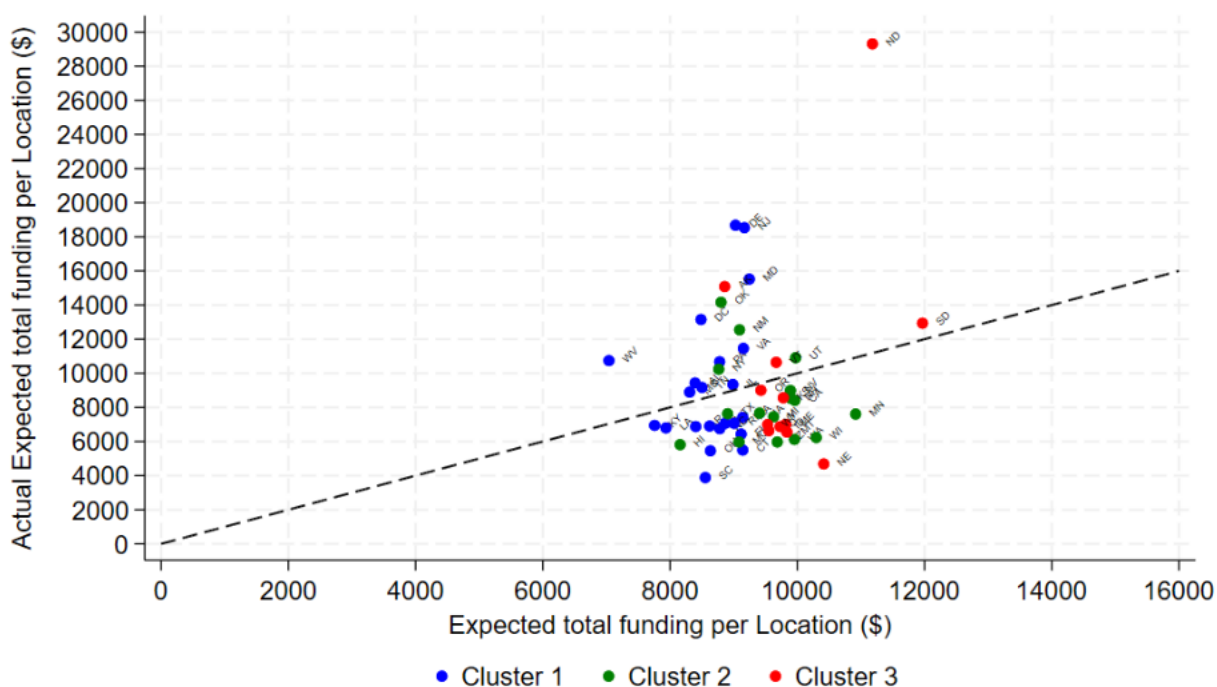


Figure depicts deviations of actual total funding per location from a predicted value based on cost drivers. It shows the tremendous diversity of conditions and outcomes of the benefit for the bargain process. This is reflected in the low explanatory power of multivariate regression models. Additional analyses will be necessary once more detailed data is available.

4.3 Integrating BEAD data with other reporting systems

BEAD eligible locations typically are dispersed across the entire state. Documenting progress for these locations is particularly useful during program implementation and assessment. Eventually,

the information will be reflected in other state- and nation-wide reporting frameworks, such as ACS and Census data, the FCC broadband map, and other statistics.

Despite this gradual integration, BEAD-specific reporting could remain meaningful for some time beyond the completion of the program. For example, the experience with other programs, such as CAF II, indicates that providers adjust the quality of service offered to locations after program requirements end. For example, Manda et al. (2024) document that a significant share of locations funded by the Connect America Fund II did not receive the download speeds stipulated in the program after the program ended. A large part of this may be a flaw in program design, which did not include provisions beyond the program's end date. Part of it may be the outcome of confounding factors and/or corporate strategy. However, it suggests that BEAD may suffer from a similar vulnerability, and that continued monitoring of the developments affecting BEAD-supported locations may be worthwhile.

Apart from these concerns, states will be well advised to develop frameworks to monitor the heterogeneous access infrastructure that will emerge from the BEAD program and how well it is suited to meet emerging uses and needs. As AI-enabled services and applications go online, the current threshold of 100/20 Mbps may not be sufficient, and new and old locations may require initiatives to improve the level and quality of connectivity. AI-enabled services will require adjustments in the data center infrastructure and in the associated middle mile and end-user network infrastructures. Should quantum computing become a reality, some of the existing and currently rolled out infrastructures will likely become obsolete.

The timelines of these developments are difficult to predict. Unless federal support programs are reformed, states may have to devise their own sustainable mechanisms to address these emerging challenges. One important component of such longer-term plans will be systematic horizon scanning to identify needs with some lead time. Such forward-looking perspectives will also facilitate the design of appropriate programs at the state level. These range from broad-based universal service programs modeled after the federal Universal Service Fund to innovative solutions such as credit guarantees to enable smaller businesses to get access to external funding. Well-designed credit guarantees would have a low risk to the public sector and can accelerate rural entrepreneurship and continued network improvements.

5. Implications of BEAD restructuring

The BEAD Restructuring Policy Notice of June 6, 2025 (PN) made several changes to the original BEAD program, as discussed in Section 2. This section assesses the pros and cons and overall impacts of restructuring. Some of the changes work in favor of the goals of BEAD whereas others changed some of the premises of the original program (see Table 6 for a high-level overview). The original approach envisioned that digital equity and complementary policy measures, such as workforce development programs, would boost the social and economic benefits of high-speed Internet access. In contrast, the revised PN focuses on minimizing BEAD program outlays needed

to support access to broadband. At the time of writing, the future of non-deployment funds is uncertain.

Table 6: Strengths and weaknesses of the restructured BEAD program for network deployment (own research)

Dimension	Strengths	Weaknesses
Cost	Lower BEAD subsidy costs	Potential higher total lifetime costs
Time to connection	Technological neutrality shortens time to connection	Timeline to LEO deployment uncertain given need to additional capacity of Space X and Kuiper
Flexibility	Technological neutrality allows flexible adaptations to deployment conditions	
Scalability		Deployment of ULWL and LEOs may create future scalability problems
Resilience	Multiple access technologies increase resilience other things being equal	
Broadband competition	Technological neutrality will likely increase competition	
End-user prices	Voluntary low-cost pricing options may not meet low-income needs	Voluntary low-cost pricing options may improve low-income needs

5.1 Savings in BEAD subsidy cost

NTIA claims the difference between the original BEAD allocation and the actual BEAD subsidies as “savings” generated by the new policy.¹⁹ The administration argues that more competition among potential bidders and technology platforms combined with the simplified requirements reduced the subsidy cost. Whereas these effects were in play, the claim that they reduced subsidy needs by \$21 B is untenable for several reasons.

The assertion is not accurate because a large part of the lower cost is an outcome of the smaller number of locations that remained to be connected by the end of 2025 (see Table 1 above). Most states would have been able to extend fiber further and conserve funds from the original allocation.

¹⁹ The information is accessible here: <https://broadbandusa.ntia.gov/public-resources-related-bead-plans-and-milestones>. It is organized by state, for example https://broadbandusa.ntia.gov/sites/default/files/2026-01/BEAD_FP_Overview_MI.pdf for the State of Michigan. The original BEAD allocation in June 2022 was \$1,559,362,479 and the final subsidy need \$916,605,938. However, the original allocation was for 368,388 locations whereas the final allocation needed to cover only 197,964. The remaining non-deployment funds of \$642,756,541 cannot meaningfully be claimed as “savings” caused by the restructured BEAD program. If anything, the reduction in locations that remained unserved is an indication of entrepreneurship and other policy support in the state.

In addition, some high-cost locations will likely remain unconnected in the restructured program.²⁰ Given the smaller size of the problem, it is not surprising that the total subsidy costs are lower.

It is difficult to accurately assess the incremental, cost-reducing impact of the simplification of rules and of competitive bidding during the benefit-of-the-bargain approach. The bidding likely incentivized providers to increase their matches and choose a different, lower-cost technology mix. The presence of satellite bidders with a very different cost structure and the unclear approval process at NTIA likely added uncertainty that might have contributed to lower requests for subsidies.²¹ Bidding under the original BEAD was not completed, and the data had to be rescinded. Therefore, we do not have a historical counterfactual of what would have happened under the old rules except for the handful of states that completed bidding. However, we can establish lower and upper bounds for the likely savings that show that the savings are likely much smaller than the amounts claimed by NTIA. To this end, we will conduct two thought experiments that will bring us some clarity.

First, to determine a lower bound of savings, let us make the simplifying assumption that the cost of serving a location was comparable across all remaining locations. We would then expect the necessary subsidy to decline in parallel with the reduction of BEAD-eligible locations between 2022 and the end of 2025. If, for example, only 80% of the originally identified locations were left by the end of 2025 and need funding, the expected required subsidy would be about 20% lower than the initial BEAD allocation. This is of course simplified logic, but it gives a rough benchmark to assess how a reduction in unserved locations reduces the expected subsidy.

Because BEAD rules changed, it will also be necessary to split the lower subsidy requirement into two components: (1) a part that can be attributed to continued investment that reduced the number of unserved locations and (2) a part that is due to changes in program rules, particularly the treatment of UFWL locations as served. The first part cannot meaningfully be claimed to save from the benefit of the bargain round, as would have occurred anyway. The second component can be claimed as savings due to rule change.

To estimate that second part, we take advantage of an analysis by the Advanced Communications Law and Policy Institute (ACLP) at NYU. ACLP estimates that about 815,000 of the locations (or about 15% of BEAD eligible locations) were served by UFWL at 100/20 Mbps and thus eliminated.²² This implies that about 3.8M of the approximately 4.6 M reduction in BEAD eligible locations since

²⁰ During the Senate Committee on Appropriations Hearing on February 10, 2026, Senator Shelley Capito (R-WV) stated that 76 locations in West Virginia would remain unserved. A data analysis by Alex Karras and Michael Santorelli claims that one million locations might remain unserved, although this number must be considered as a preliminary, upper-end estimate. See, One Million Locations Might Remain Unserved Post-BEAD. Leftover Funds Should be Used to Connect Them, October 23, 2025, <https://broadbandexpanded.com/posts/unservedafterbead> (last visited February 14, 2026).

²¹ The presence of satellite companies during RDOF had a similar effect of lowering all bid prices, an outcome that may have contributed to a higher rate of defaults between pre-and post-approval.

²² See BEAD Eligible Locations Drop 14% in New Benefit of the Bargain Lists, a Combined 65% Drop Since Dec. 2022 BEAD Allocations, retrieved on June 5, 2026, from <https://broadbandexpanded.com/posts/botblocations>.

BEAD funds were allocated were not affected by BEAD rule changes. If we apply this thought experiment to the NTIA final data, we can establish that the hypothetical total required BEAD subsidy across all states would have been about 43% lower than the expected subsidy in 2023.

Second, to determine an upper bound of savings, let us take into consideration the varying costs of the remaining locations. The BEAD-eligible locations that remain to be served at the end of 2025 are probably more expensive than those that were served between 2022 and 2025. State planning data show that the typical pattern of costs of connecting the remaining locations is a hockey stick-like function that is initially flat and then rises steeply for the most expensive locations. For example, data released by Louisiana during the original BEAD planning phase, analyzed by Nathan Smith, show that the subsidy needed for the cheapest 10% of locations was \$1,500 per BSL. The median subsidy need was \$3,300 per BSL. The most expensive 10% of locations required subsidies above \$10,000 per BSL and the most expensive 1% of locations required above \$30,000 per BSL.²³

Taking this information into consideration, we can estimate that the total subsidy required for the 50% of the lowest cost locations will likely be 25% of the total subsidy required to serve all locations. If we make the strong assumption that the 50% decline in BSL-eligible locations were all among the lowest cost locations so that only the most expensive locations would require additional subsidies, we can establish an upper bound of savings. In this thought experiment, the total subsidy to serve the remaining 50% of locations under the original BEAD rules would have been approximately \$31.9 B. Savings attributable to the restructured BEAD program would be about half of the savings claimed by NTIA and the U.S. Department of Commerce.

Thus, we establish an upper bound of savings from BEAD restructuring of about \$10.5B and a lower bound of about \$2B. The most likely scenario is between these two extreme cases. For example, it is likely that some Capital Project subsidies benefited locations with connection costs above the median. What these analyses indicate is that the saving asserted by the administration is noticeable and positive, but it is much less than what is claimed on the NTIA BEAD portal. That number is strongly inflated because it claims the entire difference between the original allocation and the subsidy amount after the benefit-for-the-bargain round as savings for the public sector. A more reliable estimate would adjust the figures to reflect the smaller number of locations that remained unserved and make additional adjustments for the costs of the various locations, as sketched in our thought experiments.

The second observation is important. The current data are planning data and not actual costs and connections. The ambiguous incentives created by the restructured BEAD program could have motivated some bidders to submit low estimates for project costs. This is the experience with bidding in the first Rural Digital Opportunities Fund auction (RDOF I), where by one count more than

²³ See the analysis by Nathan Smith, How Louisiana solved the BEAD Rubik's Cube, December 9, 2024, <https://connectednation.org/blog/how-louisiana-solved-the-bead-rubiks-cube> (last visited February 14, 2026), and the detailed documentation in the Connect LA Resource Library, <https://connect.la.gov/resource-library> (last visited February 14, 2026).

one third of the committed locations did not measure up to commitments.²⁴ This experience with RDOF I, which has many similarities to the restructured BEAD, may serve as a cautionary tale for what to expect in BEAD. For example, the services promised by some of the winning bidders, such as Kuiper, are yet untested, and the satellite infrastructure is not yet in place.²⁵ It is true that the SBOs have done significant due diligence work to assess the capabilities of providers. This greatly reduced the likelihood of pre-approval defaults. However, only time and experience will tell whether post approval defaults are a concern.

Finally, it is not proven that unlicensed wireless and satellite technologies will be sufficiently scalable and resilient. This is certainly possible, as technological change has transformed these access platforms significantly and will continue to be in play. With new authorizations to place more satellites into orbit, Starlink and Kuiper have some flexibility to expand the capacity and performance of their networks. Nonetheless, LEOs are subject to potentially catastrophic risks of failure due to space junk. It is unclear how to plan for such low-probability, high-impact events other than to aim for redundancy and resilience (Adilov et al., 2018; Van Eeten & Bauer, 2012).

5.2 Non-deployment funds and their uses

As Table 2 and the discussion in Section 3 above illustrate, the reduced number of unserved and underserved locations and the combined effects of the restructured BEAD provisions resulted in funding needs that are lower than the initial BEAD allocation of June 2022. It is important to keep in mind that many states would have conserved part of the original BEAD allocation. For example, the plan submitted by Louisiana in 2024 was premised on deploying fiber to 95.8% of the locations (compared to 64.9% for the final plan approved in 2025). Yet Louisiana's original plan anticipated about \$636M in savings for non-deployment purposes.²⁶ In the final approved plan, Louisiana shows savings of \$856.7M. Thus, the additional savings from the benefit-of-the bargain round are about \$220M.

The original BEAD program allowed states to use these non-deployment funds for complementary purposes, such as workforce development. Such uses would likely have amplified the economic and social effects of the network investment component. Moreover, a model whereby states could

²⁴ According to an analysis of FCC data by the Benton Institute for Broadband and Society, providers making bids for more than 1.9 million locations went into default. About 1.8 million of these bids, including the bid by Starlink to serve more than 600,000 locations, did not receive authorization to go ahead during the detailed, longform screening conducted by the FCC. In addition to these pre-approval defaults, providers defaulted in more than 100,000 locations after they had been authorized. See *New Dataset Reveals Impact of RDOF Defaults on Each State*, <https://www.benton.org/blog/new-dataset-reveals-impact-rdof-defaults-each-state>.

²⁵ On February 1, 2026, Broadband Breakfast reported that Amazon is asking the FCC to extend the deadline for launching the first 1,618 of its approved fleet of 3,232 satellites by two years to July 30, 2028. See Jake Neenan, *Amazon Wants More Time to Hit LEO Launch Milestone*, *Broadband Breakfast*, February 2, 2026, <https://broadbandbreakfast.com/amazon-wants-more-time-to-hit-leo-launch-milestone/?ref=alerts-newsletter> (visited February 2, 2026).

²⁶ See Joan Engebretson, *NTIA Approves First BEAD Final Proposal, Louisiana Gets Bragging Rights Again*, *Telecompetitor*, January 13, 2025, <https://www.telecompetitor.com/ntia-approves-first-bead-final-proposal-louisiana-gets-bragging-rights-again/> (last visited February 19, 2026).

expect to keep the conserved funds would have constituted a stronger incentive to maximize efficiency compared to the chosen NTIA-driven model.²⁷

During the benefit-for-the-bargain rounds, the administration left it unclear whether states would get access to non-deployment funds and whether any additional conditions would be attached. In the Senate Appropriations Committee Hearing on February 10, 2026, Commerce Secretary Lutnick confirmed that states would get access to all non-deployment funds.²⁸ However, NTIA has not established its guidelines for how these funds may be used.²⁹ An Executive Order of December 2025 links release of these funds with aspects of state AI policy. Details of these contingencies are currently worked out by NTIA and the FCC. Moreover, NTIA has started a series of listening sessions to solicit suggestions for the best use of the funds.³⁰

Independently of the outcomes of these processes, reasonable uses of non-deployment funds in line with the broader goals of the Infrastructure Act would be:

- Expand connectivity to locations that would remain unserved
- Establish a reserve fund to assist locations that might be affected by subgrantee defaults while measures are pending to resolve the legal issues associated with defaults³¹
- Provide support for workforce training, both related to network deployment and in sectors that can multiply BEAD benefits
- Support programs to improve digital literacy, cybersecurity, and telehealth services

Several locations did not receive bids during the benefit-of-the-bargain round. Non-deployment funds could be used to extend connections to these locations. Some additional due diligence will be needed to examine why these locations did not receive bids. Once these factors are understood, least-cost solutions can be developed. This could include supply-side as well as demand-side measures.

Earlier programs, such as RDOF, were affected by ISP defaults. Defaults could in theory happen during the contracting phase, but they are more likely during project implementation. Given the intense due diligence during earlier phases of BEAD, the number hopefully will be low. A share of non-deployment funds could be earmarked for cases in which default warrants a public remedy.

²⁷ See, e.g., Gregory Rosston & Scott Wallsten, New BEAD Rules Enable Efficient Spending But Make it Pointless to Try, Technology Policy Institute, July 8, 2025. <https://www.ntia.gov/blog/2026/ntia-hears-public-how-best-use-bead-savings> (last visited February 15, 2026).

²⁸ See CNBC, Commerce Secretary Lutnick Testifies Before Senate Panel, viewed on February 10, 2026, https://www.youtube.com/watch?v=eRJHXA1c_w.

²⁹ NTIA conducted several listening sessions in February 2026 to collect input into the guidelines, originally anticipated for March 2026 but further delayed since.

³⁰ Proposals from the first listening session include using funds to enhance public safety (e.g., upgrades to 911 call centers), to streamline permitting processes, and to increase broadband resilience and redundancy. See <https://www.ntia.gov/blog/2026/ntia-hears-public-how-best-use-bead-savings> (last visited February 15, 2026).

³¹ In the case of RDOF, the post-approval default rate was in the 5% range. If BEAD were to experience a comparable default rate, this would translate into 250,000 locations nationwide.

The original BEAD program envisioned workforce training programs to support the broadband industry. In addition, it permitted use of funds for digital skills training, cybersecurity training, and telehealth services. Research suggests that such training can amplify the benefits of infrastructure investment. However, well-designed programs must be adapted to local conditions and the needs of states and specific communities.

5.3 A preliminary analysis of incremental costs and benefits

The analysis thus far identified several benefits but also several potential costs of the restructuring of the BEAD program. A detailed analysis of the overall costs and benefits of the program and their distribution to locations and demographic groups is complicated by several facts. For one, some of the effects are intangible and difficult to quantify. In other areas, such as the use of non-deployment funds, information is not yet available.

Table 7 lists main costs and benefits of comparing the restructured BEAD program with what plausibly would have been the outcome of the original BEAD program. Our team pursued two approaches. One was the development of a simulation model of what might have happened under the original BEAD program. The simulation model was verified in several ways, and we are confident that the resulting synthetic counterfactual can serve as a preliminary comparison standard (see Mack et al. 2025). For the purposes of this report, we adopt a simpler, more cautious approach, if states would have spent all funds if the number of locations had been equal to the number established in the 2022 FCC Broadband Map.

Given limited data availability, this preliminary benefit-cost analysis does not consider the full costs and benefits of both program designs but considers only the main differences between the original and restructured programs. Thus, we implicitly assume, for the sake of simplicity, that all other effects are comparable between the programs. Benefits include reduced BEAD subsidy requirements and potential consumer benefits from shorter timelines to connectivity. Costs include losses of consumer benefits due to additional program delays, and the costs of additional uncertainty. We do not examine the distributional effects of the restructuring or of benefits and costs in detail. However, we will comment on their direction and magnitude.

Lower required subsidies and a shorter timeline to connection are possible benefits of BEAD restructuring. The previous section explained that the savings from restructuring are much lower than the numbers asserted by NTIA. Within the range we established, it is likely that the savings are more than \$2B but likely less than \$10B. Given this uncertainty, we will use both bounds to establish a range of benefits from restructuring. Several states, including Maine, have designed programs to shorten the wait time, and the simpler program rules will likely allow faster completion times for some projects.

Table 7: Changes in costs and benefits between the original and restructured BEAD programs

Changes in Benefits		Changes in Costs	
Lower required BEAD subsidies	\$2B-\$10B	Loss of societal benefits due to one additional year to connection	\$5B
Societal benefits of a potentially shorter time to connection	N/A	Remaining unserved locations	N/A
Societal benefits from broadband competition	Positive	Increased uncertainty regarding scalability	Positive
		Elimination of mandatory low-income and middle-income prices	Probably reduces adoption, but no data available
Total	>\$2B-10B		>\$5B
Net effect	-\$3B to +\$5B		

Connection technologies are affected differently by these factors, and there is great variation between states. For terrestrial wireline networks, considerable challenges with pole connections rights-of-way, supply chain constraints, and workforce shortages, will have to be overcome in some areas. Terrestrial wireless broadband also requires civil engineering infrastructure and permitting. In some states, this may limit the ability to accelerate deployment and shorten the timeline to reach program goals. The situation is somewhat different for LEOs. Within the capacity limits of the existing satellite fleet, rapid deployment is possible. Once the capacity limit is reached, there may be considerable delays caused by the need for additional satellite launches and earth station capacity. The overall net effect is difficult to estimate, but we do not expect a noticeable acceleration of the timeline and hence do not consider such benefits for now.

Restructuring also created costs in comparison to the original program. Here we only take costs into account that would not have occurred in the original deployment scenario. The requirement to rescind existing work and engage in an additional round of bids and negotiations with NTIA likely extended the time to connectivity for many BEAD-eligible locations. Although it is possible that the new technology mix reduces time to connection for some locations, we cannot assume that the lost time will be fully made up or that the opposite is not true for some locations. Given additional hurdles such as deployment of additional LEOs, spectrum access, and permitting, we believe it is reasonable to assume that the one-year planning delay will also shift the timeline to completion by one year. This implies longer waiting times to connectivity for the affected locations, which is reflected in the imputed costs for the additional delay.

The societal cost of the delay is the forgone benefits to residents and businesses at locations that do not have reliable broadband connectivity for a longer period (Biedny et al., 2026; Biedny et al., 2024). Several studies have attempted to estimate the benefits of broadband connectivity for individual households. For example, (Zuo & Jackson, 2025; Zuo, 2021) examined the effects of the Comcast Internet Essentials programs on labor market outcomes. The research found benefits of

\$1,385 per individual and \$2,202 per household (Zuo, 2021, pp. 17-18). Using a deliberately conservative low bound of the potential effects of lacking connectivity of \$1,000 per year and location, this would translate into about \$5B per year of delayed connectivity for the remaining locations.³² Should delays be longer or shorter, this amount would vary proportionally.

Additional costs would occur if locations remained unconnected. For the purposes of this cost-benefit analysis, we will assume that a solution will be found to ensure that all locations are connected. A third potential cost is the higher uncertainty that terrestrial and space wireless broadband will be more difficult and costly to scale to higher capacity. The FCC has increased the broadband benchmark from 4/1 Mbps in 2010 to 25/3 Mbps in 2015 and 100/20 Mbps in 2024. Updates are typically discussed as part of the Section 706 Report proceedings. The agency currently does not have an established method to adjust this standard, and NTIA decides thresholds for programs administered by the DOC independently. It is not clear when or whether the 100/20 Mbps threshold might be increased. The 2024 FCC Section 706 Report envisioned Gigabit connectivity as a next step, and the BEAD program already requires it for Community Anchor Institutions. However, the current FCC has adopted a less aggressive stance and has asked in a Public Notice if this forward-looking goal should be abolished.³³

Many regions of the country have access to Gigabit connectivity, but there continues to be significant variation between urban and rural locations.³⁴ All network technologies require incremental investment to be upgraded to Gigabit connectivity, but the costs vary. Fiber requires changes to the electronics used on the network; fixed wireless access (FWA) networks require changes in the radio equipment, spectrum, and higher capacity backhaul; LEO networks require additional satellite capacity, ground station expansion, and terminals. Although several of these costs are declining rapidly, upgrading fiber currently would cost in the \$150-\$450 range per location. The incremental costs of FWA are approximately twice those of fiber, and those for satellites could be six times those for fiber (and three times FWA).³⁵

Broadband providers will price their services in ways that allow both the building of reserves and the recovery of these incremental investment costs. However, even if no additional subsidy is requested, it is appropriate to adjust the benefit-cost analysis for the higher upgrade costs of FWA

³² It should be noted that the original BEAD program was not immune to this effect. Every year of additional wait creates an economic welfare loss in the form of these foregone benefits. This suggests that in future infrastructure programs time to deployment should feature more prominently.

³³ See Inquiry Concerning Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion Nineteenth Section 706 Report Notice of Inquiry (2025), GN Docket No. 25-223, July 17, 2025. Retrieved on April 25, 2026, from <https://docs.fcc.gov/public/attachments/DOC-413059A1.pdf>.

³⁴ See, e.g., the June 30, 2025, FCC Broadband Map, <https://broadbandmap.fcc.gov/home>.

³⁵ See, e.g., Cartesian, Broadband Technologies Review. A Technical Assessment of Low Earth Satellite Broadband, 2025, https://fiberbroadband.org/wp-content/uploads/2026/01/LEO-Satellite-Study_2025_FINAL.pdf (last visited February 16, 2026); Fiber Broadband Association & Cartesian, Fiber Deployment Cost Annual Report 2025, https://fiberbroadband.org/wp-content/uploads/2026/01/FBA_Cartesian_Fiber-Deployment-Cost-Annual-Report_2025.pdf (last visited February 16, 2026).

and satellite broadband relative to fiber. Because these costs are shifted into the future, the savings claimed relying on these technologies are overstated by the difference between the cost of FWA and satellite upgrades and the cost of fiber upgrades.

BEAD also changed the original rules requiring low- and middle-income broadband offers. The mandate was replaced by voluntary provider offers. It is likely that the more competitive market environment in many locations will result in more differentiated prices. This typically entails both lower and higher prices with simultaneous variation of quality attributes.³⁶ Although such differentiation is often seen with concern, it often is welfare increasing and the details matter. Rigorous monitoring of broadband prices and an assessment of how different income and socio-demographic groups are affected will therefore be critical. Due to the limited information available at this point about voluntary provider offers and price differentiation, it is impossible to put a number on that effect as it relates to BEAD restructuring.

Overall, this analysis yields an ambiguous picture. Once savings from BEAD are calculated in a more reliable way and other benefits and costs are considered, the short-term net effect could be positive or negative. Assuming the best scenario of high savings from the benefit of the bargain round and low costs of the restructuring, the changes may have resulted in a benefit of +\$5B. In the worst-case scenario, the net effect could be negative, at about -\$3B. Using realistic middle of the range assumptions, the short-term net welfare effect of the restructuring is likely very small or negligible. This could change if the non-deployment funds can be used in a way that amplifies the positive effects of improved connectivity.

6. Discussion

The goal of this paper was to discuss the changes to the BEAD program and what these changes mean for program implementation and long-term success. Key considerations for monitoring and evaluating the restructured program were also outlined, including the necessary data that needs to be collected by the responsible parties.

The technological neutrality requirement of the revised program and the provision that locations served by the program use the least amount of subsidy possible constrained the ability of states to choose the technology mix. Given federal oversight and opaque rules, states probably chose the cheapest technology based on cost that emerged in the Benefit for the Bargain round, even if another technology may have been a better choice in the long run. While this means locations will

³⁶ For a general discussion of these issues see Johannes M. Bauer and Steven S. Wildman, The economics of usage-based pricing in broadband markets, unpublished, 2012. Recent pricing trends in urban markets seem to be in line with these expected adjustments. See John Horrigan, Broadband Prices Increased in 2025, Benton Institute for Broadband and Society, 2026, <https://www.benton.org/blog/broadband-prices-increased-2025> (last visited February 18, 2026). See also George S. Ford, Are broadband prices rising? The perils of naïve price comparisons. Phoenix Center Perspectives 26-02, February 23, 2026, for a critical analysis.

be served in the short run, some of the complications associated with particular platforms may make them unsustainable in the long run. For example, foliage, topography, and weather conditions may make satellite service less reliable than terrestrial alternatives. There are also choices about spectrum allocation made by other federal agencies, such as the FCC and NTIA, that will in part determine the long-term viability of wireless service.

Accurate comparisons of the old technology mix resulting from the original version of BEAD and the revised version are not possible. Bidding under the old BEAD program was never completed, and the data rescinded. Thus, there is no historical counterfactual that would allow us to understand what would have happened under old program rules, except for a handful of states where bidding was completed (e.g., Delaware, Louisiana, Nevada). This lack of data also makes it difficult to validate claims that the newer version of the program resulted in cost savings from reduced subsidy needs. One potential way of determining any savings from the revised version of the program, as noted previously, is to split the lower subsidy requirement into two components: (1) a part that can be attributed to continued investment that reduced the number of unserved locations and (2) a part that is due to changes in program rules, particularly the treatment of UFWL locations as served. While the first component cannot be used to claim cost savings, the second component can be claimed as savings. This latter area of savings, however, assumes that both satellite and wireless deployment are cheaper than fiber, which may not be, as highlighted above.

Another potentially murky area related to the new version of BEAD is the potential for a lack of data moving forward. The new version of BEAD does not require states to make information public, nor does it require the release of data documenting progress over time. On July 22, the U.S. Senate Committee on Commerce, Science, and Transportation advanced and cleared a bill that would require NTIA to publish data and semi-annual reports on broadband progress.³⁷ If this bill fails to become law, the lack of clear reporting guidelines would allow states not to document progress over time and impede transparency and accountability. A lack of monitoring or lax monitoring would also complicate future updates that are needed to the network related to emerging uses and needs related to AI enabled services and applications.

Lastly, the elimination of the digital equity component of BEAD, including socio-economic and affordability plan components, leaves gaps related to non-adoption of broadband should the infrastructure be made available. Despite the U.S. District Court finding that granted standing to NDIA, a final decision on the future of the digital equity programs has not been reached by courts. As noted in prior work, two of the reasons broadband is not adopted are for cost reasons and because people do not see it relevant to their lives and/or lack the skills to use broadband enabled

³⁷ The Accelerating Broadband Permits Act of 2026 requires that NTIA release data from the semi-annual reports (SARs) within 90 days after receipt, the creation of a public-facing tracking dashboard, and the creating of a permit tracking tool. See Committee on Commerce, Science, and Transportation, S.4448 - Accelerating Broadband Permits Act of 2026, <https://www.congress.gov/bill/119th-congress/senate-bill/4448/text>.

applications (Humphrey et al., 2025). Thus, the current version of BEAD is an infrastructure only program and does not address larger questions to advancing infrastructure once deployed.

7. Conclusion

Monitoring and assessing progress toward serving all eligible Broadband Serviceable Locations (BSLs) are integral parts of implementing the restructured Broadband, Equity, Access, and Deployment (BEAD) program. This report suggests using the NTIA approved numbers for BEAD-eligible locations as the baseline for assessing BEAD implementation. It proposes three layers of assessment, starting from a narrow monitoring of BEAD network rollout to broader assessments.

Most of these indicators can be derived from the semi-annual report (SAR) data. In addition, it suggests collecting a small number of additional indicators that will allow better assessment of the repercussions of BEAD investment. The report offers guidelines for comparisons between geographic areas and for the assessment of broader community impacts of BEAD investment.

Data to enable robust assessment by SBOs and other state agencies should be collected at the level of individual locations and released to the public with appropriate safeguards for proprietary information. It is therefore important that State Broadband Offices (SBOs) develop appropriate reporting mechanisms that can be used for assessment purposes in addition to meeting compliance requirements.

The reporting requirements established in the Infrastructure Act and detailed by NTIA go a long way to achieving narrow BEAD assessment goals. However, states have an interest in also understanding the effects of investment on broader outcomes. To assess these effects, we recommend collecting additional indicators. We also offer guidance on how the data can be meaningfully analyzed. Where the collection of additional data is recommended, it should be organized at the lowest possible administrative burden for subgrantees and SBOs.

Regular assessment that is built into the implementation process, and not as add-on at a later stage, serves accountability, transparency, and democratic legitimacy. It helps discern implementation strategies that work and flags obstacles and unanticipated consequences to assist in taking remedial measures. Moreover, it is a necessary ingredient for better broadband planning for the future, enabled by waves of new technologies. To facilitate learning between states, standardized reporting would be desirable.

The indicators and empirical assessment methods outlined in this document could be used most fruitfully if states made information collected from subgrantees available in a standardized, comparable form. Such information would facilitate learning from experience and knowledge sharing that would benefit all states. It would also allow gaining insights that can inform the next generation of digital connectivity infrastructure challenges.

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