# Fiber Deployment Cost Annual Report

2025

## EXECUTIVE SUMMARY

The Fiber Broadband Association partnered with Cartesian to research the cost of deploying fiber in communities and environments in the United States.

In preparing the third edition of the Fiber Deployment Cost Report, Cartesian gathered input from a wide variety of firms building fiber networks across the nation. Research was conducted via phone interviews and online surveys in September and October 2025. Participants included network operators and contractors, with projects distributed across 38 individual states. We also reviewed FCC data, company announcements, and other literature to provide context for the scale and pace of deployment.

Selected highlights from this year's study are presented below.

### *More than 60% of households have access to fiber today*

Fiber now passes more than 60% of US households, with 11.8M additional homes passed in 2025 (including homes with more than one passing), of which 8.1M passings represent unique homes. Fiber also won big with the Broadband Equity Access and Deployment (BEAD) program, with fiber selected for 63% of eligible locations[1].

### *Underground deployments are twice as costly as aerial deployments and more expensive than last year*

This year, the typical underground deployment was reported to cost $18.00/ft, while the typical aerial deployment was $8.00/ft. Reported deployment costs were higher this year than last; the median underground deployment cost increased by 3% and for aerial, the median cost increased by 14%. While these are independent samples, the comparison aligns with reports that overall costs have increased from last year (see below).

### *Labor accounts for 72% of underground deployment costs and 64% of aerial*

Labor formed the largest share of deployment costs, typically 72% of underground deployments and 64% of aerial deployments. Median labor costs were reported as $12.23/ft for underground builds, and $4.50/ft for aerial builds. Using internal labor tended to provide cost efficiencies of about 10%.

### *Burial and construction methods are key determinants of deployment costs*

Laying fiber underground directly versus in a new conduit is ~40% cheaper but offers less flexibility and potentially higher maintenance costs. Trenching was reported to have the highest deployment cost, 60% more than plowing and 6% more than directional boring based on median costs.

### *Most respondents felt the burden of higher deployment costs in 2025 and expect to face more cost increases in 2026*

92% of this year's respondents reported a cost increase in 2025 compared to 80% of respondents last year who expected an increase in 2025. Going into 2026, 88% of respondents expect costs to increase again next year, driven by labor and materials, with permitting and make-ready costs also cited as key contributors.

[1] State Broadband Offices, NTIA

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## INTRODUCTION

More than 60% of all households in the US—nearly 84.6M households—are serviceable by fiber today. Of those with fiber access, 40M households are connected to fiber, making it more accessible than ever before. Fiber coverage is set to expand further in the years to come, with the Fiber Broadband Association projecting fiber will reach 90% of homes by 2030—positioning fiber to become the dominant broadband access technology in the country.

As industry players continue to build out fiber broadband networks, understanding how costs vary across different scenarios can help operators and contractors evaluate opportunities and plan construction more effectively. Historically, the industry has lacked reliable benchmarks to provide an in-depth look at costs related to fiber deployment. To bridge this gap, the Fiber Broadband Association has again partnered with Cartesian to research the cost of fiber deployment in communities across the US over time. The first edition of this report was published in 2023, followed by the second edition, released last year.

In this latest report, we explore the fiber deployment landscape in 2025 using our findings from the 2025 Fiber Deployment Cost Survey and look ahead to developments expected in 2026 and beyond.

Section 1 looks at 2025 fiber deployment through deployment numbers, trends, and industry news.

Section 2 provides an overview of the factors that impact fiber deployment costs and detailed findings from this year's Fiber Deployment Cost Study.

Section 3 reviews deployment costs and timeline trends based on findings from this year's Fiber Deployment Cost Study and summarizes expectations for the coming year.

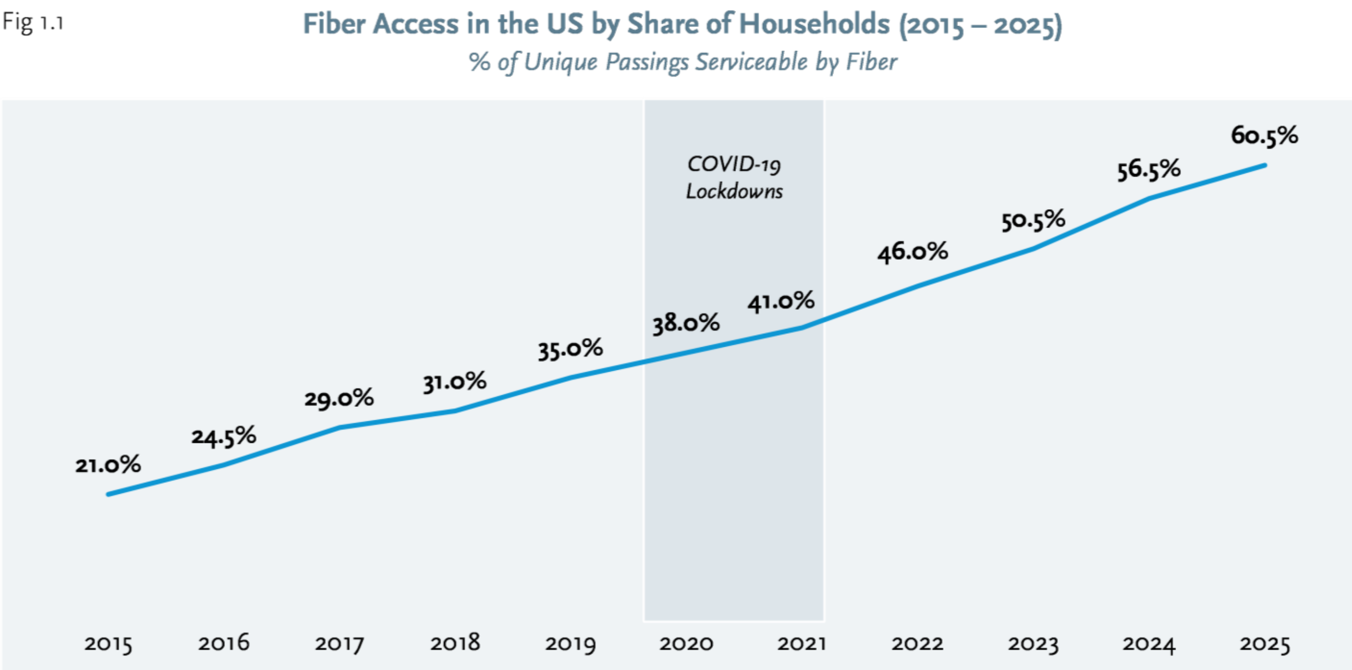
## SECTION 1: FIBER YEAR IN REVIEW

### *Over 60% of homes in the US are now serviceable by fiber*

The momentum of fiber deployment continued in 2025, with another strong year for fiber rollouts in the books.

According to a recent study by the Fiber Broadband Association and RVA, more than 60% of US homes are now passed by fiber[2], about 84.6M homes in total. This reflects 11% growth in 2025 with 11.8M additional homes passed in 2025 (including homes with more than one passing), of which 8.1M passings represent unique homes. While slightly below the record-breaking 13% growth rate of 2024, the deployment landscape remains strong. Figure 1.1 reflects the evolution of fiber coverage in the US since 2015.

Fig 1.1




Source: 2025 US FTTH Deployment and Market Update – Fiber Broadband Association, RVA LLC

Deployment momentum is expected to continue into 2026, supported by continued high levels of private and public investment. Current and projected growth for fiber rollouts are on track with Fiber Broadband Association's goal for fiber to reach 90% of US homes by 2030.

### *16% of fiber serviceable homes now have a choice of fiber network*

Continued investment in fiber means more competition for providers and more choice for consumers, as seen by the growing number of homes with multiple fiber providers. As of September 2025, 13.8M homes[3] (16.1% of homes with fiber access) are now serviceable by at least two fiber providers, an increase of 2.2M additional homes over the previous year (Figure 1.2).

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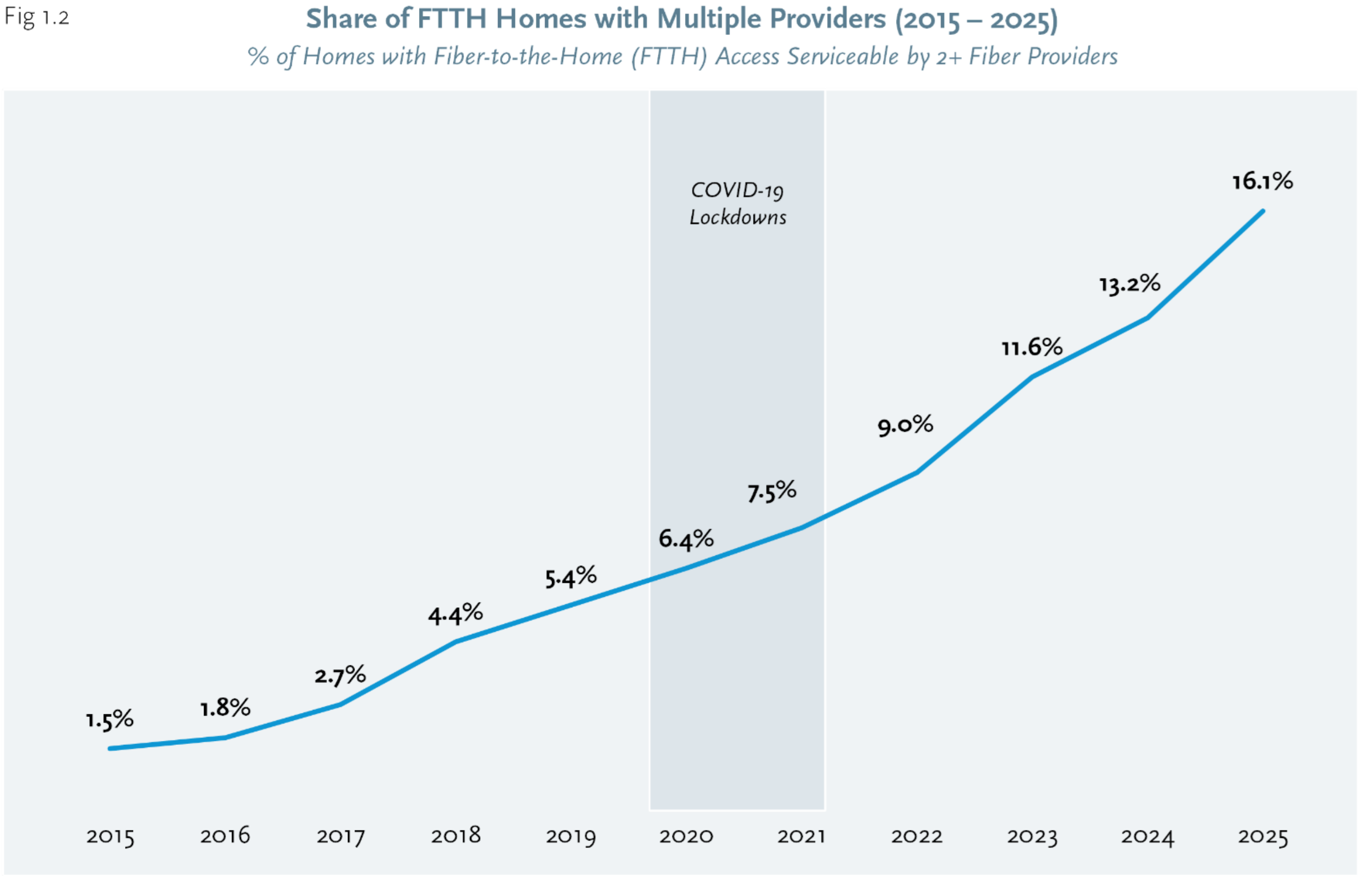
[2] Fiber Broadband Association, RVA LLC joint study – data as of September 2025; passings represents homes with at least one fiber service marketed

[3] Fiber Broadband Association, RVA LLC joint study – data as of September 2025; passings represents homes with at least one fiber service marketed

Fig 1.2




Source: 2025 US FTTH Deployment and Market Update – Fiber Broadband Association, RVA LLC

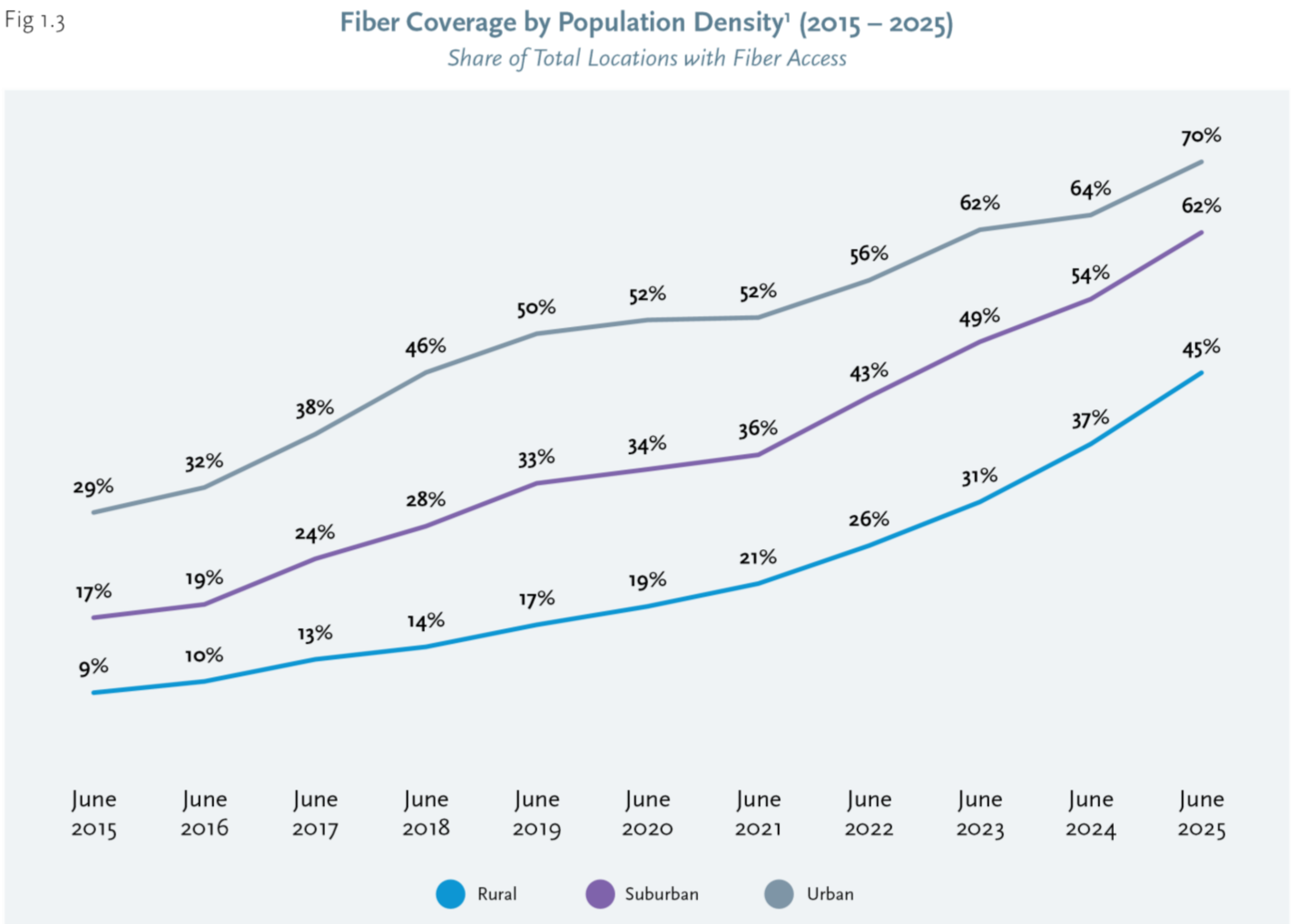
This year's 3-percentage point increase in access to two or more providers represents the largest year-over-year increase since tracking began in 2015.

## *Suburban and rural coverage make significant gains*

More rural areas are getting access to fiber, with coverage nearing 50%, helping to narrow the rural-urban digital divide that peaked in 2020. This gap in fiber access is expected to shrink further as BEAD deployments prioritize more rural areas and providers continue pursuing first-to-fiber market positions in greenfield markets.

As of June 2025, approximately 12.8M rural locations (45%) were serviceable by fiber, a year-over-year increase of 2.3M locations. Rural coverage has made rapid headway since 2021, with fiber penetration more than doubling from 21% in 2021 to 45% in 2025. Suburban coverage has also increased, with approximately 47.8M suburban locations (62%) serviceable by fiber as of June 2025, up from 41.4M locations in June 2024. As expected, urban locations continue to lead on fiber access, with 70% of locations serviceable by fiber. Coverage across the board continues to make strides, with rural areas showing the most significant gains in recent years (Figure 1.3).

Fig 1.3



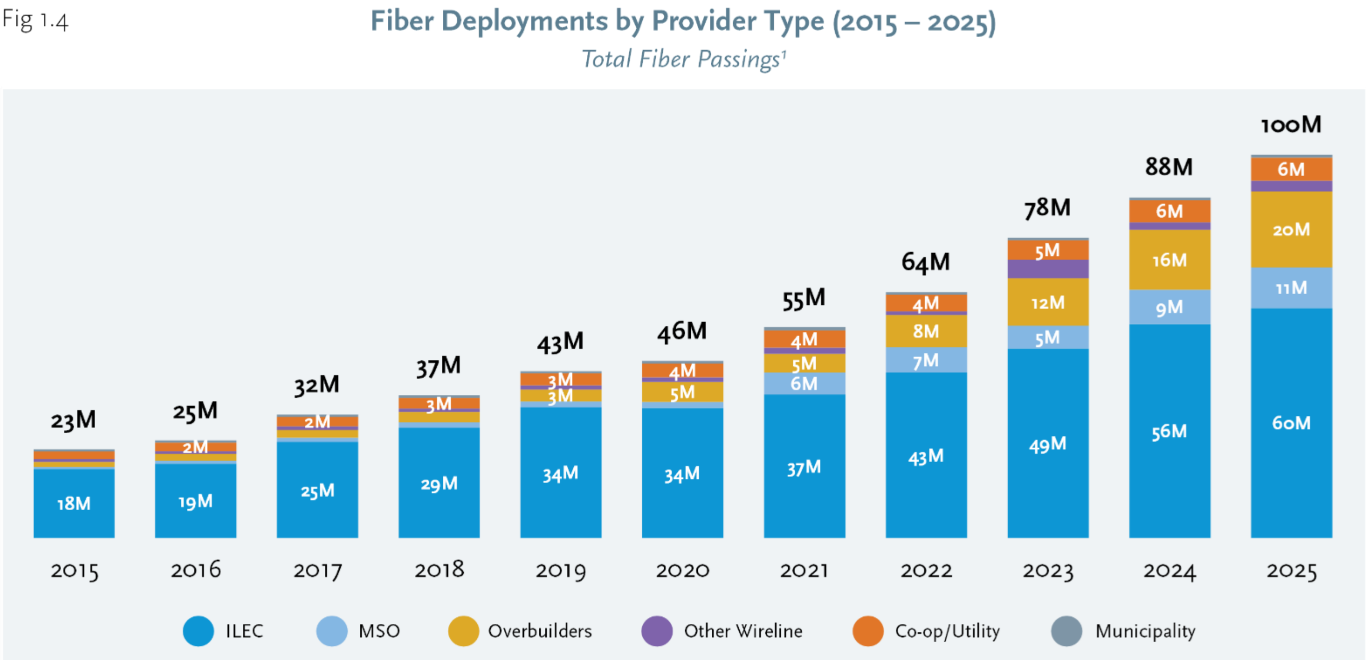

Note: FCC Form 477 data utilized for June 2015 to June 2021, and FCC Broadband Data Maps used for June 2022 and beyond
1: Rural is <100 locations per square mile, suburban is 101 – 2500 locations per square mile, urban is 2500+ locations per square mile
Source: FCC Form 477 and Broadband Data Collection (BDC) filings, June 2025 serviceability, accessed November 2025

Increased rural coverage is reflected in the rapid growth seen in relatively rural states including Arizona, Idaho, Maine, New Mexico, and Wyoming—these states recorded the largest growth in fiber coverage from 2024 to 2025, averaging 39% year-over-year (YoY).

### *Fiber growth is driven by overbuilder expansions and ILEC activity*

Current fiber expansion is driven by a mix of footprint expansion by ILECs and overbuild of legacy players by fiber-based providers. While ILECs still account for the largest share of homes currently served by fiber, other service provider types are increasingly deploying more fiber in both new and existing footprints (Figure 1.4).

Fig 1.4




Note: Cartesian estimates based on data from FCC Form 477, FCC Broadband Data Map, and Census Bureau data
1: Includes double passings
Source: FCC Form 477 and Broadband Data Collection (BDC) filings, June 2025 serviceability, accessed November 2025, Census Bureau

ILECs continue to grow through organic expansion, network upgrades, and acquisitions. Since 2020, ILECs have nearly doubled their fiber passings (34M in 2020 to 60M in 2025), with annual growth rates between 10–15%.

Significant acquisition and investment activity further underscores the industry's optimism around fiber. AT&T's acquisition of Lumen's Mass Markets fiber business, Verizon's acquisition of Frontier, and T-Mobile's joint venture with KKR to acquire Metronet are among the major deals nearing finalization. These transactions will expand the long-term footprints of these players, with Verizon gaining 10M premises[4], T-Mobile gaining 6.5M premises[5] and AT&T gaining at least 4.5M premises[6].

Overbuilders, meanwhile, are reshaping the competitive landscape. Historically a smaller share of the market, overbuilders deployed as much fiber in 2025 as ILECs, adding more than 4M new passings—a 25% increase YoY and the fastest growth rate of any provider type. Since 2020, they have quadrupled their passings to 20M, threatening the dominance of incumbents like ILECs and MSOs.

MSOs also made considerable progress in 2025 primarily by upgrading legacy networks to fiber to remain competitive with overbuilders in overlapping territories. They were the largest recipients of funding in the recent BEAD Benefit of the Bargain round (BoB), signaling continued momentum in their fiber rollout strategy. Electric cooperatives and municipalities continued to expand, as well, with approximately 7M fiber passings between them at a steady annual growth rate of about 5%. As dominant providers in many rural areas, they play a key role in connecting digitally isolated communities.

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[4] Verizon press release, September 2024

[5] T-Mobile press release, July 2024

[6] AT&T press release, May 2025; Lumen Q3 2025

## SECTION 2: FIBER DEPLOYMENT COSTS

Here we present findings from our annual fiber deployment cost survey, including deployment and drop cost benchmarks across a range of build scenarios in the US. Now in its third year, the survey allows us to track how costs are evolving over time by comparing results across the years.

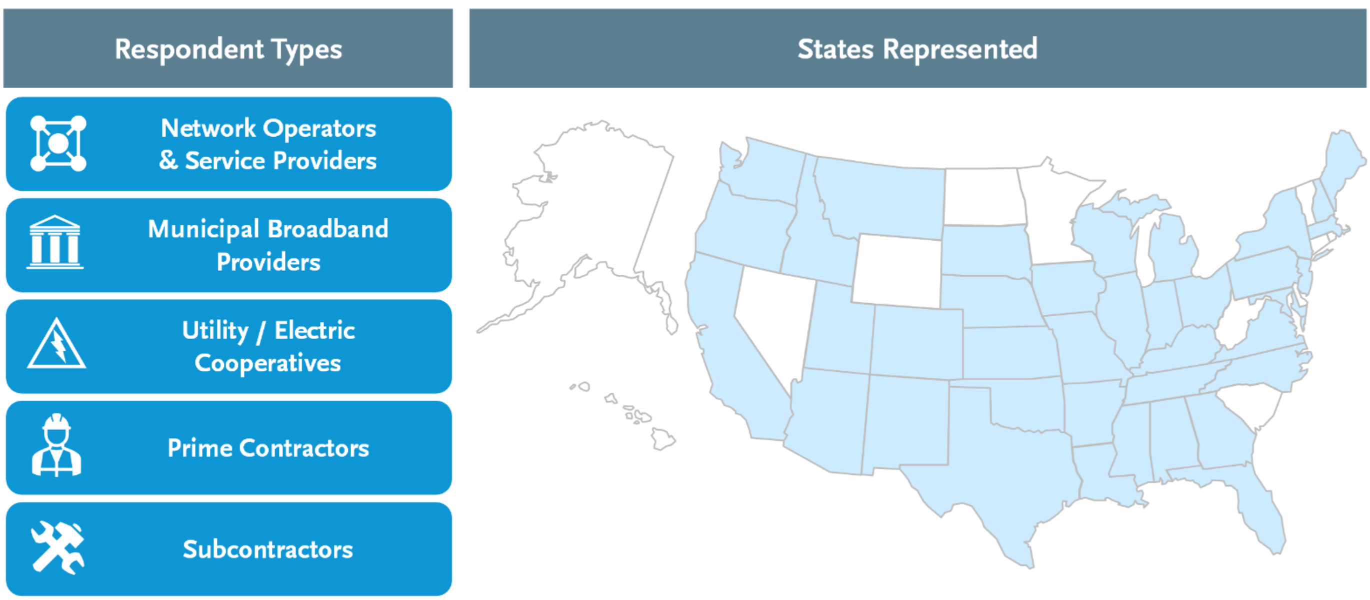
The survey covers four main topic areas: deployment costs (labor and materials), drop costs, other project costs, and changes in costs over time. The first three topics are addressed in Section 2, while sentiment on cost changes is covered in Section 3.

### *Survey responses represent a cross-section of the fiber industry*

We conducted an online survey and phone interviews with a broad range of industry participants involved in fiber deployment, including service providers, contractors, national players, local operators, new entrants, and more. Nearly half of the responses came from service providers, and most respondents had more than 10 years of deployment experience.

Responses covered deployment projects in 38 states and a wide variety of build scenarios and topographies, with a roughly even split across urban, suburban, and rural areas (approximately 30% each).

While the results reflect typical build costs based on self-reported survey data, they provide a representative view of prevailing deployment economics. Costs may not be representative of every fiber deployment and should not be interpreted as precise benchmarks. Many factors influence the cost of fiber deployment, and no two projects are the same.




Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

As in last year's study, respondents were asked to characterize their reported deployment project to help contextualize costs, including by terrain, construction technique, housing density, labor model[7] (internal vs. outsourced), and cable type for aerial builds (Strand and Lash vs. All-Dielectric Self-Supporting (ADSS)).

A new addition to this year's report is data on the pace of deployments and the typical crew sizes associated with a respondent's fiber build. Another new addition relates to deployment timelines, which is largely covered in Section 3.

To allow for meaningful comparison of responses, respondents were asked to report labor[8] and materials on a unit cost basis (cost per foot) when reporting deployment costs.

### *Underground deployments are more than twice as expensive and more common than aerial builds*

We received information from respondents for both underground and aerial deployment projects. In aerial deployment, fiber cables are run overhead on utility poles, whereas underground deployments place cables in conduits and ducts.

Underground deployments are generally more expensive but offer greater resilience, with higher upfront capex enabling lower ongoing costs due to fewer repairs. Aerial deployments can also be costly when significant pole work is required, but when poles are available and need minimal preparation, they offer significant advantages.

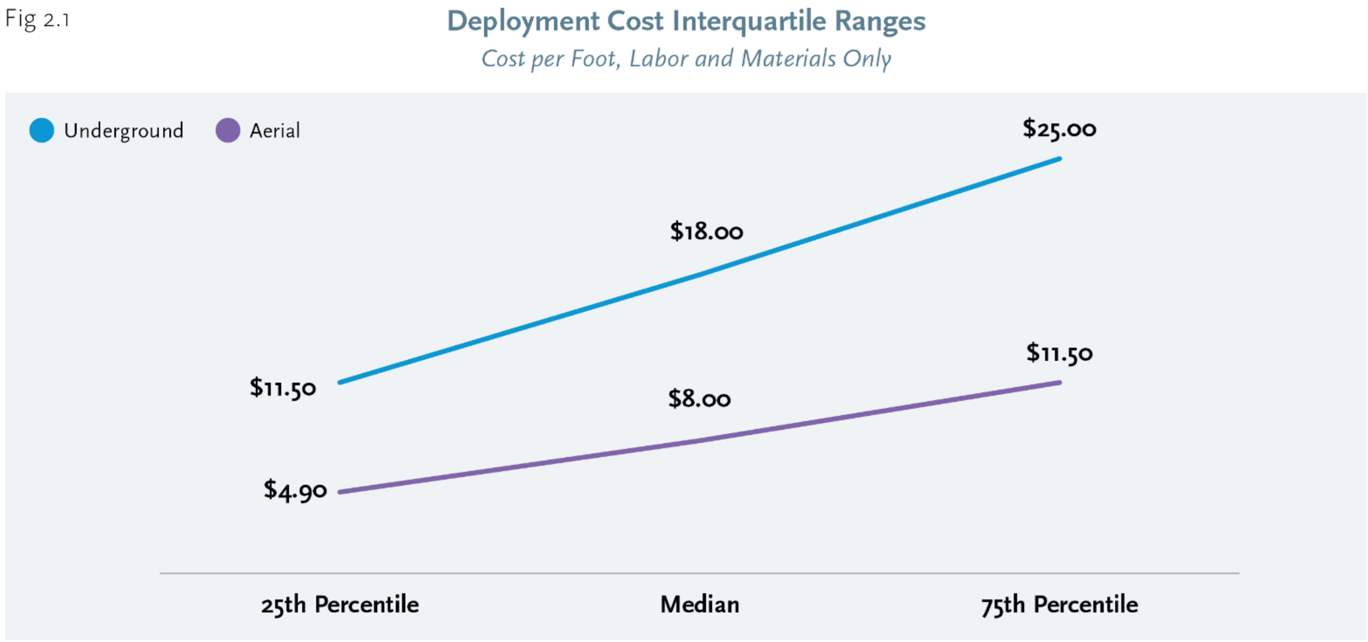
Given the unique benefits of each approach, nearly half (49%) of survey respondents use both aerial and underground deployment methods in their network build outs. Thirty eight percent exclusively deploy fiber underground and 13% exclusively deploy fiber overhead.

Survey responses confirm the cost differences between the two methods: median underground deployment costs were $18.00/ft compared to $8.00/ft for aerial, as shown in Figure 2.1. For underground deployments, the interquartile range spans $11.50/ft to $25.00/ft, compared with $4.90/ft to $11.50/ft for aerial. Given the wide variation in reported costs, our analysis focuses on median costs unless otherwise stated.

[7] Characterizations of internal and outsourced labor were self-reported and may vary by organization or respondent

[8] For labor costs, respondents were asked to provide fully loaded costs

Fig 2.1



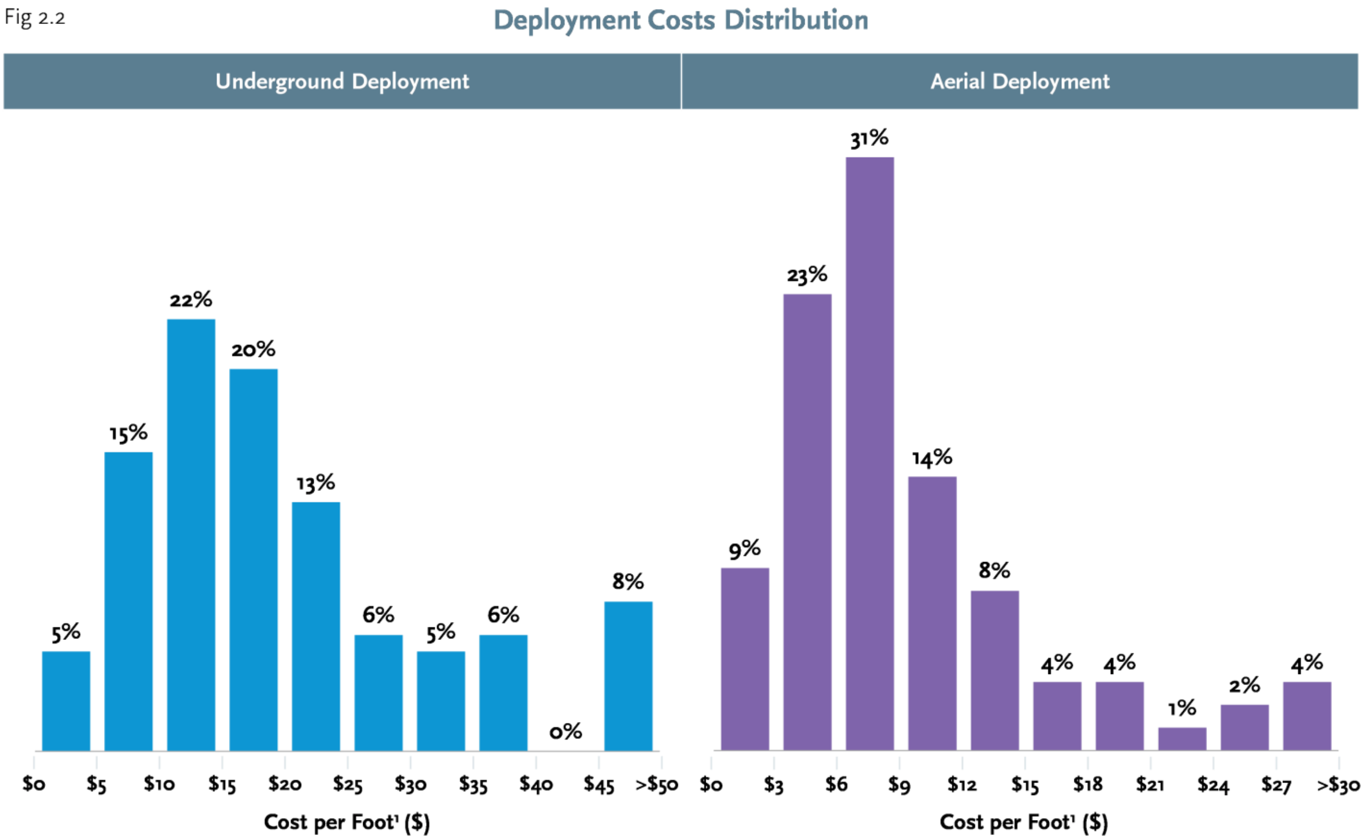

Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

### *Underground builds have a wider cost distribution than aerial builds*

The reported range of aerial costs is heavily concentrated around the $8.00/ft median, with only 15% exceeding $15.00/ft. The long tail of higher cost responses shown in Figure 2.2 reflects more difficult and expensive deployments outside the norm. Unlike aerial construction, underground deployments have a greater variability at both ends of the distribution, with some builds reported to be as low as $5.00/ft or as much as $50.00/ft for labor and materials.

Figure 2.2 illustrates the cost distribution for underground and aerial builds, both showing a cluster of responses around the median and a long tail of more expensive, complex builds.

Fig 2.2




1: Cost per foot inclusive of labor and materials components only
Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

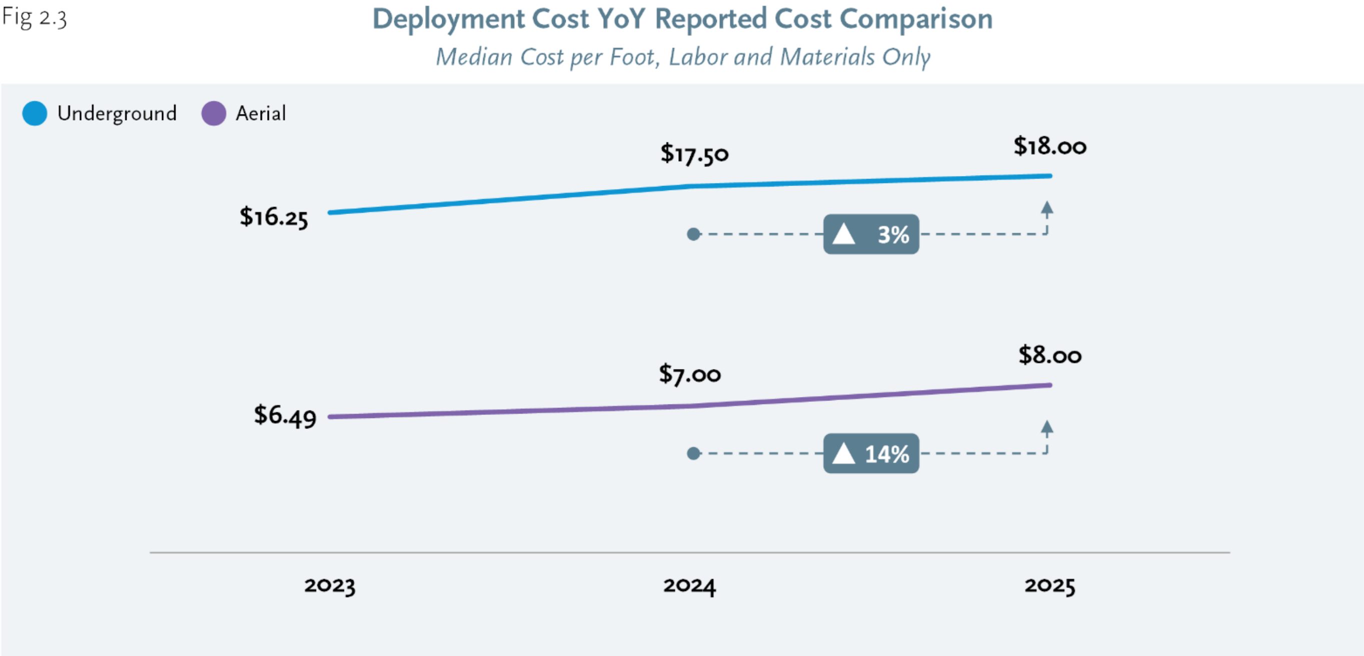
### *Reported deployment costs are higher than previous years*

Figure 2.3 illustrates the median deployment costs from 2023 to 2025, with 2025 marking the highest costs to date[9]. Compared to 2024, median underground costs rose 3% ($18.00/ft vs. $17.50/ft), while aerial costs increased 14% ($8.00/ft vs. $7.00/ft). Since the first edition of this report in 2023, both underground and aerial deployment costs have increased each year[10].

[9] Note: Based on respondents to the 2023, 2024, and 2025 studies reporting on current costs for the current year. Each year of data is independent from the next, hence care should be taken when interpreting the results.

[10] Several respondents updated their 2024 responses during the data collection period for 2025, resulting in a slight variation to reported costs from the 2024 annual report.

Fig 2.3




Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

Current inflation levels provide a macroeconomic backdrop for rising costs. Higher wages, increased overhead (e.g., insurance, healthcare), and skilled worker shortages[11] are driving labor expenses up, while tariffs have elevated the cost of imported materials, despite more stable supply chains. Commentary from respondents echo these macroeconomic concerns and shed light on industry-specific burdens.

Most respondents reporting notably higher costs in 2025 point to labor rates as the primary reason. Conversely, providers that had similar costs to last year point to multi-year service agreements with contractors and/or stockpiled materials that have shielded them from some of the current market dynamics. While aerial and underground builds were both impacted by labor and materials, make-ready costs also increased deployment costs for aerial deployments.

### *Labor accounts for 72% of underground deployment costs and 64% of aerial*

Labor's share of deployment costs, about 72% of underground and 64% of aerial, is consistent with last year's findings (75% for underground, 63% for aerial)[12]. Median labor and materials costs were $12.23/ft and $4.65/ft for underground deployments, and $4.50/ft and $2.50/ft for aerial deployments, respectively.

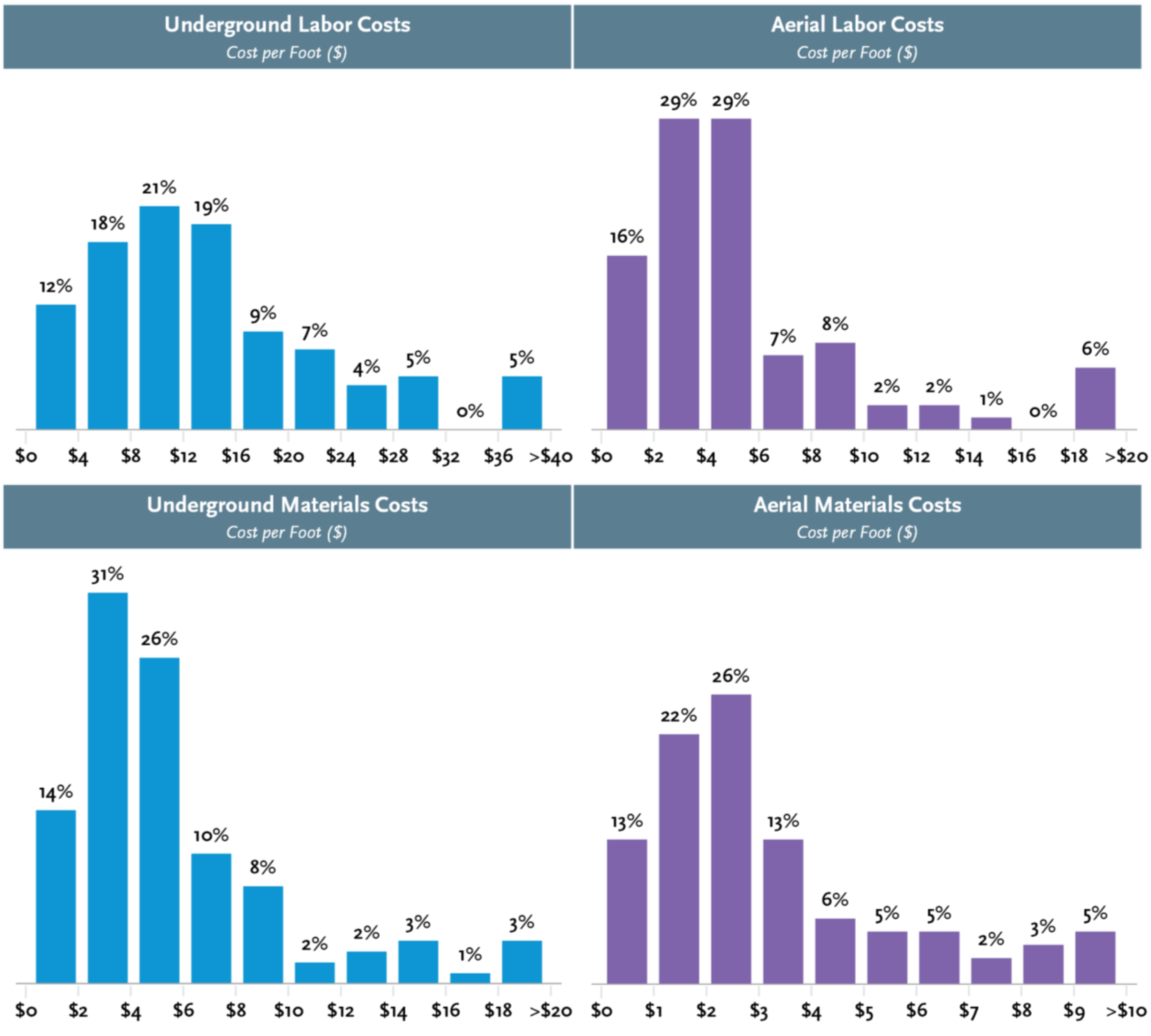
Figure 2.4 shows the distributions of reported labor and material costs. As with overall deployment costs seen in Figure 2.1, underground labor has a much wider range and a median nearly three times that of aerial. Material costs follow a similar distribution across both underground and aerial deployments, with roughly 80% of responses falling within $2.00 of the median amount.

11 Fiber Broadband Association, PCCA joint study – July 2024

12 For labor costs, respondents were asked to provide fully loaded costs

Fig 2.4

## Distribution of Deployment Cost Inputs




Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

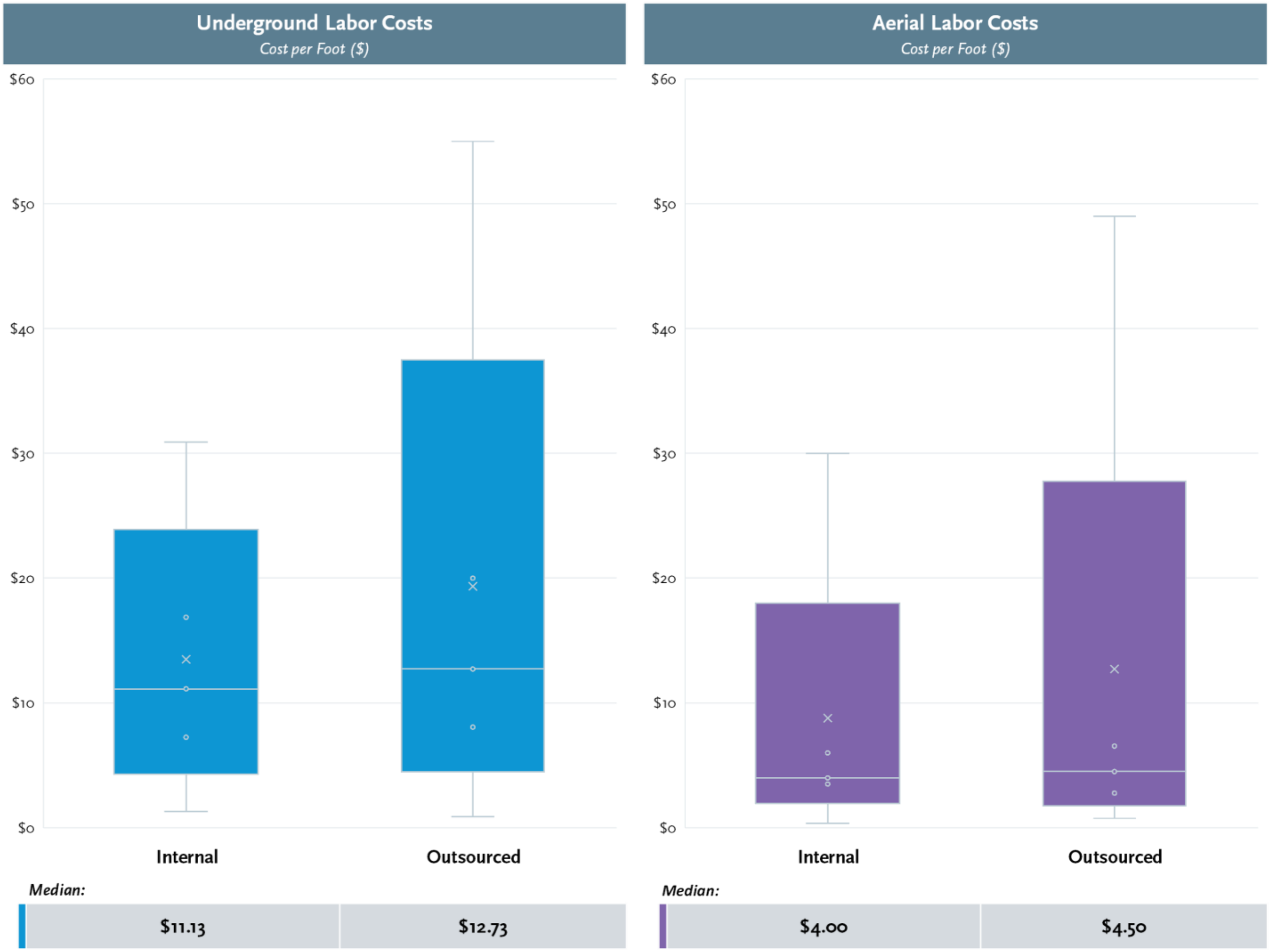
A closer look at labor costs (Figure 2.5) shows that using internal crews often yields lower costs[13]. For underground deployments, typical costs for internal versus outsourced labor were $11.13/ft vs. $12.73/ft (i.e., savings of 13% by using internal labor). Similarly, for aerial deployments, the typical costs were $4.00/ft for internal vs. $4.50/ft for outsourced (i.e., savings of 11% by using internal labor).

[13] Depending on the respondent, internal versus external labor may have different context

While the reported costs for internal labor are typically lower, outsourced labor crews can provide greater flexibility. Some respondents noted that overhead costs—such as travel—can drastically increase overall costs, even if not reflected in the labor rate. Using localized crews can help alleviate extra costs imposed by mobile crews.

Fig 2.5

**Range of Labor Costs by Labor Source**



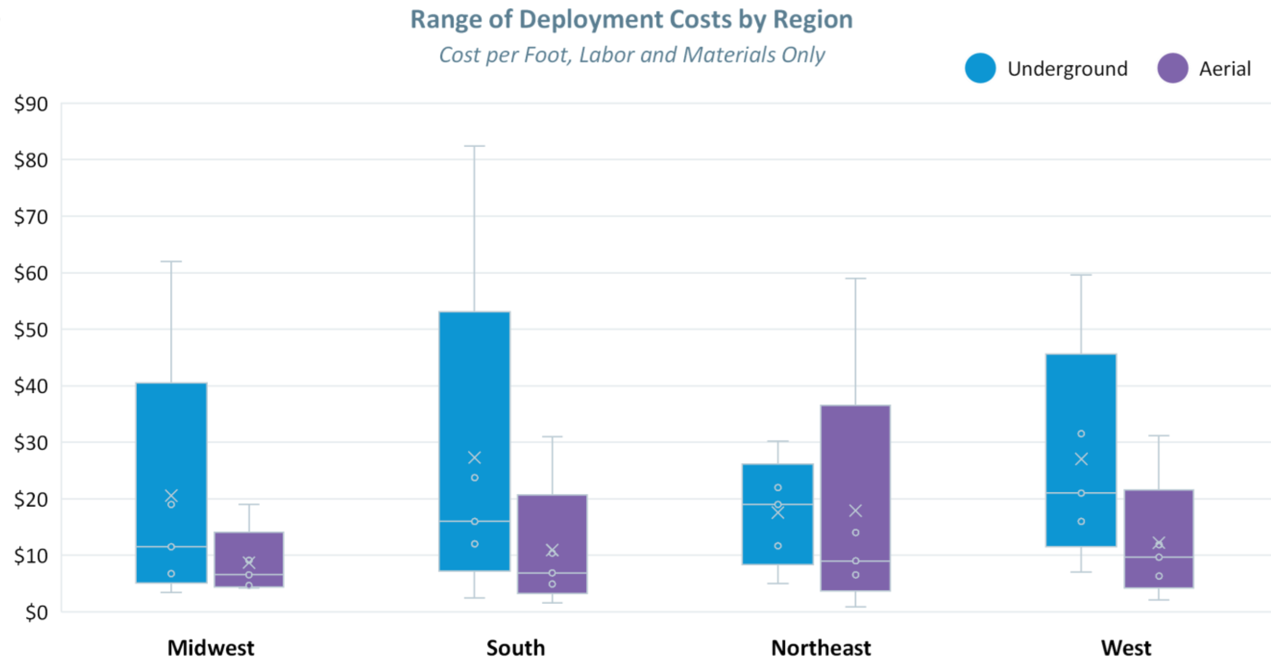

Note: Box represents range between 25th and 75th percentiles and whiskers show full range of responses
Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

### *Western and Northeastern states have the highest reported costs*

Reported costs vary within and between regions due to differences in terrain, topography, labor pools, and wages.

As depicted in Figure 2.6, Western and Northeastern states are typically the most expensive regions for fiber deployment. This is more prevalent for underground deployments, with median costs in the West nearly double those in the Midwest. Notably, the South had the most variability in underground deployment costs, as reflected by the widest interquartile range.

Fig 2.6




***Median:***

| | Midwest | South | Northeast | West |
|---|---|---|---|---|
| **UG** | **$11.50** | **$16.00** | **$18.98** | **$21.00** |
| **Aerial** | **$6.55** | **$6.88** | **$9.00** | **$9.65** |

Note: Box represents range between 25th and 75th percentiles and whiskers show full range of responses
Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

While Western and Northeastern aerial deployments are the most expensive, the difference between regions is not as steep for aerial builds as for underground deployments. Western states have a median cost of $9.65/ft for aerial builds versus Midwestern states with a cost of $6.55/ft. As aerial builds are less impacted by terrain (compared to underground builds), a closer cost range between regions is to be expected.

### *Deployment costs are directly related to housing density*

Housing density is a key consideration in fiber deployment. Cost per home passed typically increases as density decreases (total cost spread among fewer homes). However, the opposite trend appears on a per-foot basis: Less dense regions tend to have lower per-foot costs as there are fewer obstacles (roads, sidewalks, buildings, etc.) to navigate than in urban areas. From a density perspective, rural deployments are generally less complex.

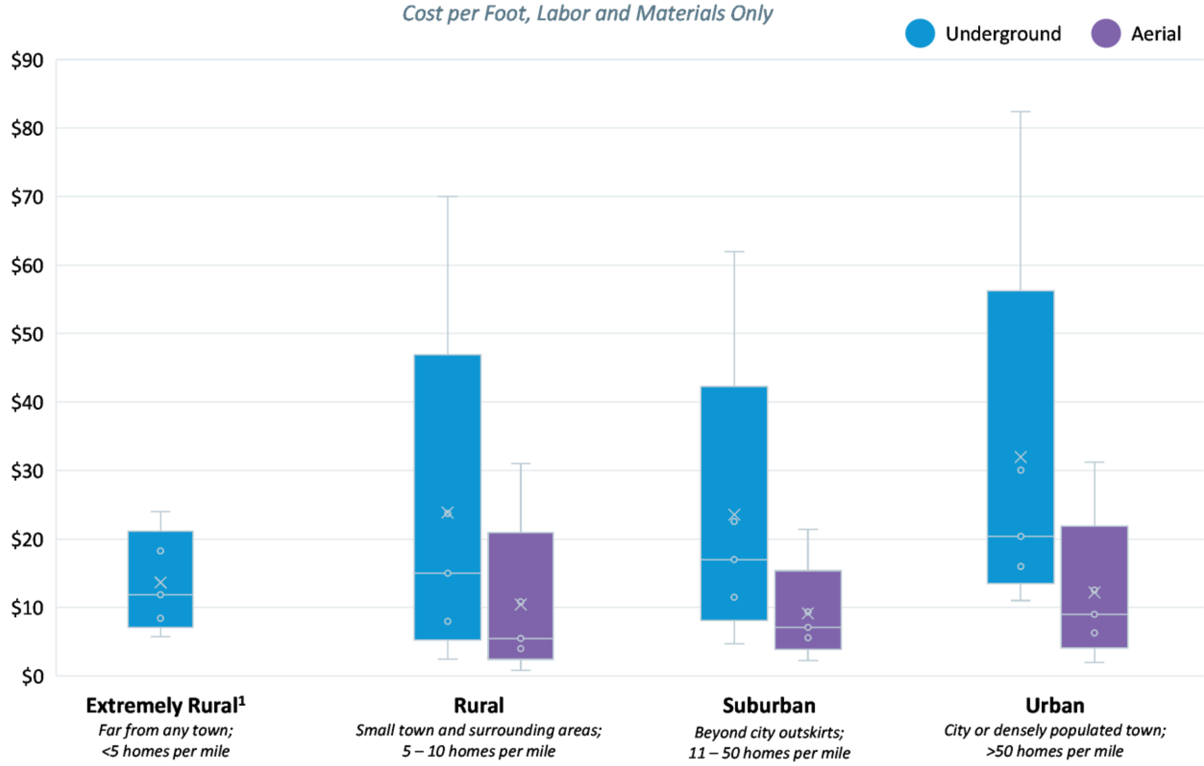
This pattern is reflected in our results: urban deployments have the most expensive unit costs, nearly twice those of extremely rural builds (Figure 2.7). For underground builds, median costs range from $11.88/ft for extremely rural areas to $20.38/ft for urban areas. Aerial builds show a similar spread, with a median cost of $5.47/ft in rural areas versus $9.00/ft in urban areas. Nearly 60% of all underground urban builds exceed the overall median for underground deployments, reflecting the challenges associated with urban builds. The same relationship holds true for aerial deployments.

Underground build costs varied widely, particularly for rural and urban builds, driven by factors such as terrain and labor availability that cause such variations.

Fig 2.7

**Range of Deployment Costs by Housing Density**

*Cost per Foot, Labor and Materials Only*




***Median:***

| | Extremely Rural | Rural | Suburban | Urban |
|---|---|---|---|---|
| **UG** | **$11.88** | **$15.00** | **$17.00** | **$20.38** |
| **Aerial** | **-** | **$5.47** | **$7.10** | **$9.00** |

Note: Box represents range between 25th and 75th percentiles and whiskers show full range of responses
1: Limited data for extremely rural aerial deployments
Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

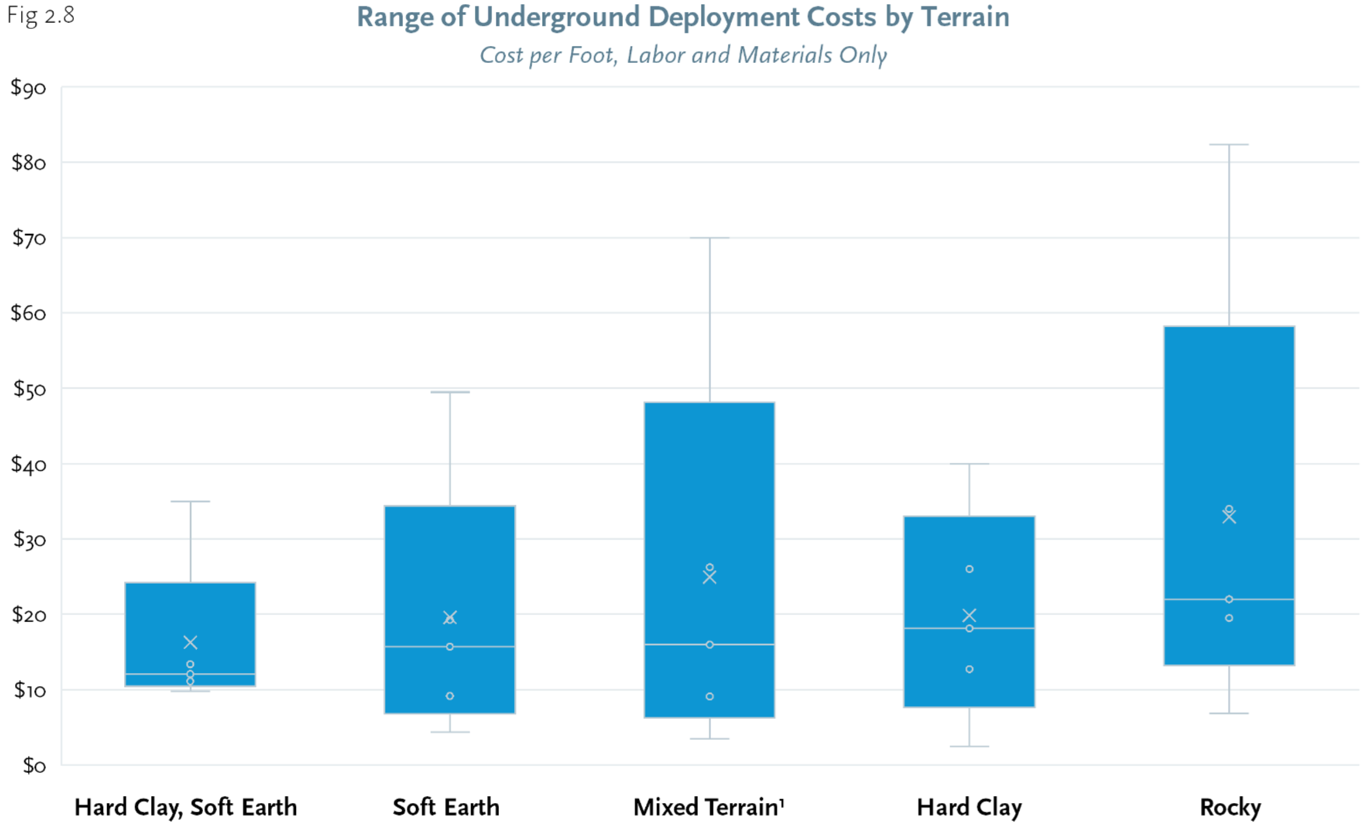
Compared to last year's study, cost pressures in underground urban and suburban builds eased slightly, with slightly lower median costs in 2025 vs 2024. Higher YoY median costs were more acutely felt in very rural underground builds and urban aerial builds.

## *Underground deployments are significantly impacted by the terrain*

Terrain can significantly impact deployment costs by influencing construction methods, deployment pace, and use of conduit. Respondents identified the dominant terrain for their underground builds—hard clay, soft earth, rocky, wetlands, or a mix of terrains.

As expected, the most difficult terrains had the highest costs. Rocky terrain emerged with the highest median cost of $22.00/ft and produced some of the most expensive deployments overall, reflected in the long tail of higher cost responses. More than 75% of all rocky (and hard clay) builds exceeded the national median of $18.00/ft. The range of deployment costs by terrain are shown in Figure 2.8.

Fig 2.8




*Median:*

| Hard Clay, Soft Earth | Soft Earth | Mixed Terrain[1] | Hard Clay | Rocky |
|---|---|---|---|---|
| $12.10 | $15.73 | $16.00 | $18.15 | $22.00 |

Note: Box represents range between 25th and 75th percentiles and whiskers show full range of responses
1: Mixed terrain includes other terrain combinations besides Hard Clay, Soft Earth
Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

Areas with softer ground typically present less complex build environments and therefore lower median costs ($12.10/ft for hard clay and soft earth and $15.73/ft for soft earth).

Respondents whose builds spanned multiple terrains had a typical build cost of $16.00/ft, however, the upper range of costs went well beyond $50.00/ft. Mixed terrains may require fiber crews to employ different techniques across different terrains, which drives up costs.

### *How fiber is laid can often provide cost savings depending on infrastructure availability*

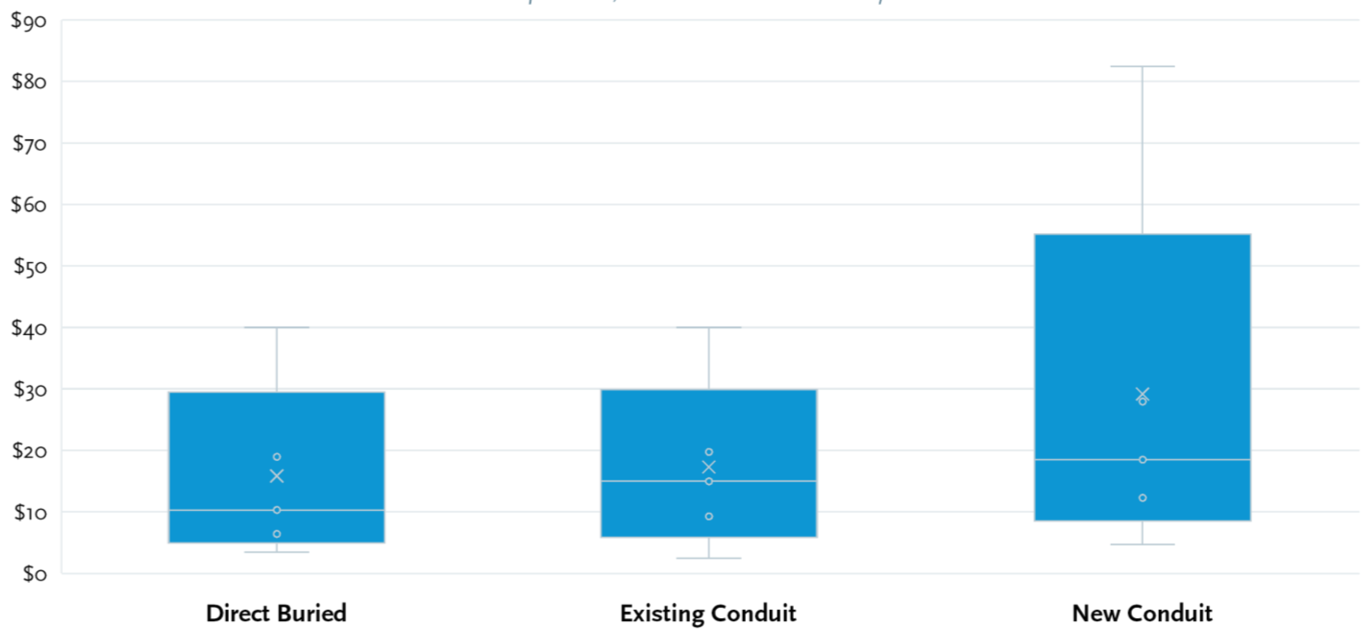
Respondents were asked to provide their typical method for laying underground fiber: direct burial, using existing conduits, or laying via new conduits.

Unsurprisingly, the process of installing new conduits and pulling fiber cables through them was associated with the highest median deployment cost at $18.50/ft, as seen in Figure 2.9. This was also the most common method to install fiber, used by more than 75% of respondents, and showed the widest range of reported costs.

Fig 2.9

**Range of Underground Deployment Costs by Burial Method**

*Cost per Foot, Labor and Materials Only*




***Median:***

| Direct Buried | Existing Conduit | New Conduit |
|---|---|---|
| $10.32 | $15.00 | $18.50 |

Note: Box represents range between 25th and 75th percentiles and whiskers show full range of responses
Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

Where feasible, using existing conduits can provide capex savings ($15.00/ft vs. $18.50/ft) compared to installing a new conduit. However, respondents noted that existing conduits are commonly at full capacity and poorly maintained, resulting in the need to install new conduits even if conduits already exist along the route.

Direct burial was the cheapest method, costing only $10.32/ft. However, this was also the least common method, with only 15% of respondents reportedly burying fiber directly. While less expensive upfront, direct burial exposes the cables to a greater risk of fiber cuts than using conduits, increasing the potential for higher maintenance and repair costs in the future.

### *Construction method drives deployment cost variation*

A variety of construction techniques are available for both underground and aerial builds, each with their own strengths and challenges. A description of the most common methods can be found in the appendix (Tables A.1 - A.2).

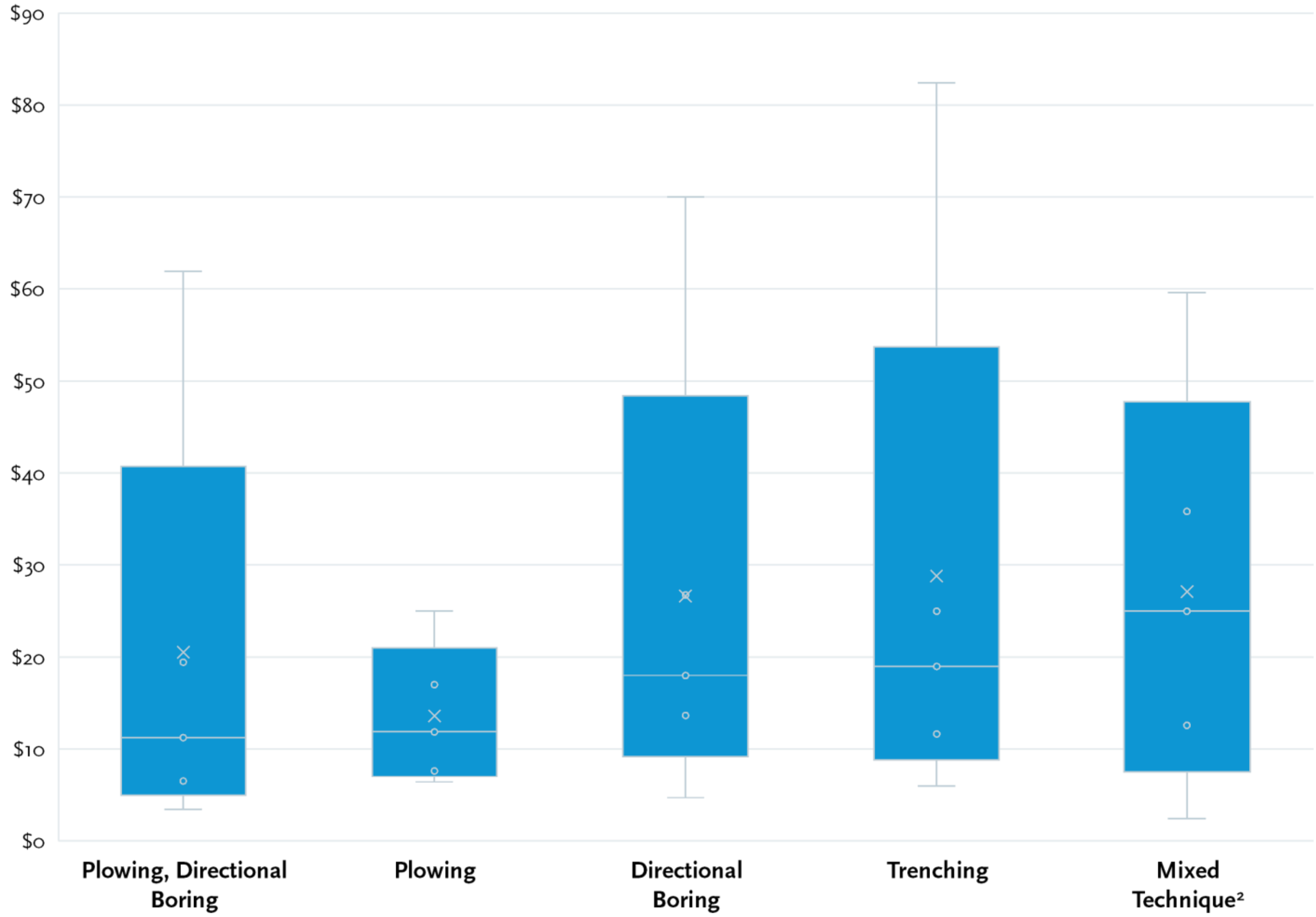
For underground deployments, respondents identified their primary construction technique for the project(s) they reported on—plowing, directional boring, trenching, microtrenching, or a combination of techniques. The variation between underground construction methods is highlighted in Figure 2.10.

Among individual techniques, Trenching had the highest median costs at $19.00/ft and the greatest range of costs, while plowing was least expensive, clustering around the median cost of $11.88/ft. Most combinations of construction techniques resulted in the highest median costs of $25.00/ft, reflecting the added equipment and specialized skill for deployment.

Fig 2.10

**Range of Underground Deployment Costs by Primary Construction Technique[1]**

*Cost per Foot, Labor and Materials Only*




***Median:***

| Plowing, Directional Boring | Plowing | Directional Boring | Trenching | Mixed Technique[2] |
|---|---|---|---|---|
| $11.25 | $11.88 | $18.00 | $19.00 | $25.00 |

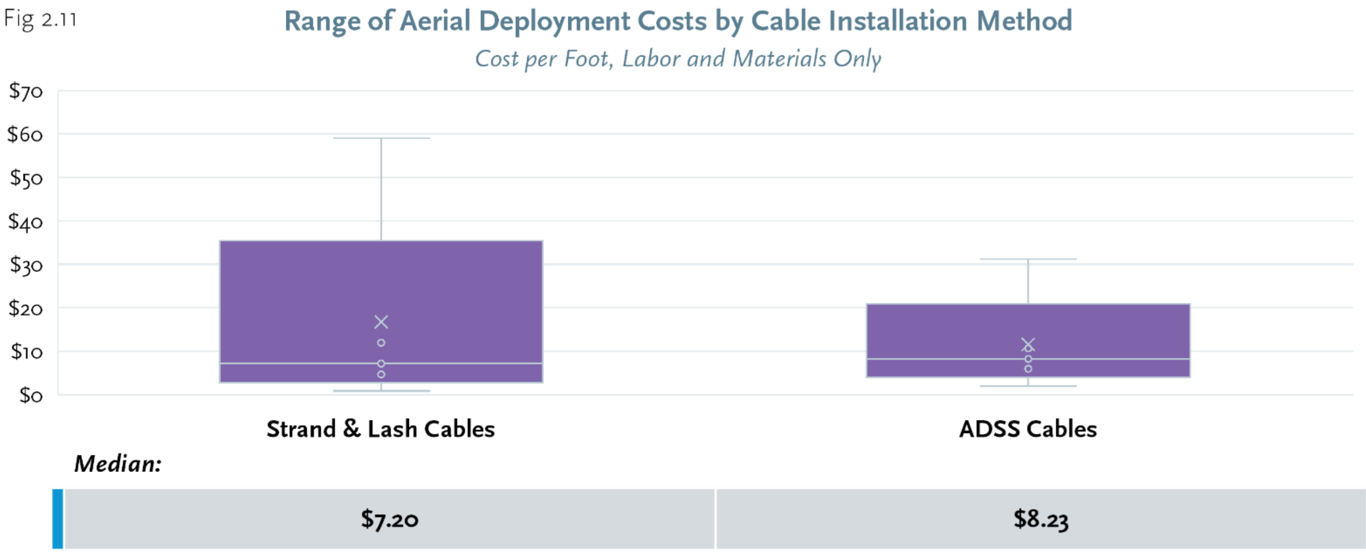
Note: Box represents range between 25th and 75th percentiles and whiskers show full range of responses
1: Insufficient response count to display microtrenching construction technique; 2: Mixed technique is any combination of techniques listed excluding Plowing, Directional Boring
Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

Trenching's high price tag relative to other techniques is consistent with last year's study; however, the median cost of trenching is down slightly YoY.

For aerial deployments, strand and lash installations had a lower median cost versus ADSS cables ($7.20/ft vs. $8.23/ft); however, strand and lash installations also had a wider range of costs, reportedly reaching up to $60.00/ft—see Figure 2.11. Beyond deployment costs, it is generally understood that ADSS installations have lower make-ready costs, potentially reducing overall project costs by ~15-20%[14].

[14] AFL Global, Commscope, STL Tech

Fig 2.11

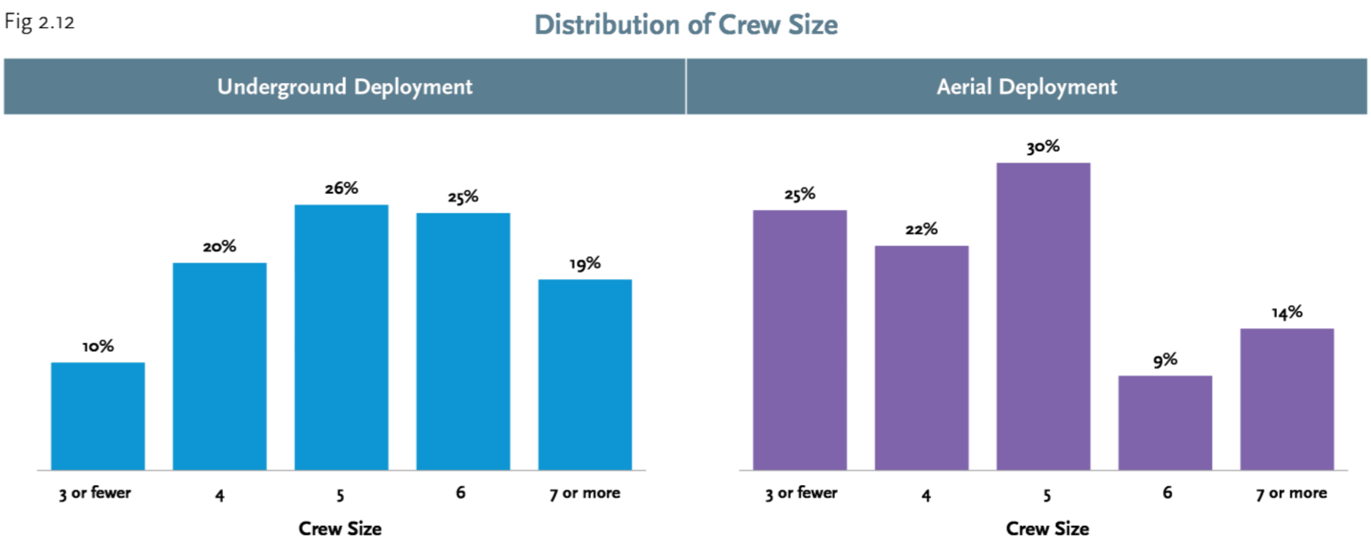



Note: Box represents range between 25th and 75th percentiles and whiskers show full range of responses
Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

## *Impact of Crew Sizes on Pace of Fiber Deployment*

This year, we analyzed crew sizes and the pace of rollout to better understand if there are benefits to using crews of certain sizes. We asked respondents to provide their typical crew size and daily fiber rollout (in feet) per crew.

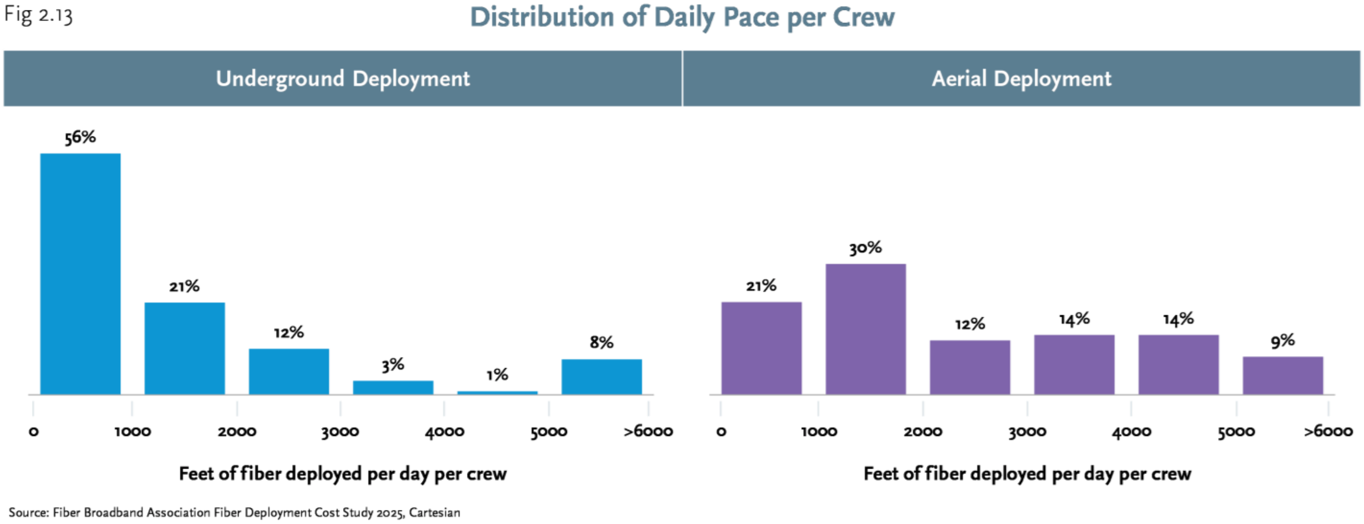
Fig 2.12




Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

Figure 2.12 illustrates the distribution of crew sizes used by respondents for their projects. For underground deployments, 51% of respondents used crews of 5 or 6 members, while 30% of respondents used crews of 4 or fewer members. For more complex/large scale builds, crews of 7 or more members were used (19% of the time). When aerial methods are used, 77% of respondents used crews of 5 or fewer members, with less than a quarter of respondents having larger crews.

Fig 2.13

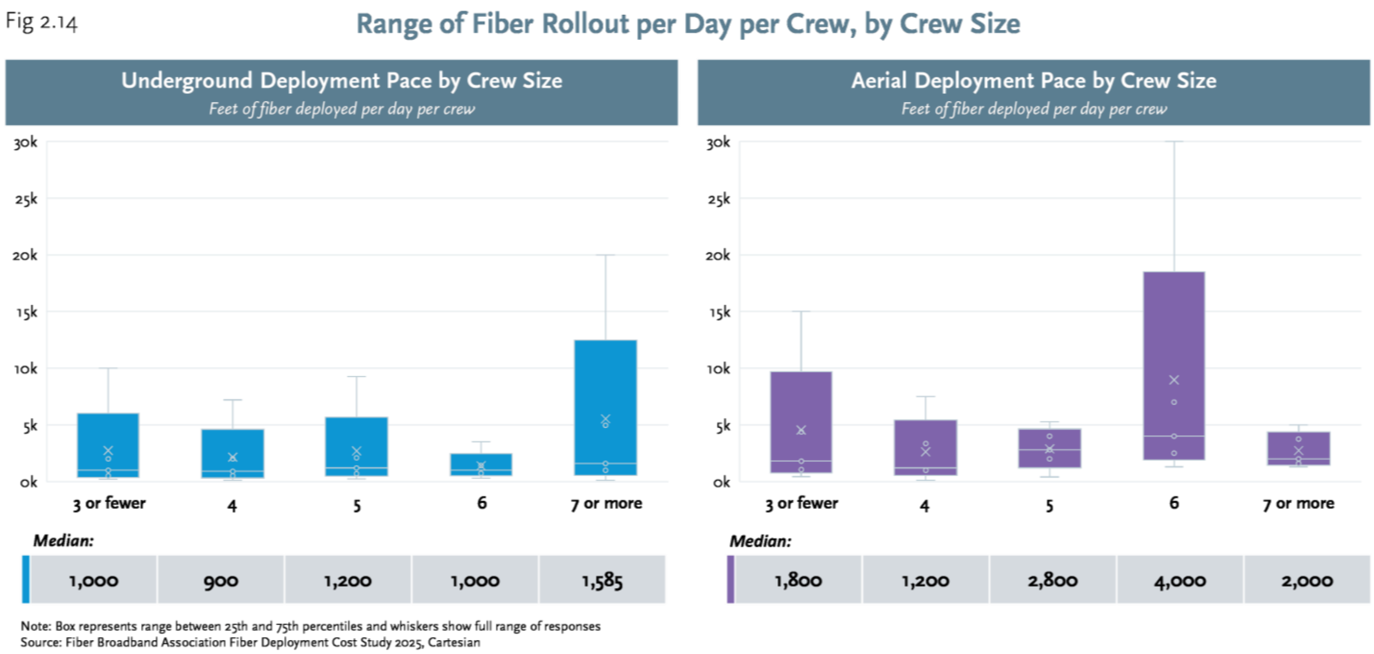



Because underground builds are more labor intensive, rollout pace tends to be slower than for aerial builds. Figure 2.13 shows that over 75% of underground crews deploy less than 2,000 feet of fiber per day per crew, compared to 51% of aerial crews. Aerial respondents reported a wider range of paces, suggesting that comparatively greater lengths of fiber can be rolled out by an aerial crew on a given day provided conditions are conducive.

For underground builds, more than half (56%) of the rollouts have a daily pace of less than 1,000 feet of fiber per day per crew. Of this share, about 56% of the rollouts are less than 500 feet per day, while 44% of the rollouts are between 500–1,000 feet per day per crew.

We also explore the relationship between crew size and pace per day per fiber crew as seen in Figure 2.14.

Fig 2.14



The results suggest a modest positive relationship between crew size and deployment pace, especially when comparing smaller teams to much larger ones. However, the relationship is not definitive, as larger crews may also be associated with more complex builds.

At the median, underground crews with seven or more members install around 1,600 feet per day, compared to about 1,000 feet per day for crews of three or fewer members. For aerial deployments, crews of six members tend to deploy the most fiber per day with a median of 4,000 feet compared to crews of three or fewer members who typically deploy around 1,800 feet per day. In general, crews of the same size can deploy more rapidly aerially as compared to underground.

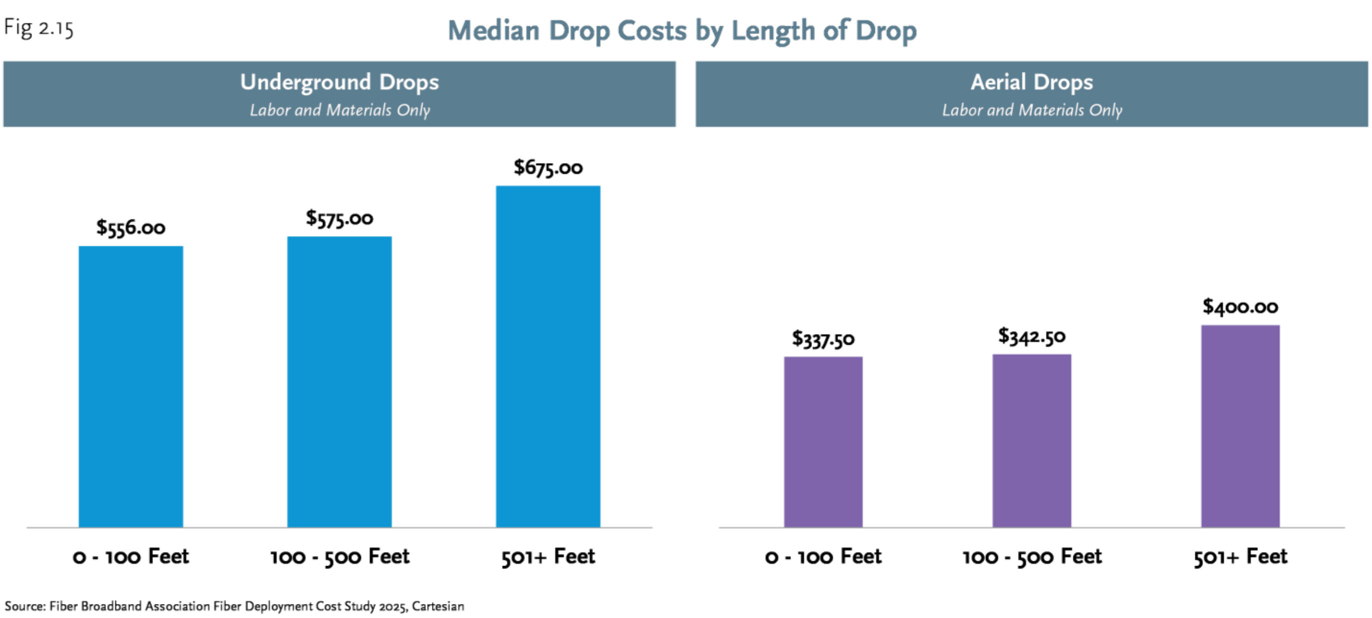
### *Customer drops/connection costs vary slightly by last-mile network lengths*

In addition to deployment costs, we also asked respondents to characterize their customer connections ("drops"). Drop costs were reported on a per-connection basis and exclude any costs associated with the ONT and any other CPE.

Similar to network build, underground drop costs tend to be higher than aerial drop costs. Median underground drop costs range from $556 for drops under 100 feet to $675 for drops over 500 feet, while median aerial drop costs range from $338 for drops under 100 feet to $400 for drops over 500 feet (Figure 2.15).

Drop length appears to have limited impact on median drop costs—underground drops have slightly more variability than aerial drops, with typical drop costs increasing by 21% and 18% respectively due to lengths. For most underground drops, labor costs account for 70% of total drop costs, while for aerial drops, it is slightly less at 60% of total drop costs.

Fig 2.15



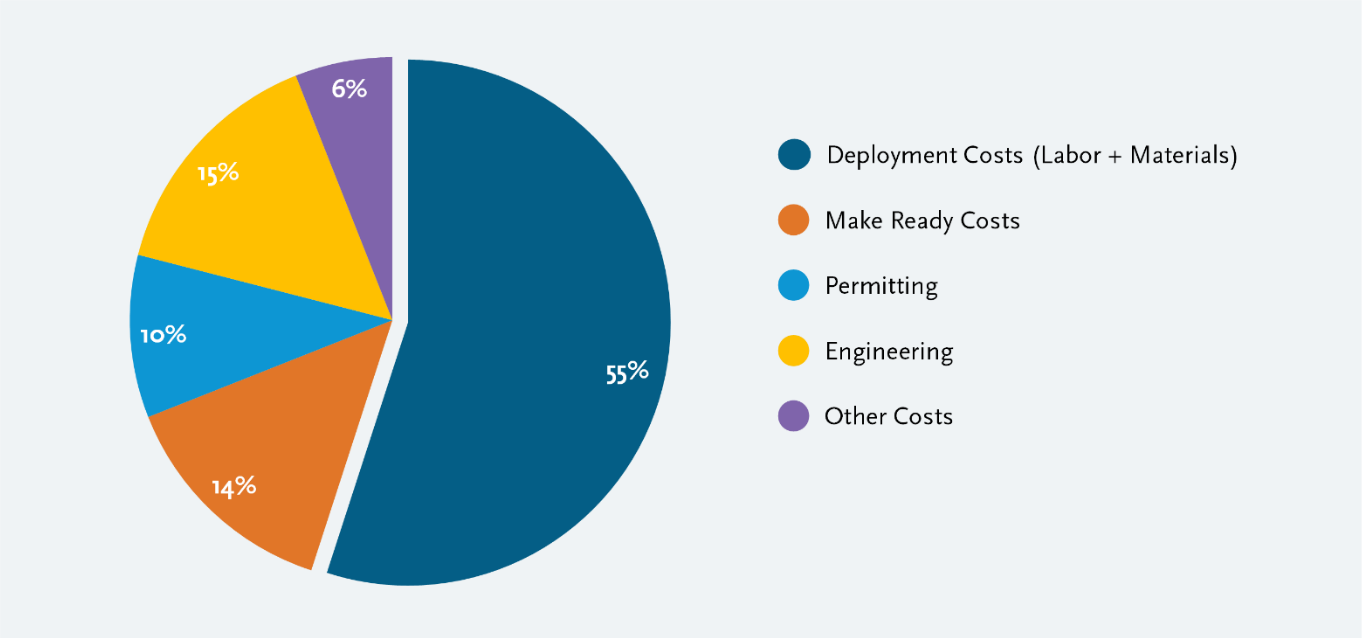

### *Make-ready costs and permitting had a large impact on project costs in 2025*

Beyond labor and materials, many other costs are associated with deploying fiber. These include pre-deployment activities like planning the network route, obtaining permits from various property owners to use rights of way (ROWs), preparing utility poles for other attachments, locating utility infrastructure, conducting environmental assessments, and coordinating construction logistics.

Fig 2.16

**Share of Total Project Costs, by Component**

*Average Share of Total Project Cost*




Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

Respondents were asked to estimate the share of total project costs attributable to deployment (labor and materials), make-ready work, permitting, and engineering/designing (see Figure 2.16). Deployment—the actual laying or hanging of fiber, discussed throughout this section—accounted for around 55% of the total project cost. Engineering, make-ready costs, and permitting ranged widely but on average comprised 15%, 14%, and 10% of total project costs, respectively. While respondents report that engineering costs contribute more to overall costs on average than make-ready work and permitting, most of the feedback received on unexpected and prohibitive costs centered on make-ready work and permitting.

Make-ready work prepares poles for attachments in aerial deployments and typically includes surveying, engineering, and construction. Costs for these activities vary based on pole ownership and the condition of existing attachments. Respondents noted obstacles such as lack of pole space, coordination with utilities and multiple pole owners, aging infrastructure, and the need to install new poles—all of which significantly impact make-ready costs.

In some cases, make-ready costs were estimated to be upwards of 150% of the construction budget, forcing re-engineering and adding further complexity and expense (including higher engineering costs). Several respondents noted that the make-ready estimates were so high that they changed their planned builds from aerial to underground.

On average, permitting made up around 10% of project costs, rising to as much as 30% in unique circumstances. Permitting costs (i.e., fee structures and total fees) can vary based on jurisdiction and planned construction. More than the fee itself, respondents noted permitting's impact on project cost in the form of delays. Respondents with higher permitting burdens reported longer-than-usual delays in securing approvals, which pushed back timelines and increased costs. Permitting delays tend to have a domino effect on other project cost components, introducing uncertainty that further inflates planning costs and timelines.

## SECTION 3: DEPLOYMENT COST & TIMELINE TRENDS

This section examines how deployment costs have changed over the past year and how respondents expect them to change in the year ahead. To understand how costs are evolving, we asked respondents to classify annual cost changes as decreasing "significantly" (more than 10% lower), decreasing "slightly" (less than 10% lower), stable (no material change), increasing "slightly" (less than 10% higher), or increasing "significantly" (more than 10% higher)[15]. Respondents also identified the main factors driving reported and predicted changes. Beyond costs, we asked how deployment timelines have changed over the past year and how they expect them to evolve in the coming year.

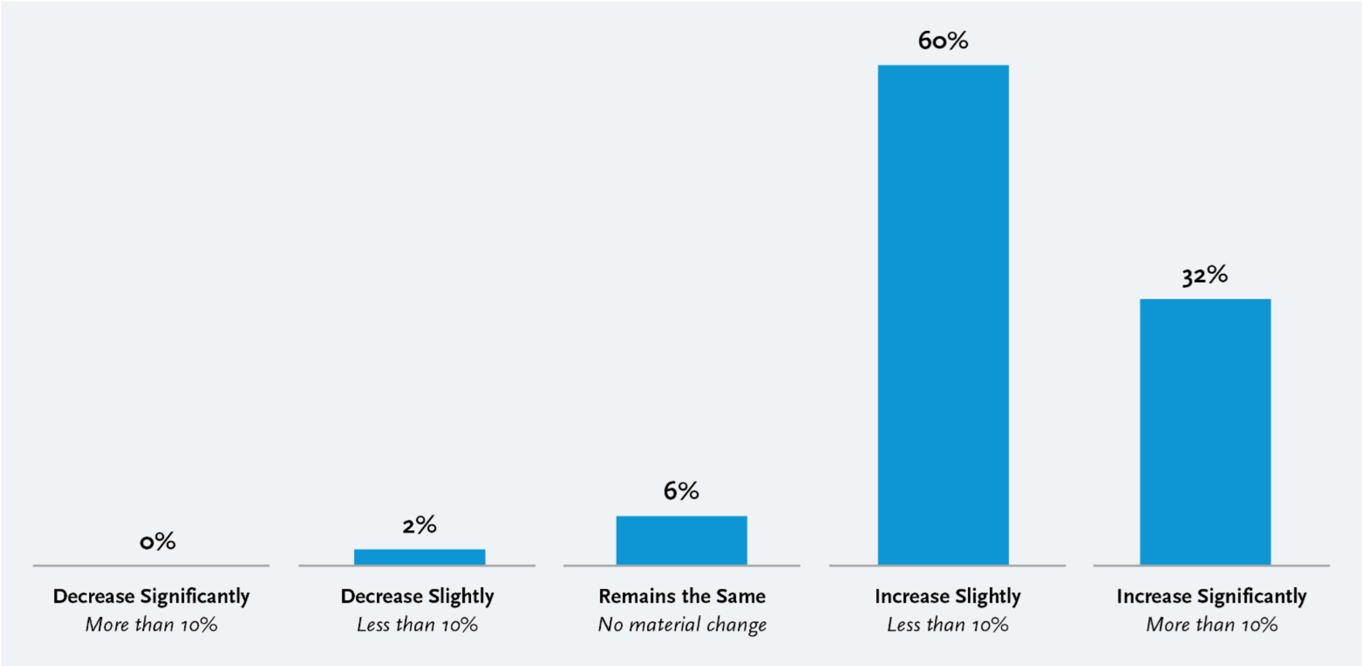
### *Most respondents are facing higher deployment costs in 2025*

When asked how deployment costs have changed from 2024, an overwhelming 92% of respondents experienced higher costs in 2025, including nearly a third of respondents reporting "significantly" higher costs in 2025 (Figure 3.1). Very few respondents reported stable (6%) or decreasing (2%) costs in 2025. These trends mirror what we see happening to median deployment costs; per Section 2, median underground and aerial costs rose by 3% and 14% YoY, respectively.

Fig 3.1

**Reported YoY Deployment Cost Changes, 2024 – 2025**

*Change in Deployment Costs from Previous Year to Current Year, by level of change*




Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

The share of respondents reporting annual cost increases rose compared to last year, increasing from 84% of respondents in last year's study to 92% this year. However, the share of respondents reporting "significantly" higher costs is down from 41% in 2024 to 32% in 2025 (Figure 3.2), indicating relief for some from the largest cost hikes.

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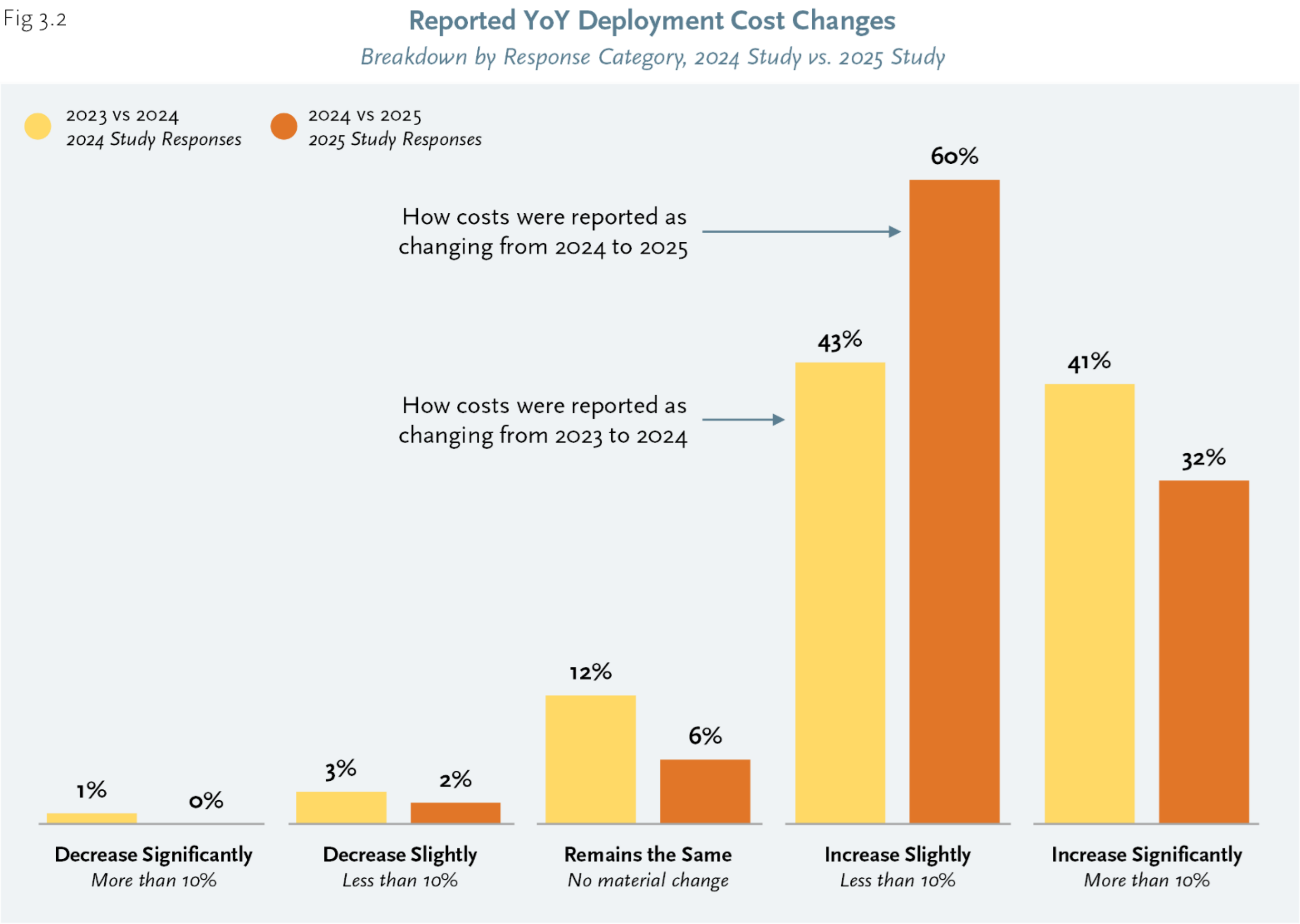
[15] Level of cost changes may have different financial impacts for any given respondent based on their fiscal situation, which is beyond the scope of this report

Fig 3.2




Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

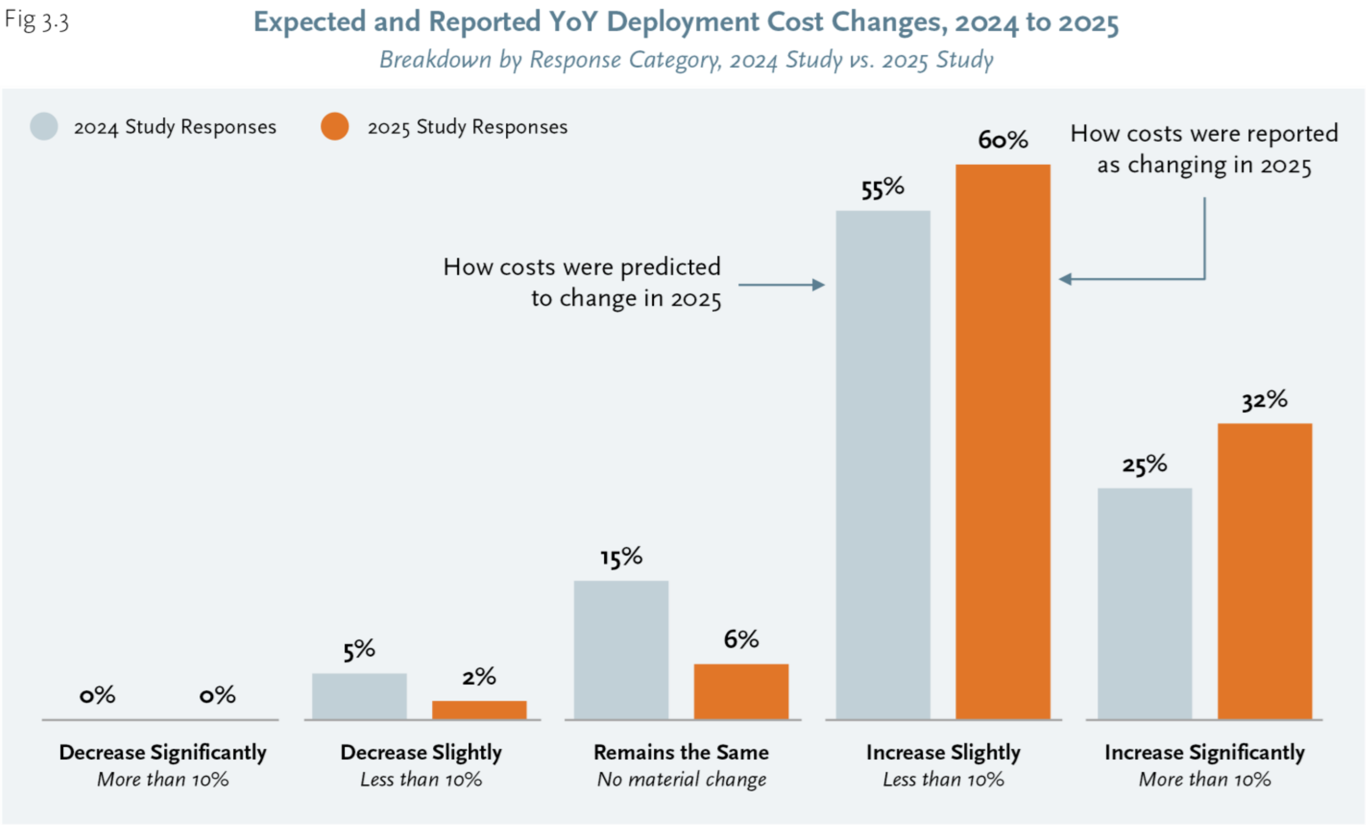
### *Larger than predicted share of respondents reported significant cost increases in 2025*

In last year's study, respondents were asked to predict how deployment costs would change in 2025. We can now compare those expectations with the cost changes reported in this year's survey. While the samples are independent, the comparison offers useful insight into how cost expectations align with actual outcomes.

In 2024, 80% of respondents predicted costs would increase in 2025; in reality, 92% reported higher costs in 2025—a 12-percentage point difference. This difference is most prominent for those reporting a "significant" increase, with a 7-percentage point difference between expectations from 2024 and 2025 reality (Figure 3.3).

The largest mismatch, however, was in expectations that costs would remain stable. 15% of 2024 respondents expected costs to hold steady in 2025, whereas only 6% of 2025 respondents reported experiencing stable costs. This lines up with consensus from stakeholders that deployment costs in 2025 are higher than what was anticipated.

Fig 3.3




Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

### *Labor and Materials continue to drive up deployment costs*

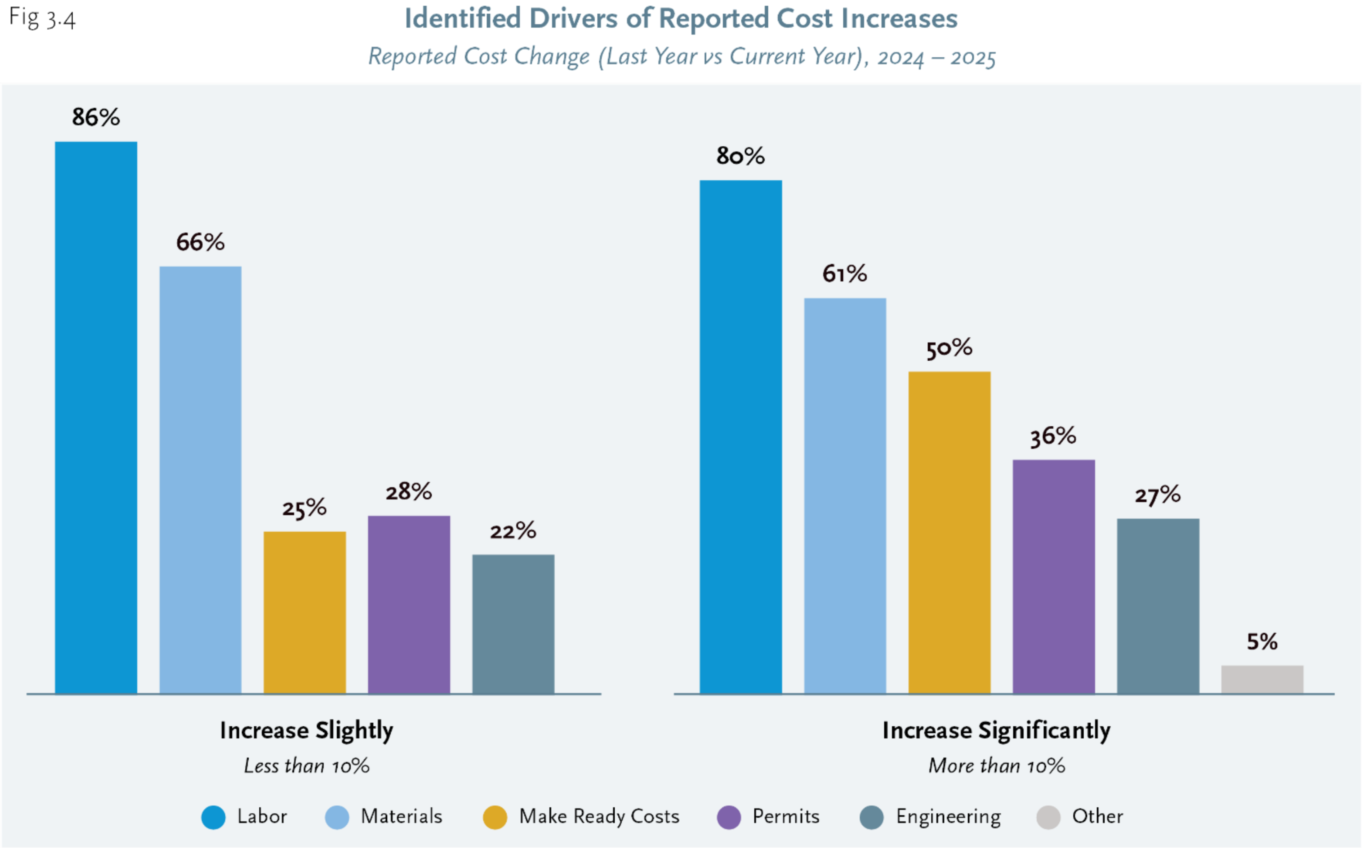
To identify the drivers of deployment cost changes, respondents were asked to select the primary cost categories contributing to higher or lower costs. Study participants could choose one or more options between labor, materials, make-ready costs, engineering, permits, and "other".

Consistent with last year's findings, labor and materials remain the dominant drivers of increasing deployment costs. For those who reported "slight" increases, 86% cited labor as the key driver and 66% cited materials (Figure 3.4). The share of labor and materials is similar for those who reported a "significant" cost increase—80% of respondents cited labor as the key driver, and 61% of respondents cited materials.

This year's results also highlight the growing impact of make-ready and permitting costs. Make-ready work was cited by 25% of respondents reporting "slight" increases, doubling to 50% among those reporting "significant" increases. As discussed in Section 2, make-ready costs are highly variable and can escalate quickly due to infrastructure constraints, coordination requirements, and timeline extensions. Respondents also noted that increased deployment in rural areas (as discussed in Section 1) has further amplified make-ready needs, translating to higher costs for respondents in 2025.

Permitting and engineering costs followed a similar pattern, cited more frequently by respondents who faced "significant" increases (36% and 27% respectively) than those who faced "slight" increases (28% and 22% respectively). Permitting was another major challenge for respondents, with unforeseen requirements and permitting delays frequently cited as key factors resulting in higher deployment costs.

Fig 3.4




Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

### *Delays in deployment timelines impact nearly 50% of respondents*

We asked respondents whether, and to what extent deployment delays were longer than previous years. In 2025, nearly half (46%) of the respondents faced material project delays. Among respondents who reported a cost increase in 2025, the share also reporting delays rose marginally to 50%. However, delays were not limited to higher-cost projects—25% of respondents who did not report cost increases still experienced timeline setbacks.

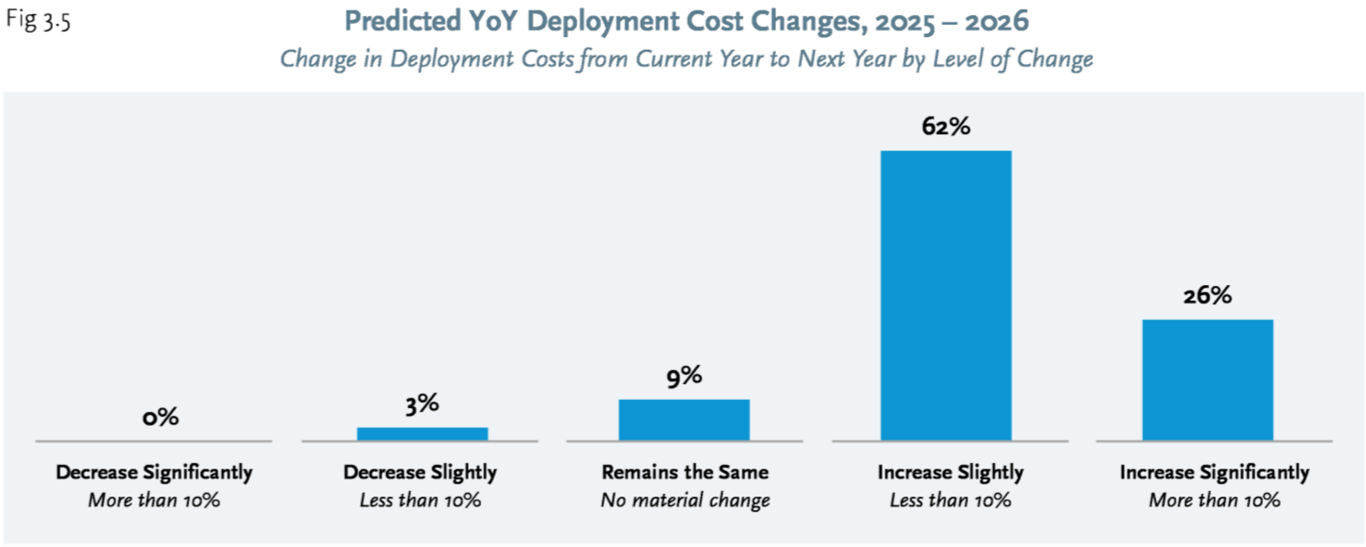
Permitting, utility locates, and make-ready work were the most cited drivers of delays. Permitting issues were particularly impactful, with respondents reporting timelines extending by approximately 20% compared to previous years—extending projects by two months in many cases, and up to 18 months in the most egregious of cases. Respondents pointed to understaffed/under-resourced permitting offices, changing regulations, and longer approval cycles as causes for the delays they're seeing in obtaining permits.

Utility locates were also a major concern, with respondents noting locate worker shortages and marking inaccuracies contributing to project delays.

### *Costs are expected to increase again next year, but not as steeply as 2025*

As in previous years, respondents were asked to predict how costs will change in the coming year. Figure 3.5 shows how respondents from this year predict deployment costs to change going into 2026.

Fig 3.5



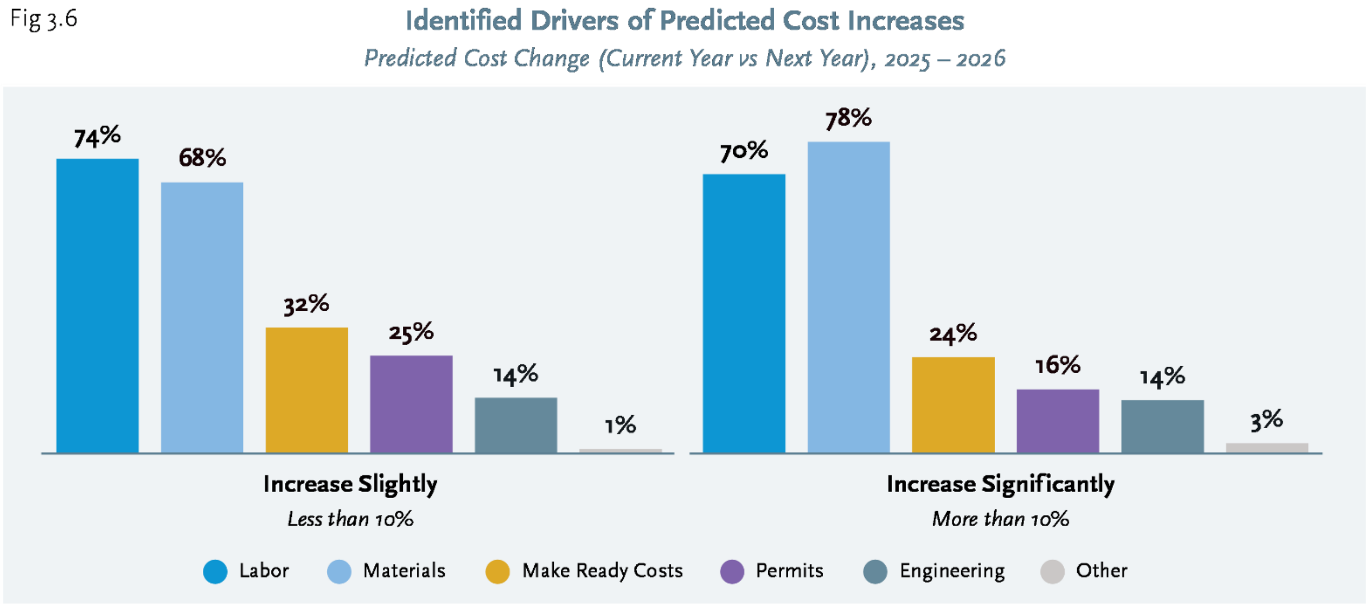

Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

Most respondents (88%) are preparing for higher costs next year. Nearly two-thirds (62%) expect increases of less than 10%, while about a quarter (26%) anticipate a "significant" cost increase. A small minority of respondents (3%) anticipate costs to decrease in 2026.

The overall cost outlook for the upcoming year largely resembles predictions from our 2024 study and is somewhat more optimistic than actual 2025 results: fewer respondents expect "significant" increases (26% versus 32% who experienced "significant" increases in 2025).

Going into 2026, labor and materials remain the main drivers of anticipated cost increases. Notably, respondents emphasized materials as an even stronger contributor than labor in cases of "significant" increases (Figure 3.6).

Fig 3.6




Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

Anecdotally, respondents remain concerned with the impact of tariffs and inflation on material costs. While material stockpiles shielded some respondents from price increases in 2025, those buying materials next year may face higher prices.

Beyond deployment labor and materials, concerns around make-ready, permitting, and engineering costs aren't going anywhere. These factors remain top of mind, as they can drastically raise project costs or cause delay.

### *Deployments are expected to take even longer in 2026*

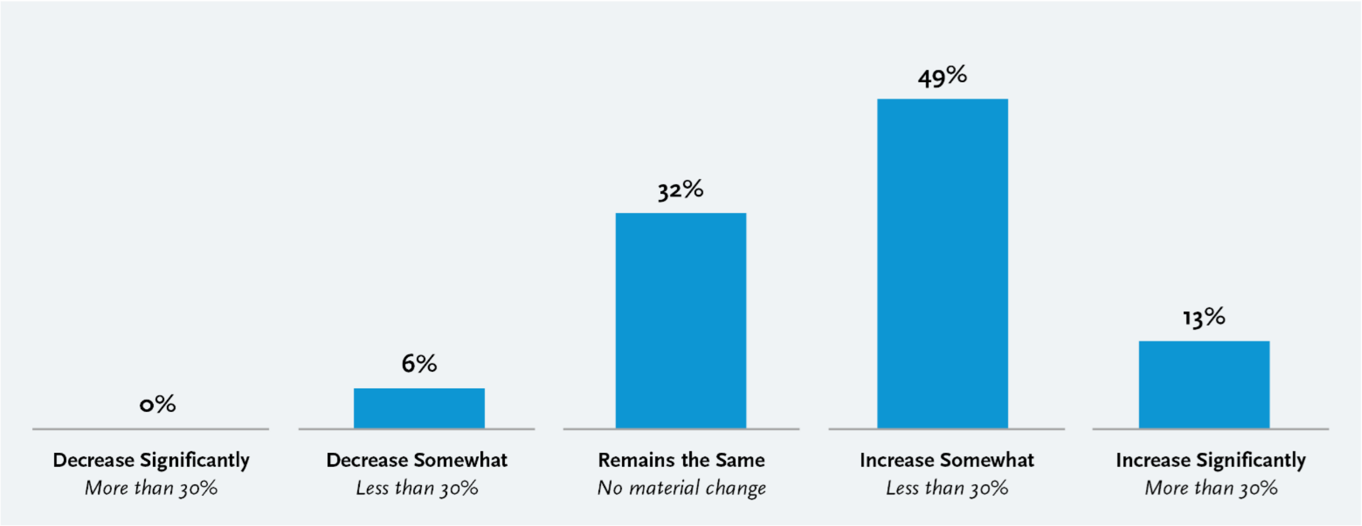
This year we asked participants to predict whether, and to what extent, deployment timelines will deviate from their norm in 2026. As discussed in Section 2, delays are frequently associated with higher costs.

Nearly two-thirds of respondents (62%) expect deployment delays, including 49% who anticipate "somewhat longer"[16] timelines next year and 13% who are bracing for "significant" delays (Figure 3.7). Respondents noted that permitting timelines and utility locates are expected to be key drivers of delays.

Fig 3.7

**Predicted YoY Deployment Timeline Changes, 2025 – 2026**

*Change in Deployment Timelines from Current Year to Next Year by Level of Change*




Source: Fiber Broadband Association Fiber Deployment Cost Study 2025, Cartesian

Deployment delays can lead to higher build costs by disrupting planned resource use and introducing uncertainty. When timelines are extended, labor crews scheduled for a project may need to be reassigned, resulting in less efficient labor utilization and higher overall costs. These delays can be especially costly in regions with limited construction windows (e.g., cold weather climates), where there is little flexibility to recover lost time.

Delays also create opportunity and financing costs. Projects may incur expenses before construction begins while revenue generation is postponed, and crews may not be freed up to move to the next sites as planned. In some cases, projects are financed with loans based on initial cost assumptions that become outdated after delays occur, particularly if labor costs rise before construction resumes.

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[16] Increase "somewhat" implies ttimelines increases by less than 30%, while increase "significantly" implies timelines increase by more than 30%

## CONCLUSION

### *Fiber is the clear preference for broadband access in the US*

Fiber continued its upwards trajectory in 2025, with 84.6M homes passed by fiber as of September—meaning more than 60% of US households are now serviceable by fiber. 16% of serviceable households even have access to multiple fiber providers.

This progress has been driven by significant activity in the private sector, with major ILECs rapidly expanding their fiber footprints through acquisitions, joint ventures, legacy network upgrades, and expansions. Fiber overbuilders also aggressively increased their presence across both new and existing markets.

Despite economic pressure from tariffs and inflation, sentiment around fiber as a resilient, long-term broadband technology remains strong. While some economic headwinds that characterized 2025 are expected to remain, recently lowered interest rates and full bonus depreciation are likely to promote investment.

Public funding has also played a significant role. The BEAD program reached key milestones in 2025, including the BoB round that culminated in final proposal submissions and approvals (now complete for most entities). Fiber was selected for 63% of all eligible locations and received 84% of awarded funding—the greatest of any technology. These projects will bring fiber to all corners of the US and connect more rural communities than ever before. Historical public investment and continued private investment will aid fiber in becoming the dominant broadband delivery technology.

Deployment costs increased in 2025 for most study participants, primarily due to more expensive labor and materials. Respondents also frequently cited permitting delays, difficulties with utility locates, and costly make-ready work as factors impacting deployment timelines and overall project costs—obstacles that appear more pervasive than in prior years.

Looking ahead to next year, with BEAD deployments set to break ground and major ILECs and local ISPs alike pushing ahead towards passings targets, we expect 2026 to keep pace with previous record levels of deployment. We also expect further cost increases, as 88% of respondents are bracing for higher deployment costs in 2026. Permitting, longer deployment timelines, labor shortages, and growing demand from AI and data center development are all expected to shape the deployment landscape.

Beyond consumer broadband, fiber is becoming increasingly critical to the future growth of major tech players, as it is the only technology capable of supporting the backhaul requirements of AI data centers. As AI adoption accelerates, fiber's strategic importance will continue to grow.

Overall, fiber's outlook remains strong, supported by public funding, private investment, and continued demand from both consumers and hyperscalers. Successfully managing rising costs and deployment complexity will be key to sustaining this momentum.

## APPENDIX

A.1

### Description of Underground Construction Techniques

| Construction Method | Description | Key Advantages |
|---|---|---|
| **Boring** | • Horizontal hole (~2" to 6" diameter, 3' to 5' deep) created via boring machine<br>• Creates a straight path tunnel to install conduit<br>• Push casing through borehole as it's being dug | • Requires less sophisticated (and therefore cheaper) machinery<br>• Ideal for shorter distances and wider variety of soil types |
| **Directional Boring** | • Horizontal hole (~2" to 6") drilled 3' to 5' deep with a steerable surface level drill<br>• Creates a tunnel in desired direction under the roadway/surface to install conduit | • Efficient for long distances<br>• Useful when there's limited space<br>• Minimizes disruption to infrastructure and environment |
| **Trenching** | • 2" to 6" wide cut trench, 2' to 6' deep via a chain blade and pulled through by a tractor<br>• Conduit/cable paced at bottom of the cut<br>• Trench is reinstated through compaction of removed spoils | • More visibility of the work area allowing for easier installation<br>• Allows for easy future expansion |
| **Microtrenching** | • Narrow trench, up to 2" and no deeper than 18"<br>• Conduit laid directly into the trench within a roadway<br>• Routed through/under curbs or into surface vaults | • Advantageous for urban environments<br>• Speed minimizes disruptions to traffic flow<br>• Requires less ground surface restoration |
| **Plowing** | • 2" to 6" wide slice made 2' to 4' deep with a blade and pulled through with a tractor<br>• Conduit/cable paced at bottom of the slice and covered with cutting spoils | • Beneficial when there's no obstacles along route and in softer soil environments<br>• Creates less disturbance to surface area |

A.2

### Description of Aerial Cable Installation Methods

| Cabling Method | Description | Key Advantages |
|---|---|---|
| **Strand & Lash Cables** | • Steel strand first installed between utility poles, with tensioning equipment used to make it taut<br>• Fiber optic cable laid alongside steel strand<br>• Lashing wire then used to wrap around the strand and fiber cable – this secures the cables, and prevents it from sagging, or moving due to environmental factors | • Armored cables can be used to protect against potential rodent chew<br>• Additional cables can be easily installed by overlashing<br>• Telecom crews can do installations, do not require specialized power/utility crews |
| **ADSS Cables** | • All-dielectric cables, i.e., cables do not contain any metallic components<br>• Attachment points installed on poles using clamps or dead-end hardware<br>• ADSS cables strung between poles using tensioning equipment | • No messenger wires needed – ADSS cables can support its own weight<br>• Minimal make ready costs, ~15 – 20% savings of total construction cost<br>• ADSS cables are light-weight, making them easier to handle and install |