

BEAD Pole Analysis

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Overview

The Broadband Equity, Access, and Deployment (BEAD) program will fund construction of broadband infrastructure to unserved and underserved locations across the United States. A significant portion of this build-out will use aerial fiber, which requires attachment to utility poles. Specifically, planned aerial deployment totals about 188,287 route-miles, or 41.8% of total BEAD fiber miles.

This report presents two separate quantifications.

First, it overlays 3,830,075 BEAD-funded locations across 6,265 projects and 54 states against 2,053 electric utility service territory polygons to investigate how BEAD deployments will span utility service territories. We focus on poles owned by electric utilities for two primary reasons. First, they own the vast majority of poles across the country, upwards of 70% per recent estimates [1]. Second, because electric utilities own most of the poles in the U.S., many of the pole-related disputes between parties involve electric utilities.

Second, it applies planning assumptions to BEAD aerial fiber mile figures to estimate utility-pole touches and related costs per touched pole and replacement costs. As part of their applications, BEAD subgrantees should have accounted for many of these costs when putting forward their bids. Our goal is not to duplicate those estimates. Rather, our goal is to provide a reasonable spread of potential pole-related costs.

Recent history of broadband deployment is replete with examples of ISPs encountering higher-than-expected pole-related costs even after negotiating in good faith with utilities. In some cases, this has made broadband projects uneconomic even with significant grant dollars. In response, legislative and regulatory bodies, including the FCC and a growing number of states, have stepped in to settle disputes and ensure that pole-related costs are fairly apportioned. However, given the patchwork nature of these responses, it is likely that BEAD subgrantees may encounter unexpected pole-related costs.

BEAD Fiber Deployment Across Utility Territories

The table below is based on the latest available compiled state BEAD Final Proposal data, which includes a mix of draft, submitted, and approved final proposals from state broadband offices.

Table 1. National BEAD deployment by ownership type.

Ownership Type	Aerial Fiber Miles In Territory	Total Fiber Miles In Territory	% of Aerial Fiber Miles	BEAD Funding	BEAD Locations
INVESTOR OWNED	83,962	179,784	44.6%	\$6,469M	1,307,737
COOPERATIVE	76,036	192,817	40.4%	\$8,313M	1,645,905
NOT AVAILABLE	16,616	53,886	8.8%	\$2,396M	458,038
POLITICAL SUBDIVISION	6,130	10,522	3.3%	\$685M	145,419
MUNICIPAL	4,460	9,989	2.4%	\$370M	92,450
FEDERAL	585	1,003	0.3%	\$78M	24,568
STATE	253	1,000	0.1%	\$341M	53,261
MUNICIPAL MKTG AUTHORITY	127	792	0.1%	\$13M	2,310
COMMUNITY CHOICE AGGREGATOR	117	257	0.1%	\$29M	10,457
WHOLESALE POWER MARKETER	0	618	0%	\$10M	2,827
Total	188,287	450,668	100%	\$18,704M	3,742,972

The following table compares BEAD aerial mile share with the nationwide customer share across utility ownership types. Most notably, a disproportionately large share of BEAD deployment will take place across electric cooperative service territories, compared to their share of total utility customers. In other words, close to half of all aerial BEAD fiber deployment may involve poles owned by cooperatives.

Table 2. Ownership-type comparison of BEAD aerial-mile share and nationwide electric-customer share.

Ownership Type	Percent of BEAD Aerial Miles	Percent of Total Utility Customers
INVESTOR OWNED	44.6%	69.5%
COOPERATIVE	40.4%	13.1%
NOT AVAILABLE	8.8%	2.9%
POLITICAL SUBDIVISION	3.3%	2.7%
MUNICIPAL	2.4%	9.6%
FEDERAL	0.3%	0%
STATE	0.1%	2%
MUNICIPAL MKTG AUTHORITY	0.1%	9.6%
COMMUNITY CHOICE AGGREGATOR	0.1%	0.3%
WHOLESALE POWER MARKETER	0%	0%

Pole Touches and Cost Exposure

The following section uses planning assumptions to estimate utility-owned poles touched and cost exposure from BEAD aerial route miles. These are intended to illustrate the magnitude of potential costs, and are in no way intended as exact engineering estimates. Specifically, the “low” and “high” scenarios are the cumulative result of picking all of our “low” and “high” assumptions respectively, and are intended to act as a lower and upper bound to this illustrative calculation.

As stated above, BEAD subgrantees should have accounted for many of these costs when putting forward their bids. Our goal is not to duplicate those estimates. Rather, our goal is to provide a reasonable spread of potential pole-related costs.

Assumptions Summary

Low / Base / High

- **Poles per mile:** 30 (about one pole every 176 feet)
- **Utility pole ownership share:** 70%
- **Cost per touched pole:** \$75 / \$175 / \$450
- **Replacement rate:** 3% / 4% / 8%
- **Replacement cost per replaced pole:** \$2,000 / \$3,500 / \$9,000

Details on these assumptions are provided in Methodology, Pole Touches and Cost Exposure, Assumption Inputs.

Estimated Poles Touched

Total poles touched before applying the utility-ownership share adjustment are shown below.

Table 3. Fixed geometry and ownership inputs used in all scenarios.

Total Poles Touched	Utility Ownership Share	Utility Poles Touched
5,648,614	70%	3,954,030

Whether a state regulates its utility poles (versus the FCC) is one of several factors that can influence pole related costs [2]. The following table breaks down our estimates of poles touched by FCC- and state-regulated regimes.

Table 4. Estimated pole touches by FCC-regulated vs state-regulated pole-attachment regimes.

Regulatory Regime	States	Total Poles	Utility Poles	IOU Poles
FCC-Regulated ¹	27	2,227,775	1,559,442	411,384
State-Regulated	23	3,418,887	2,393,221	1,350,459

The neat dichotomy in the above table belies the inconsistent patchwork reality of utility pole regulation. FCC jurisdiction extends only to IOU electric utilities; cooperatives and municipal utilities are exempt. A similar dynamic is evident in many, but not all, of the 23 states that have “reverse preempted” themselves from the FCC. In practice, this has resulted in electric utilities charging a broad range of different fees to ISPs seeking to attach equipment on their poles. According to one study, on average, attachment rates vary from \$6.84/attachment/year for IOUs to \$15.39/attachment/year for cooperatives [2].

¹States treated as FCC-regulated in this report: Alabama, Arizona, Colorado, Georgia, Hawaii, Indiana, Iowa, Kansas, Maryland, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Mexico, North Carolina, North Dakota, Oklahoma, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Virginia, Wisconsin, and Wyoming. Source: FCC public notice on state pole-attachment self-certification [3].

In states where cooperatives and municipal electric utilities are unregulated, there are few guardrails in place to provide predictability and consistency in how pole-related costs are set, increasing the chances that BEAD subgrantees could encounter higher-than-expected pole fees from these entities.

Estimated Pole Costs

The cost-per-touched-pole in the following table is intended to capture a “total” cost-per-pole, including make-ready, attachment, and any other associated costs. Replacement costs are estimated separately.

Table 5. Nationwide cost-per-touched-pole component estimates.

Scenario	Utility Poles Touched	Cost per Touched Pole	Cost Component
LOW	3,954,030	\$75	\$296.6M
BASE	3,954,030	\$175	\$692.0M
HIGH	3,954,030	\$450	\$1,779.3M

Replacement costs are estimated as a function of both the average replacement rate (what share of poles must be replaced) and the average replacement cost. The following table presents a wide range of estimates.

Table 6. Nationwide replacement component estimates.

Scenario	Utility Poles Touched	Replacement Rate	Replacement Cost per Pole	Utility Replacement Poles	Cost Component
LOW	3,954,030	3%	\$2,000	118,621	\$237.2M
BASE	3,954,030	4%	\$3,500	158,161	\$553.6M
HIGH	3,954,030	8%	\$9,000	316,322	\$2,846.9M

Methodology

BEAD Fiber Deployment Across Utility Territories

Data Sources

- **BEAD Project and Location Data (NTIA):** 3,830,075 locations across 6,265 projects in 54 states and territories.
- **FCC Broadband Serviceable Location Fabric (v7):** Provides latitude and longitude for each BEAD location.
- **EIA Electric Retail Service Territories:** 2,053 utility service territory polygons covering the continental United States, Alaska, Hawaii, and territories.

Spatial Matching

Each BEAD location was geocoded via the Fabric and tested for containment within utility service territory polygons using a point-in-polygon spatial join. When a location fell within overlapping territories (e.g., a distribution utility within a larger transmission territory), the smallest polygon by area was selected.

Utilities registered in one state may serve neighboring states (e.g., Idaho Power serves eastern Oregon). No state filter was applied to the utility dataset to ensure cross-border territories were captured.

Allocation

BEAD project data reports aerial and buried fiber mileage, total funding, and location counts at the *project level*, not per-location. Each location within a project is allocated an equal share of the project's aerial miles, total fiber miles, and BEAD funding. These per-location shares are then aggregated by utility territory to produce the estimates in this report.

In the cost-per-touched-pole component, cost is modeled as an expected incremental USD-per-utility-pole-touched term. This term captures non-replacement costs (for example, make-ready work, attachment fees, and related pole-attachment charges).

Data Quality Exclusions

Our initial review of BEAD Final Proposal data identified several potential data errors, namely where “fiber miles” appears to have been erroneously entered in feet, or otherwise incorrectly. To prevent these from skewing results or appearing in output, we implemented a simple filter. Utility rows are excluded from all aggregate analysis tables when both of the following conditions are true:

- total-fiber-miles per location ≥ 2 , and
- total-fiber-miles per USD 1M of BEAD support ≥ 300 .

This results in 7 of 2053 utility rows are excluded, removing about 8,702 aerial miles, 15,874 total fiber miles, \$10M in BEAD support, and 2,277 locations from analysis aggregates.

Pole Touches and Cost Exposure

This calculation is intended to estimate **utility-owned** pole touches and cost exposure.

Assumption Inputs

Poles Per Mile

Assumption: use **30 poles per aerial mile** (about one pole every 176 feet).

Table 7. Poles-per-mile evidence.

Source	Figure	How used
PG&E pole inventory reporting [4]	2.5M poles over 87,000 overhead line-miles (about 28.7 poles/mile)	Large utility asset-derived benchmark for blended system spacing; treated as a conservative national anchor due to circuit-mile vs route-mile ambiguity.
Vulcan field-data collection guide [5]	Roughly 30 poles per continuous mile	Industry practitioner planning benchmark for route-mile fieldwork; used as a second empirical anchor near the high-20s to low-30s range.
PSE&G utility operations explainer [6]	Typically 100 or 125 ft apart	Operator-provided distribution context; implies about 53 or 42 poles/mile.
NAWPC technical bulletin [7]	Worked examples at 200, 250, and 300 ft wind spans	Engineering design context; implies about 26, 21, and 18 poles/mile.
Wisconsin utility distribution standards [8]	P55 examples use 250-ft and 300-ft spans	Utility-specific design examples; additional context for longer-span cases.

Utility Pole Ownership

Assumption: apply a nationwide utility-owned share of **70%**.

Table 8. Pole-ownership evidence.

Source	Figure	How used
USTelecom pole ownership submission [1]	Utilities own about 60%-75% of poles (implied telco share 25%-40%)	Applies a nationwide utility-ownership share adjustment so cost estimates reflect utility-owned poles only.

Cost per Touched Pole

Assumption: use cost per touched pole of **\$75 (low)**, **\$175 (base)**, and **\$450 (high)**. This term captures non-replacement costs only.

Table 9. Cost-per-touched-pole evidence.

Source	Figure	How used
NY annual reports bulk extract, deduped by (company, year) [9]	\$99 per licensed attachment	Direct lower-bound empirical anchor from template-reported charges.
NY annual reports major-utility quality-checked subset [9]	~\$88 per licensed attachment	Cross-check benchmark from larger utility filings.
NY annual reports distribution [9]	p25 ~\$72; median ~\$168; p75 ~\$321; p90 ~\$927	Shows strong dispersion and supports scenario bands.

Source	Figure	How used
FBA 2025 survey [10]	Make-ready ~14% of project cost (outliers up to 150%)	Supports higher-tail scenarios even when per-pole invoices are not explicit.

Replacement Cost per Replaced Pole

Assumption: use replacement cost of **\$2,000 (low)**, **\$3,500 (base)**, and **\$9,000 (high)** per replaced pole.

Table 10. Replacement cost evidence.

Source	Figure	How used
NH 2025 pole cost table [11]	\$1,881-\$2,853	Lower-bound replacement benchmark.
Texas replacement program (implied full cost) [12]	~\$3,000 per replaced pole	Moderate program-scale replacement anchor.
Charter NY filing [13]	~\$9,000 average; up to \$13,500	Upper non-California benchmark for stressed replacement cases.
SCE filing (high-cost context) [14]	~\$27,500-\$40,700	Extreme stress context; not used in the core nationwide range.

Replacement Rate

Assumption: set replacement rate to **3% (low)**, **4% (base)**, and **8% (high)**.

Table 11. Replacement-rate evidence.

Source	Figure	How used
NY white paper (utility comparison) [15]	Attacher-paid replacement incidence ~3.2% to ~7.9%	Primary anchor for low/base and upper-tail replacement-rate settings.
NY annual reports major-utility quality-checked subset [9]	Weighted signal ~5.7%	Cross-check for central tendency around low/base assumptions.

Appendices

Appendix A: State Summary by Ownership Type

Table 12. State BEAD aerial fiber miles by ownership type.

State	IOU	Co-op	Muni	Pol. Sub.	Federal	Other ²	Total
AK	0	495	0	0	0	251	745
AL	1,657	2,735	328	0	0	171	4,891
AR	2,081	1,505	110	0	0	83	3,779
AS	0	0	0	0	0	0	0
AZ	1,594	1,167	42	114	133	937	3,988
BC	0	0	0	0	0	0	0
CA	4,644	66	125	1,648	0	306	6,789
CO	144	2,202	2	0	0	92	2,440
CT	51	0	0	0	0	3	54
DC	65	0	0	0	0	0	65
DE	48	448	16	0	0	2	515
FL	1,052	1,336	116	0	0	9	2,513
GA	1,294	3,385	92	4	0	159	4,935
HI	4,762	66	0	0	0	0	4,828
IA	0	0	0	0	0	4	4
ID	62	277	0	0	0	22	361
IL	1,304	2,450	11	0	0	1,704	5,469
IN	885	2,525	18	0	0	772	4,200
KS	0	0	4	0	0	720	724
KY	1,062	9,690	90	0	0	160	11,002
LA	107	1,507	15	2	0	65	1,695
MA	106	0	52	30	0	4	192
MD	334	179	63	0	0	1	577
ME	2,903	908	0	0	0	37	3,848
MI	1,772	1,985	143	0	0	752	4,653
MN	402	1,333	7	0	0	38	1,780
MO	1,677	8,631	30	0	0	1,279	11,617
MP	0	0	0	0	0	0	0
MS	406	3,993	251	0	0	215	4,865
MT	2	106	0	0	0	86	194
NC	1,844	2,343	67	0	0	78	4,332
ND	0	0	0	0	0	0	0
NE	0	0	0	250	0	249	499
NH	547	155	0	0	0	1	704

²Includes “Not Available,” “State,” “Wholesale Power Marketer,” “Community Choice Aggregator,” “Municipal Marketing Authority,” and unmatched locations.

State	IOU	Co-op	Muni	Pol. Sub.	Federal	Other ³	Total
NJ	879	0	0	0	0	62	940
NM	89	1,290	0	0	0	106	1,485
NV	394	68	0	0	0	0	462
NY	4,062	0	5	0	0	991	5,058
OH	8,155	1,466	6	0	0	373	10,001
OK	3	2,264	4	0	0	263	2,534
OR	17,549	334	144	536	117	299	18,979
PA	12,844	4,925	8	0	0	1,617	19,393
RI	101	0	0	30	0	0	131
SC	113	454	0	0	0	9	577
SD	44	13	0	0	0	7	63
TN	0	1,964	2,612	0	334	0	4,910
TX	474	6,192	57	22	0	998	7,743
UT	0	10	2	10	0	116	138
VA	103	115	1	0	0	149	368
VT	709	1,043	0	0	0	129	1,881
WA	2,880	4,569	18	3,484	0	635	11,584
WI	3,268	1,840	22	0	0	982	6,112
WV	1,490	0	0	0	0	2,179	3,669
WY	0	1	0	0	0	0	1

³Includes "Not Available," "State," "Wholesale Power Marketer," "Community Choice Aggregator," "Municipal Marketing Authority," and unmatched locations.

Appendix B: Top 50 Utilities by Aerial Miles

Table 13. Top 50 utilities by estimated BEAD aerial fiber miles.

Utility ⁴	State	Type	Aerial Miles	Total Miles	BEAD Funding	Locations
PACIFICORP	OR	IOU	16,496	25,800	\$463M	69,436
PPL ELECTRIC UTILITIES CORP	PA	IOU	4,429	5,253	\$153M	27,941
PACIFIC GAS & ELECTRIC CO.	CA	IOU	3,939	8,617	\$769M	151,382
HAWAII ELECTRIC LIGHT CO INC	HI	IOU	3,916	3,981	\$18M	5,001
MONONGAHELA POWER CO	PA	IOU	3,411	3,469	\$134M	15,833
INLAND POWER & LIGHT COMPANY	WA	Co-op	3,099	3,905	\$163M	23,596
APPALACHIAN POWER CO	OH	IOU	2,861	3,195	\$229M	40,454
WEST PENN POWER COMPANY	PA	IOU	2,308	2,700	\$105M	18,880
HARRISON RURAL ELEC ASSN, INC	WV	N/A	2,088	2,178	\$97M	12,972
ENTERGY ARKANSAS LLC	AR	IOU	2,081	4,969	\$159M	37,565
WISCONSIN PUBLIC SERVICE CORP	WI	IOU	1,901	12,107	\$184M	40,304
ALABAMA POWER CO	AL	IOU	1,657	3,192	\$130M	23,974
CENTRAL MAINE POWER CO	ME	IOU	1,608	1,686	\$17M	6,834
AVISTA CORP	WA	IOU	1,529	1,989	\$60M	8,686
THE POTOMAC EDISON COMPANY	PA	IOU	1,502	2,055	\$103M	13,930
BLACK DIAMOND POWER CO	WV	IOU	1,490	1,640	\$69M	7,275
TAYLOR COUNTY RURAL E C C	KY	Co-op	1,386	1,386	\$24M	6,281
CENTRAL HUDSON GAS & ELEC CORP	NY	IOU	1,338	1,719	\$78M	3,377
SOUTHWEST MISSISSIPPI E P A	MS	Co-op	1,313	1,857	\$61M	12,854
COMMONWEALTH EDISON CO	IL	IOU	1,300	6,635	\$179M	36,798
SOUTH KENTUCKY RURAL E C C	KY	Co-op	1,300	1,300	\$40M	8,218
VERSANT POWER	ME	IOU	1,296	1,321	\$14M	6,470
GEORGIA POWER CO	GA	IOU	1,294	3,757	\$54M	24,054
OZARK BORDER ELECTRIC COOP	MO	Co-op	1,286	1,479	\$53M	13,339

⁴Rows shown here exclude quality-control outliers removed from analysis.

Utility ⁵	State	Type	Aerial Miles	Total Miles	BEAD Funding	Locations
PUGET SOUND ENERGY INC	WA	IOU	1,259	1,795	\$126M	33,352
MID-SOUTH ELECTRIC COOP ASSN	TX	Co-op	1,258	1,947	\$106M	16,494
SOUTHERN PINE ELEC COOP, INC	AL	Co-op	1,131	1,436	\$43M	6,892
OZARK ELECTRIC COOP INC - (MO)	MO	Co-op	1,128	1,387	\$44M	13,964
NIAGARA MOHAWK POWER CORP.	NY	IOU	1,104	1,314	\$85M	17,540
GREAT LAKES ENERGY COOP	MI	Co-op	1,104	3,355	\$94M	18,831
EAST CENTRAL ENERGY	MN	Co-op	1,082	1,529	\$23M	6,961
NOLIN RURAL ELECTRIC COOP CORP	KY	Co-op	1,075	1,075	\$21M	5,712
DTE ELECTRIC COMPANY	MI	IOU	1,063	7,087	\$206M	44,175
PORTLAND GENERAL ELECTRIC CO	OR	IOU	1,053	1,664	\$149M	22,085
DUKE ENERGY CAROLINAS, LLC	NC	IOU	1,044	2,941	\$107M	26,045
KENTUCKY UTILITIES CO	KY	IOU	1,042	1,042	\$31M	7,810
ARIZONA PUBLIC SERVICE CO	AZ	IOU	1,026	1,931	\$100M	27,044
OHIO POWER CO	OH	IOU	1,004	1,196	\$62M	17,226
JACKSON ENERGY COOP CORP - (KY)	KY	Co-op	997	997	\$26M	6,351
NEW YORK STATE ELEC & GAS CORP	NY	IOU	994	1,235	\$79M	9,342
KINGS RIVER CONSERVATION DIST	CA	Pol. Sub.	926	1,548	\$155M	20,479
EASTERN MAINE ELECTRIC COOP	ME	Co-op	908	939	\$13M	6,846
CLAVERACK RURAL ELEC COOP INC	PA	Co-op	889	903	\$47M	4,804
LACLEDE ELECTRIC COOP, INC	MO	Co-op	868	1,550	\$54M	13,754
PENNSYLVANIA ELECTRIC CO	OH	IOU	860	952	\$36M	6,900
VERMONT ELECTRIC COOPERATIVE, INC	VT	Co-op	858	921	\$48M	7,760
HAWAIIAN ELECTRIC CO INC	HI	IOU	845	1,691	\$4M	860

⁵Rows shown here exclude quality-control outliers removed from analysis.

Utility ⁶	State	Type	Aerial Miles	Total Miles	BEAD Funding	Locations
UNITED ELECTRIC COOP, INC - (PA)	PA	N/A	826	957	\$45M	6,813
CARROLL ELECTRIC COOP CORP - (AR)	AR	Co-op	826	919	\$38M	6,829
CITY OF GREENEVILLE - (TN)	TN	Muni	825	825	\$11M	2,767

⁶Rows shown here exclude quality-control outliers removed from analysis.

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