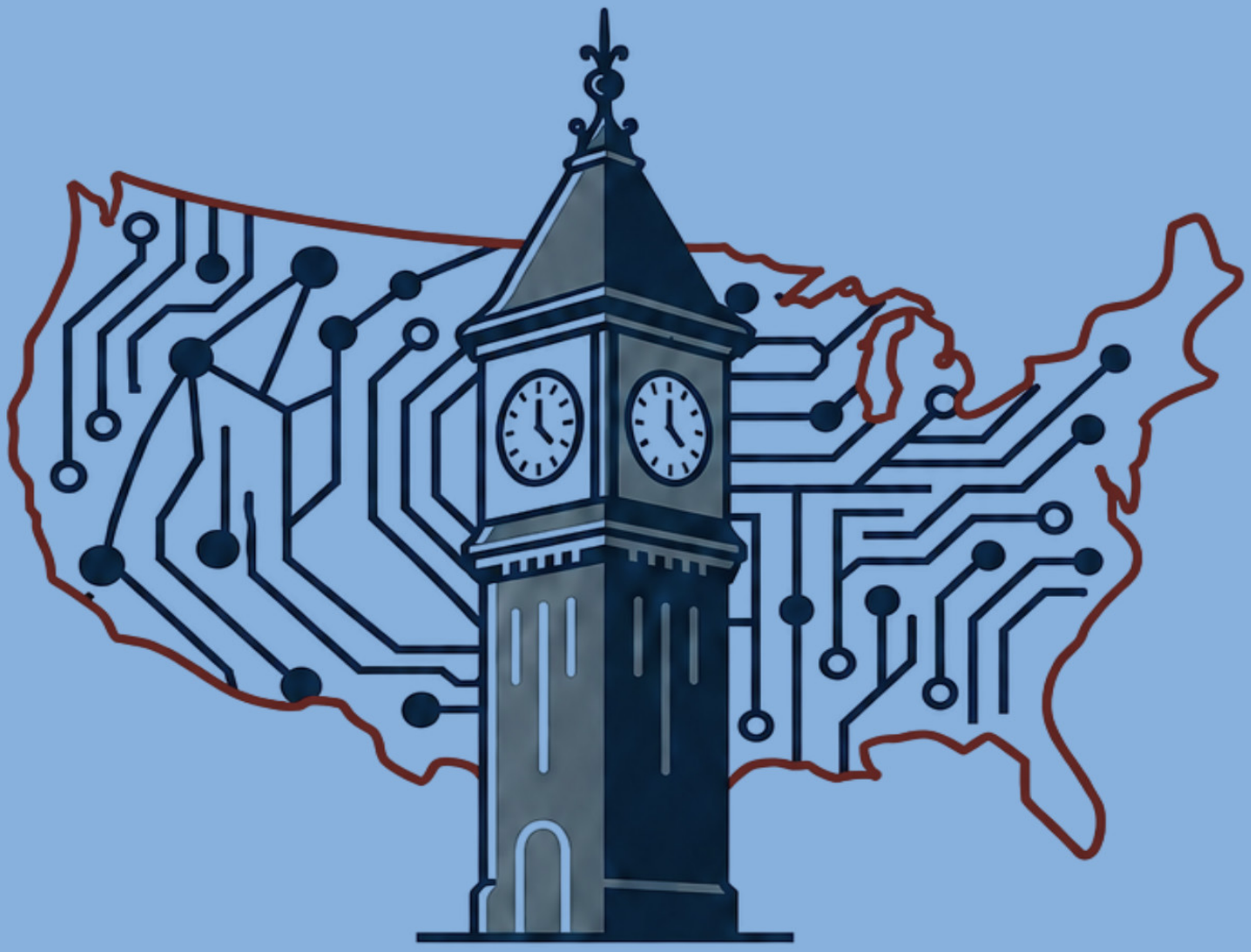

UNIVERSAL BROADBAND SUMMIT

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UNIVERSAL BROADBAND SUMMIT REPORT

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INTRODUCTION AND EXECUTIVE SUMMARY

Universal Broadband Summit at Georgetown University, Held May 21, 2026

Digital connectivity is the foundation of opportunity in modern America. A high-quality, affordable connection—and the skills needed to use it—now determine who can fully participate in the economy and civic life and who is left on the margins. The United States has made significant progress toward universal broadband, propelled by record private investment and historic federal funding, including the $42.45 billion Broadband Equity, Access, and Deployment (BEAD) program.

But deployment dollars alone will not finish the job. Persistent hurdles remain to permitting broadband networks, getting households online, training the broadband workforce, and ensuring no community is left behind. This report's central finding is that each of these challenges is solvable. States and stakeholders are already developing replicable models and measurable frameworks that address them. And on each, as this report shows, a diverse set of stakeholders who approach broadband policy from different perspectives converged on common diagnoses for why these challenges persist, practical tools for addressing them, and a shared commitment to measuring progress through real outcomes. Only by working together to overcome these remaining challenges can we achieve meaningful universal connectivity for everyone in America.

On May 21, 2026, the Georgetown Law Institute for Technology Law & Policy (Tech Institute) convened the Universal Broadband Summit (the Summit), bringing together state broadband officials, industry associations, academics, local government organizations, union representatives, and civil society. Across the board, Summit participants agreed that online connectivity is necessary for full participation in modern society, and that its benefits extend beyond individual households to a more engaged electorate, a more educated public, and a more productive economy. Together, participants assessed the nation's progress toward universal broadband, examined the challenges that remain, and identified practical, measurable tools to address them.

The Summit was deliberately future focused. Rather than relitigating how the country got here, participants took today's legal and programmatic landscape as our starting point and asked a more practical set of questions: Where do the gaps persist? Why have they proven so durable? What can states and stakeholders do about them now? Throughout, the emphasis remained on replicable models and frameworks that can be evaluated against objective outcomes, so that progress can be demonstrated rather than merely asserted.

Drawing on a pre-event survey of participants and supporting research, participants identified four challenges that emerged as the most significant remaining barriers to universal connectivity: (1) permitting reform; (2) demand-side initiatives, including affordability and adoption; (3) broadband workforce development; and (4) default risk and connecting remaining locations. The Summit sought to identify replicable models and frameworks that can make measurable progress on each challenge more achievable. This report synthesizes those discussions. To facilitate candid

discussion, the Summit operated under the Chatham House Rule. Accordingly, this is not an attributable record of the convening but a practical playbook that states and stakeholders can use to continue progress toward universal connectivity.

In the sections that follow, we first acknowledge the Summit's—and this report's—limitations and then briefly discuss the current landscape of U.S. broadband availability and adoption, based on the FCC's *Internet Access Services: Status as of June 30, 2025* (May 2026). The report then examines each of the four challenges listed above. For each, the Summit followed the same analytic approach—uncovering **root causes** that allow the problem to persist, identifying **models and frameworks** that can make measurable progress, and developing **metrics** to evaluate outcomes and demonstrate the return on the investment many of these efforts require. A summary of our findings appears below and in the one-page matrix in Appendix C, with additional analysis provided throughout the full report.

Four Key Challenges: Root Causes, Models, and Metrics

1 · Permitting Reform

Challenges remain in how to best meet permitting, environmental, preservation, and safety requirements while expediting construction.

ROOT CAUSES

Capacity constraints. Permit demand often exceeds the finite capacity of the offices that must process them, especially in rural communities least able to staff up for a temporary surge.

Analog systems and fragmented data. Paper-based processes and fragmented, undigitized records of existing underground and overhead infrastructure slow permitting and increase uncertainty.

Coordination and trust. Communication between providers and permitting authorities often breaks down, frequently during the earliest stages of engagement.

MODELS

Targeted surge support. Deploy funding and personnel where and when demand spikes through consultant-reimbursement arrangements, state-funded consultants, regional "tiger teams," or direct funding to permitting and locate authorities.

Digitization. Modernize permitting systems alongside the underlying as-built and infrastructure-mapping data that support them.

Permitting playbooks. Develop collaborative guides and workflows that standardize engagement between Internet Service Providers (ISPs) and permitting, environmental, and preservation authorities.

METRICS

Because success in permitting is often invisible, throughput and timeliness measures (time to grant and to close out) are paired with accountability measures that connect public dollars to outcomes and, where relevant, damage-prevention and safety gains.

2 · Demand-Side Initiatives

Affordability, adoption, device access and digital literacy remain persistent hurdles to ensuring consumers benefit from new networks and help sustain them.

ROOT CAUSES

Limited competition. Where a single provider serves an area, the absence of choice keeps prices high and quality low for all households.

Affordability absent a durable subsidy. Even a competitive price can exceed what a low-income household can pay, a challenge made worse by the 2024 expiration of the Affordable Connectivity Program.

Device and digital-skills barriers. Many households lack an adequate computer or the digital and information-literacy skills to make effective use of broadband.

The data gap. The lack of a comprehensive public record of what households pay makes it harder to target support and measure success.

MODELS

Increased competition. Lower barriers to market entry so that increased competition reduces prices for all households, independent of any ongoing subsidy.

State-funded subsidies. Establish ACP-style state subsidy programs, such as New Mexico's new Low-Income Telecommunications Assistance Program.

Low-cost plan requirements. Capped-rate plans for eligible low-income households, such as New York's Affordable Broadband Act—though their interaction with NTIA's BEAD conditions remains unsettled.

Devices and digital skills. Pair affordable service with device assistance and digital-skills education delivered through trusted local institutions.

Price and adoption transparency. Build the consumer-facing transparency and pricing record needed to improve policymaking and evaluate outcomes.

METRICS

Proposed metrics are organized by program type—competition, subsidy, low-cost-plan, device, and digital-skills measures—and are designed to do double duty, tracking outcomes while also helping to close the gap in demand-side data itself.

3 · Workforce Development and Scaling

Universal broadband requires building and scaling the labor pipeline that will construct and maintain new networks.

ROOT CAUSES

Communication and data gaps. Broadband workforce shortages are concentrated among contractors and subcontractors who do the work—rather than the providers in contact with state broadband offices—and are not well reflected in existing workforce data.

Pipeline and job-quality challenges. Labor shortages loom from an insufficient number of trained workers, a telecom "retirement cliff," competition from AI and data-center growth, and concerns about job quality.

Inconsistent and delayed funding. Training dollars often arrive too late to stand up programs before construction demand peaks.

MODELS

Sector partnerships. Bring together employers, workforce organizations, educators, and government to align training with actual workforce needs.

Recruitment and awareness. Expand early, hands-on exposure in schools and recruit from non-traditional labor pools, with wraparound supports.

Credentialed training programs. Build scalable pathways through community colleges, unions, and trade associations.

Registered apprenticeships. Expand paid, on-the-job training supported by intermediaries that reduce administrative burdens for small employers.

METRICS

The metrics span completion and credentialing, placement and employer demand, sustained and quality employment, and return on investment. Two caveats apply: Credentials should be stackable and transferable, and measurement should follow workers across employers wherever possible.

4 · Default Risk and Connecting Remaining Locations

Universal connectivity will require that we minimize defaults in the BEAD program and connect the locations that remain left behind.

ROOT CAUSES

Single-round program design. BEAD funds one round of deployment and provides no statutory mechanism to "true up" eligible locations or redeploy funds when a provider defaults.

Maps lag ground truth. Awards drawn from a fixed snapshot inevitably diverge from conditions as construction proceeds.

Legitimate cost increases. Rising pole and equipment costs can push even good-faith providers to walk away.

Uncertain scale and timing. The timing, number, and causes of defaults cannot be predicted in advance.

FRAMEWORK

Rather than cataloging existing models, Summit participants built a phased framework to address this challenge.

Phase 1 — Prevent. Establish conditions for success through well-structured grant agreements and proactive, predictive monitoring to prevent defaults before they occur.

Phase 2 — Preserve. Keep good-faith projects moving—while protecting taxpayer funds—by distinguishing legitimate cost overruns from manufactured ones and providing available funding where evidence and good faith demonstrate genuine need.

Phase 3 — Connect. Connect the remaining locations by giving states flexibility to choose the most appropriate pathway to connect every unserved and underserved household.

METRICS

The metrics pair leading indicators that surface trouble early—such as construction progress against milestones and financial early-warning signals—with outcome measures of defaults, funds at risk, and locations actually connected.

Using This Report

No single barrier stands between the country and universal broadband, and no single solution will clear the path. Instead, the Summit produced a set of replicable models, practical frameworks, and hard-won lessons drawn from the experience of the states and stakeholders already doing this work. The chapters that follow develop each in greater detail. Read together or section by section, they are offered in the same spirit in which the Summit was convened: practical, measurable, and aimed squarely at the work that remains.

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Acknowledged Limitations

As with any convening of this kind, the Summit could not address every facet of a subject as broad as universal broadband, and the Summit and this report reflect those limitations. Several topics were raised but set aside to keep the discussion focused, while others were shaped by the mix of participants in the room. We highlight the most significant limitations here so that readers can weigh the findings accordingly.

First, this report takes current law as its baseline. It neither resolves questions of legality nor proposes legislative solutions. The models do not, for example, address whether a state may compel a municipality or utility to act, whether a particular permitting condition is enforceable, or what statutory changes might alter the landscape. Reform of the Universal Service Fund and its programs—though central to the long-term economics of universal broadband—also falls outside the report's scope. Nor does the report address political messaging or strategy; how these models are framed or advanced is left to those who would implement them. These are consequential issues, and their omission should not be read as a judgment about their importance, but rather as a reflection of the Summit's focus on actionable models for the specific challenges discussed here.

Second, the report takes the current federal framework as given. It treats the performance measures, permitting requirements, and pole-related conditions established by the FCC and NTIA as fixed parameters rather than as variables to be reexamined. It also accepts NTIA's current BEAD definitions and benchmarks as the operating baseline. Consistent with the current BEAD program, it does not delve into differences among deployment technologies, although the discussions of permitting and workforce are largely concerned with terrestrial network deployments.

Third, this report treats the availability of remaining or future federal funding as uncertain. Several of the models discussed in this report depend on additional funding, and their feasibility may turn on developments that postdate the Summit and this report. At the time of the Summit, litigation challenging the termination of the Digital Equity Act grant programs remained pending, so those programs were not actively discussed.[1] For BEAD, NTIA had approved nearly all of the Final Proposal deployment subawards but had not yet issued highly anticipated guidance on whether and how states could access the approximately $22 billion remaining in BEAD funds. Such funding could help address some of the challenges discussed here, and we hope that the models presented may serve as a resource as NTIA releases further guidance. At the same time, we recognize that these programs cannot and should not be viewed as the only source of funding or the only means of addressing the challenges identified in this report.

[1] After the Summit, in *National Digital Inclusion Alliance v. Trump*, No. 25-3606 (D.D.C. July 15, 2026), the court held that the Digital Equity Act's designation of racial and ethnic minorities as a "covered population" is an unconstitutional racial classification but is severable, allowing the challenge to the cancellation of the Competitive Grant Program to proceed. In its filings, the government represented that it would reinstate the program without the severed racial classification.

Fourth, the report does not fully capture the variation among the 56 entities administering BEAD—the 50 states, five territories, and the District of Columbia, collectively referred to as "states" throughout this report. Each operates under distinct legal, institutional, and economic conditions, and a model that succeeds in one jurisdiction may not translate directly to another. We have tried to surface where these variables bear directly on a model's replicability, but a comprehensive treatment of 56 separate environments was beyond what the Summit could undertake.

Fifth, while the Summit included participants with diverse perspectives, it could not represent every stakeholder in the broadband ecosystem. Notably, the Summit did not include representatives from the FCC, NTIA, the Rural Utilities Service, the White House, or Congress. As a result, the report primarily reflects the views of those implementing and participating in federal broadband programs as opposed to those designing them. Similarly, broadband provider perspectives were represented largely through industry trade associations; the report does not therefore fully capture differences across deployment technologies or between the providers who deploy them. Relatedly, the Summit did not fully examine the convergence of fixed and mobile broadband service or the perspective of satellite broadband providers. The findings that follow should thus be understood as reflecting the views of those present rather than the full universe of stakeholders in universal broadband.

None of these limitations diminishes the value of this report. They do, however, define the boundaries within which it should be read: as a practical resource grounded in a specific convening, rather than an exhaustive account of every consideration bearing on the path to universal connectivity.

Universal Broadband: State of Play

What Do We Mean By "Universal Broadband?"

The Summit began with a foundational question: What do we mean when we talk about universal broadband? Organizers structured the discussion with the view that true universal connectivity requires three things:

- **Availability —** Does a high-speed broadband network reach your home?
- **Adoption —** Do you subscribe to it?
- **Utilization —** Are you using it effectively, with the skills and devices needed to realize its benefits?

To take stock of where the country stands on the first two dimensions, the Summit drew on the FCC's May 2026 Internet Access Report, which summarizes broadband availability and subscriptions using FCC Broadband Data Collection data as of June 30, 2025. The data paint a picture of meaningful—but uneven—progress, suggesting a set of remaining persistent challenges that must be addressed before the country can achieve universal connectivity.

The Availability Gap

Following BEAD's approach, the Summit focused on fixed residential terrestrial broadband at speeds of at least 100 megabits per second (Mbps) download and 20 Mbps upload. According to the FCC, the United States has approximately 116.4 million broadband serviceable locations (BSLs). Of those, about 95.5% have access to fixed terrestrial service at that benchmark speed—a significant milestone on the path toward universal availability.

TOTAL BSLS	COVERED	THE GAP
116.4M	**111.2M**	**5.2M**
Broadband serviceable locations	*95.5% have 100/20 Mbps access*	*4.5% have no qualifying service*

Source: FCC, Internet Access Report (May 2026), based on June 2025 data. Fixed residential terrestrial service ≥ 100 Mbps download / 20 Mbps upload. Provider-reported data.

That leaves 5.2 million locations—4.5% of the total BSLs—without qualifying fixed terrestrial service. These unserved and underserved locations are concentrated in rural, Tribal, and other high-cost areas, and represent BEAD's primary target populations.

Some important caveats shaped the discussion. First, the underlying data summarized in the FCC's *May 2026 Internet Access Report* are provider-reported and subject to a time lag. The FCC's Broadband Data Collection is populated by ISPs reporting their own service locations and subscription levels. That methodology could lead to overcounting: A location is marked as served based on whether an

ISP could provide service on request, not whether a connection has actually been deployed. As a result, the true availability gap may be somewhat larger than these figures suggest.

At the same time, the reported gap may also overstate current need. The FCC report is a snapshot in time based on deployment and subscription data as of June 2025, but the broadband landscape continually evolves through private investment and existing federal and state support programs—driving real-time deployments in ways not yet captured by these availability figures.

Second, these figures are grounded in BEAD's definitions and benchmarks. Consistent with BEAD's approach to defining unserved and underserved eligible locations, we have measured the availability of fixed terrestrial broadband, excluding mobile broadband service and low Earth orbit (LEO) satellite broadband. Equally important, the 5.2 million measurement reflects the FCC's current 100/20 Mbps speed benchmark and the minimum qualifying speed for BEAD funding. According to the same data set, at a higher benchmark—940 Mbps download and 500 Mbps upload, roughly gigabit-class service—the gap expands dramatically: 47.5 million locations, or nearly 41% of all broadband serviceable locations, lack service at that tier. In other words, what it means to "close the gap" depends on both which services are included and where the goalpost is set.

Caveats aside, the trend is encouraging. Using the BEAD program as the relevant benchmark, the availability gap has steadily narrowed, and BEAD's infrastructure deployment awards should accelerate that trajectory in the years ahead.

The Adoption Gap

Availability is necessary to achieving universal connectivity but is not, on its own, sufficient. The Summit also devoted considerable attention to adoption—whether people actually subscribe to and use broadband service that is available to them—and to why the demand-side issues around adoption deserve to be treated as first-order concerns.

Participants identified two distinct reasons why adoption matters. The first is straightforward: The benefits of connectivity—economic opportunity, educational resources, workforce participation, civic engagement—flow only from actually being online. A broadband network that passes a household delivers none of those benefits if that household does not, or cannot, subscribe.

The second reason is structural and often underappreciated: Without subscribers, networks are not sustainable. Broadband infrastructure is expensive to build and operate—and thus a network that cannot attract enough subscribers to cover those costs will fail, along with any public investment in that network. Adoption is therefore not simply a social equity goal; it is the demand-side financial foundation that makes deployment investments durable.

Looking at fixed residential broadband subscription data of at least 100 Mbps download and 20 Mbps upload, the FCC data show that there are 93.1 million subscribers out of the nation's 130.6 million households.

TOTAL HOUSEHOLDS	SUBSCRIBERS	NON-ADOPTERS
130.6M	**93.1M**	**37.5M**
Estimated U.S. households	*71.3% subscribe at 100/20 Mbps*	*28.7% have no qualifying subscription*

Source: FCC, Internet Access Report (May 2026), based on June 2025 data. Fixed residential connections ≥ 100 Mbps download / 20 Mbps upload. Provider-reported data. FCC relies on ACS/Census for estimated 130.6M U.S. households.

The numbers are stark. Coverage reaches 95.5% of locations, but only 71.3% of households subscribe to fixed broadband at or above the 100/20 Mbps threshold. That means 37.5 million households—more than a quarter of the country—are non-adopters of home internet service at or above that speed tier.

It is important to note that the gap is not evenly distributed. Adoption rates are significantly lower among rural, Tribal, and low-income populations. And the structural headwinds are not improving: Congress failed to reauthorize the Affordable Connectivity Program, causing it to lapse in May 2024 and ending a key federal subsidy that had previously supported uptake among low-income households. Recent analysis by John Horrigan at the Benton Institute for Broadband & Society found that wireline adoption has stagnated in recent years. And BEAD funding awards, to date, have focused on infrastructure deployment and availability rather than addressing the adoption gap directly.

BEAD's Role and Its Limits

BEAD deployment funding will make a real difference in the availability of 100/20 Mbps broadband across the country. While precise figures remain in flux, approved BEAD deployment subawards will connect millions of locations over the next four years, closing much—though not all—of the availability gap at current benchmark levels. Construction has just begun and will ramp up meaningfully in the months and years ahead as the program moves forward.

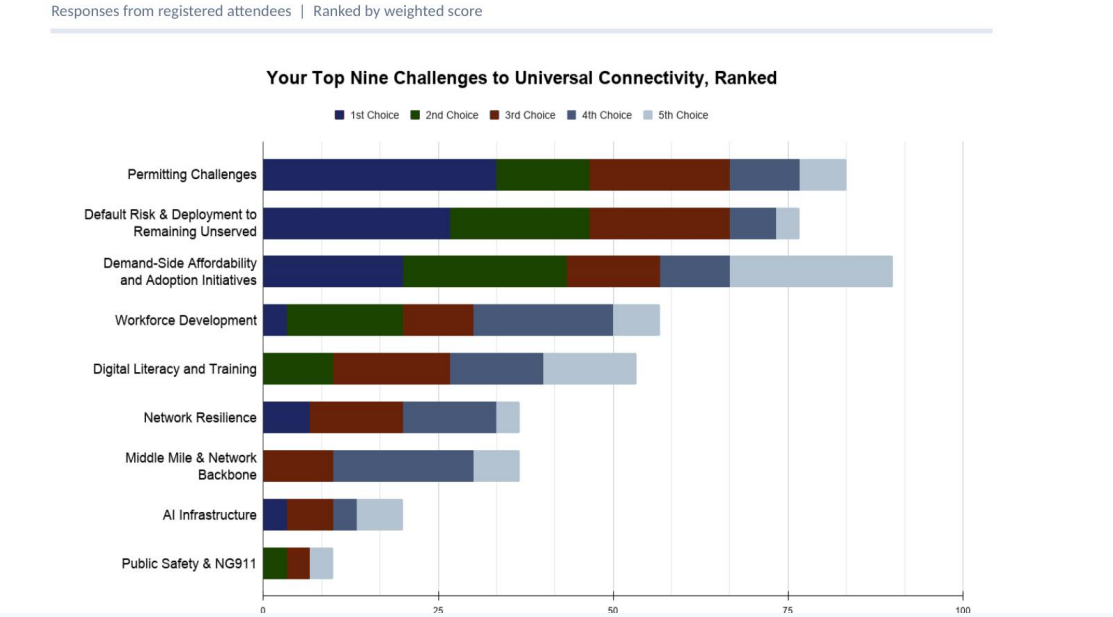
But infrastructure deployment awards under BEAD alone will not be enough. Challenges remain to ensuring that networks get built, services get delivered, households subscribe, and communities reap the benefits of connectivity. Based on current research and our pre-event survey, participants identified four persistent challenges—the subject of the Summit's substantive work sessions—that represent some of the most pressing hurdles to achieving universal connectivity:

- **Permitting Reform.** How do we meet permitting, environmental, preservation, and safety requirements while also expediting construction?
- **Demand-Side Initiatives.** How do we drive adoption and affordability so that consumers actually benefit from available broadband networks and those networks generate the subscriber revenue needed to sustain them?

- **Workforce Development and Scaling.** Where are the workers who will build and maintain these networks, and how do we develop that pipeline in time?
- **Default Risk and Connecting Remaining Locations.** What happens when subgrantees are unable to deliver—and how do we ensure no community falls through the cracks?

PRE-EVENT SURVEY RESULTS

In our pre-event survey, registered attendees ranked their top five challenges to universal connectivity from a list of nine topics. The results informed the Summit's agenda and design.



In the sections that follow, we synthesize the Summit discussion of each of these four challenges. For each challenge, participants followed the same analytic approach—uncovering **root causes** that explain why the problem persists, identifying **models and frameworks** that can make measurable headway, and developing **metrics** to evaluate and track progress and demonstrate a return on the investment many of these efforts require. The emphasis throughout is on replicable models and frameworks whose results can be measured against objective outcomes, so that progress toward universal connectivity can be tracked and demonstrated.

1. Permitting Reform

Introduction

In our pre-event survey, permitting was the issue identified by the most Summit participants as their top priority challenge to achieving universal broadband. The difficulty of meeting permitting and environmental and historic preservation ("EHP") requirements, while also completing timely broadband infrastructure deployments, will only intensify with BEAD's project volume and timeline for deployment.

The Summit's discussion of this issue built directly upon a prior broadband permitting summit held at Georgetown's Tech Institute in 2024. That permitting-focused summit convened experts from local and federal government, industry, and civil society to identify findings and case studies for effective and efficient permitting processes that would maximize the impact of BEAD and all future broadband investments. The Permitting Success Report, published by the Benton Institute for Broadband & Society, memorialized that summit and continues to serve as an excellent resource on this issue.

At our May 2026 Summit, we updated that work to account for new developments and sought to balance the need to meet applicable permitting and EHP requirements with the need to expedite construction. We began by identifying key root causes and friction points that make permitting such a persistent hurdle to achieving universal broadband. With those in mind, we then sought to identify model initiatives with measurable objectives designed to successfully address those challenges while meeting permitting and EHP requirements. We discuss these, in turn, below.

Root Causes

Participants identified the following primary root causes that make permitting and EHP requirements such persistent hurdles to achieving universal broadband:

Root Cause 1: **Lack of Processing Capacity to Meet the Volume of Requests.** A structural gap persists between the volume and variety of permitting requests and the finite capacity of the authorities that must process them. Permitting requirements legitimately differ across jurisdictions because terrain, risk, and community priorities differ. Such variability reflects real and important differences, but it also means there is no single solution that fits all 56 BEAD entities working toward a common timeline. The result burdens ISPs navigating dozens of permitting regimes while putting the greatest strain on the rural towns and counties most affected by BEAD—and least able to staff up for a temporary surge. The problem is compounded when demand spikes as federally funded construction peaks in the same places at the same time, leaving local offices with no realistic way to distinguish truly urgent requests.

The same capacity strain extends beyond permitting offices to the locate services that deployment depends on. Before any ground is disturbed, existing underground utilities must be marked through 811 "call before you dig" systems. Participants flagged that the coming construction wave will place extraordinary demand on locators, who are already in short supply, creating a bottleneck that could slow deployment and increase the risk of damaging existing infrastructure. One participant noted that a state's locators could face a dramatic increase in calls within a single month, yet receive little direct financial compensation from the deployment surge driving that demand. Because neither permitting nor locate capacity can be quickly created where it is most needed, the gap between requests and the resources available to meet them becomes a binding constraint on deployment.

Root Cause 2: Analog Data and Antiquated Systems. Paper-based processes and fragmented, non-digital data across many authorities continue to hamper permitting. Many local governments still rely on physical submissions and manual tracking processes that burden both applicants and reviewers. Yet the cost and complexity of modernization—building data flows, integrating systems across departments, and standing up portals—remain prohibitive for smaller jurisdictions. Compounding the process gap is a data gap: Existing underground and aerial infrastructure is often unmapped or siloed, while information that could streamline review—fees, timelines, as-built locations—is rarely aggregated, even when publicly available. Without modern systems and accessible data, more applicants submit incomplete applications, reviewers spend more time trying to fill information gaps, and avoidable errors and delays accumulate throughout the permitting process.

Root Cause 3: Lack of Coordination, Communication, and Trust. Coordination, communication, and trust between permit applicants and permitting authorities remain persistent challenges. The problems arise on all sides. ISPs may approach local governments without early engagement, clear construction forecasts, or an appreciation of municipal capacity and competing responsibilities. At the same time, local governments often lack visibility into the scope, pace, and methods of proposed deployments. Tribal consultation and consent, which carry their own legal and sovereign weight, add a further dimension to this challenge. Where deployments touch Tribal lands or cultural resources, early and meaningful engagement is essential to securing durable approvals. These issues compound the downstream problems that delay deployment: Agencies issue duplicative permits, permitting offices become overwhelmed by poorly sequenced or incomplete applications, and adversarial relationships replace the flexibility and collaboration needed to resolve issues quickly and keep the permitting process moving.

Models, Strategies, and Solutions

Participants identified multiple models that could address the root causes listed above. We note that these are not mutually exclusive and instead provide a menu of options designed to accommodate and meet the needs of states, ISPs, and local permitting authorities, depending on the particular permitting challenges they face.

Model 1: Surge Support—Sending Capacity Where and When It's Needed

The capacity constraint described in the first root cause above is fundamentally a resource problem. Where funding is, or becomes, available, states can address such a problem by directing funding and personnel when and where demand arises, rather than asking under-resourced communities to permanently staff up for a temporary surge. The models below illustrate replicable approaches that states could adopt should additional funds become available.

- **The Mesa Model: Consultant Reimbursement.** As discussed in the previous summit and Permitting Success Report, Mesa, Arizona, pioneered a collaborative approach in which ISPs fund third-party engineering consultants who work inside the city's permitting office. These consultants are background-checked, trained on the city's engineering and design standards, and operate within the city's own systems—functioning as city permitting staff rather than as outside contractors advocating for the applicant. The city retains authority to issue the permit and keeps the permit data, while the ISP reimburses the city for the consultant's cost. The result is added review capacity that scales with demand without compromising the quality and predictability the city requires. The principal caveat surfaced among participants is that the model is procurement-intensive and does not transfer cleanly to every community. Smaller jurisdictions, for example, may lack the contracting infrastructure to stand it up.
- **The State-Funded Consultant Model.** A similar consultant arrangement may be funded through federal or state resources and managed by the state broadband office. Some states already use administrative or programmatic funds to engage consultants or contractors who supplement local permitting capacity. Routing the funding and the contracts through the state rather than directly to each municipality can simplify procurement, promote consistency across jurisdictions, and make the model accessible to smaller communities with limited contracting ability. To succeed, however, this model must remain flexible enough to accommodate differences in local permitting priorities and processes while ensuring that consultants are sufficiently trained and integrated to gain the confidence of local jurisdictions.
- **State and Regional "Tiger Team" Model.** State or regional surge capacity could also be provided through strike teams of subject-matter experts on recurring permitting-related challenges—such as poles,[2] railroads, easements, and other recurring obstacles—to be made

[2] While pole attachment and pole replacement issues were beyond the scope of the Summit's discussion, participants identified them as challenges to broadband deployment, and several states have shown that dedicated reimbursement funds can reduce this barrier—models that may be replicable should new funding become available. North Carolina's program, for example, was funded with $100 million in federal ARPA dollars and covered 50% of eligible costs, up to $10,000 per pole. N.C. Department of Information Technology Division of Broadband and Digital Opportunity, "Broadband Pole Replacement Program," accessed July 6, 2026, https://www.ncbroadband.gov/polereplacement. Ohio's program, which was established by state legislation, provided $50 million to cover the lesser of 75% of eligible expenses or $7,500 per pole, and as of December 2025, has reimbursed $31 million and approved 175 applications to replace 2,865 poles and pass 4,719 poles by undergrounding across 51 counties, serving more than 13,000 Ohioans. Ohio Department of Development, "State Announces Investment of More Than $6.3 Million to Advance Broadband Access Across Ohio," December 16, 2025, https://development.ohio.gov/home/news-and-events/all-news/2025-1215-state-announces-investment-of-more-than-6-3-million-to-advance-broadband-access-across-ohio.

available and deployed into communities as BEAD projects seek approvals. During the subgrantee selection process, states like Colorado and Arkansas developed robust technical assistance programs to provide specialized expertise, especially to smaller participants. So-called "Tiger Teams" could surge focused permitting and EHP expertise to communities and projects most in need of support. Participants also observed that many of the most difficult permitting challenges—particularly railroads and cross-jurisdictional utilities—cross state lines, making a regional team potentially more efficient than separate state efforts.

- **Direct Funding to Permitting Authorities and Locate Systems Model.** States can also provide surge support through direct funding agreements to permitting authorities or 811 locate systems. In many cases, identifying and supporting the specific agencies or programs that gate deployment may be faster and more effective than building new state-level capacity from scratch. These existing local authorities, offices, and programs are often best positioned to determine how additional funding can most effectively surge support. One state identified county road commissions and drain commissions as its principal bottlenecks and set aside funds to support them, allocating funding based on the number of BEAD-eligible locations in each county. Others have invested directly in their 811 systems by adding dedicated staff, integrating locator services into statewide permitting coordination, and providing damage-prevention training to ISPs. Surge support can be bolstered by integrating locate services into permitting support initiatives.[3]

Model 2: Digitization—Modernizing Systems and Mapping the Network

Like the capacity constraint, reliance on paper processes and undigitized data is largely a resource problem. One participant observed that local governments often remain paper-based "for a cost reason," and that the question is whether states can use remaining BEAD funds, other funding sources, or their collective purchasing power to lower the cost of modernization. Two distinct problems emerged: digitizing the *permitting process* (how applications are submitted, tracked, and coordinated), and digitizing the *data* about what already exists underground and overhead. Both are addressed below, along with an important caution: for BEAD, these investments could arrive too late to help with current projects.

- **Models to Digitize the Permitting Process.** The most direct intervention is to replace paper-based intake and manual tracking with modern digital permitting systems. Participants discussed models to deploy centralized, real-time platforms for application tracking and inter-

[3] When it comes to permitting and 811, Arkansas offers one model: After its 811 center, which has contacts in all 75 counties, offered to help the broadband office, 811 became part of the state's permitting roundtables. Louisiana developed regional damage-prevention plans, built parish-by-parish, with a designated contact in each region who is accountable back to the state broadband office if a strike or other incident occurs. The plan functions as a standing program for preventing excavation damage, and the regional-contact structure creates a clear line of accountability that a purely statewide policy would lack.

agency coordination.[4] While benefits of digitization are clear, the practical questions for states are how to fund it and how to do so securely across many small jurisdictions at once—through shared-services arrangements, multi-jurisdiction purchasing discounts, or potentially direct support from remaining BEAD or other funding sources.

Several jurisdictions illustrate what a modernized process looks like in practice:

- **San José, California** runs permitting for telecommunications infrastructure through SJePlans, a user-friendly online portal,[5] paired with a GIS web application layering small-cell-eligible poles, streetlights, pavement conditions, and capital improvement projects—giving applicants the information they need to plan before they apply.[6]
- **Rancho Cordova, California** replaced outdated manual processes with an enterprise-wide permitting and code-management system that embeds safety protocols such as utility coordination directly into the digital workflow, producing faster reviews and fewer preventable conflicts.[7]
- **Illinois** (through its EPA's online permitting portal)[8] and **Michigan** (through its statewide infrastructure project dashboard)[9] show how states can centralize application submission and project visibility above the municipal level.

Process modernization extends to environmental reviews as well. NTIA's Environmental Screening and Permitting Tracking Tool (ESAPTT), for example, is designed to create transparency and consistency across states, projects, and agencies as federal environmental assessments move forward.[10] ESAPTT demonstrates that integrating environmental screening

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[4] The Fiber Broadband Association has projected that such systems can speed permitting by 30–50% while reducing staff workload and application backlogs with estimated development costs of roughly $10–50 million with $2–5 million in annual maintenance. Fiber Broadband Association (FBA) Deployment Specialists Committee, *Local Permitting for Fiber Network Projects: The Good, the Bad, and the Ugly*, September 2025, 12, https://fiberbroadband.org/wp-content/uploads/2025/08/FBA-Whitepaper_Local-Permitting-for-Fiber-Network-Projects_FINAL-1.pdf.

[5] City of San José, "SJePlans FAQs," accessed July 6, 2026, https://www.sanjoseca.gov/business/development-services-permit-center/sjeplans-electronic-plan-submittal-review/sjeplans-faqs.

[6] City of San José Department of Public Works, "Encroachment Permits," 2025, https://www.sanjoseca.gov/your-government/departments-offices/public-works/development-services/encroachment-permits. For the city's GIS infrastructure layers, see City of San José Enterprise GIS, "Small Cell," City of San José GIS Open Data Portal, February 10, 2026, https://gisdata-csj.opendata.arcgis.com/datasets/ff0e21112224474f84472a233835cf9e_519/explore?location=37.332044%2C-121.880204%2C12.

[7] FBA, *Local Permitting*, 5; National Telecommunications and Information Administration (NTIA), "Permitting Best Practices: Case Studies," BroadbandUSA, January 2025, 5, https://broadbandusa.ntia.gov/sites/default/files/2025-06/EHP_NTIA_Permitting_Best_Practices_Case_Studies.pdf.

[8] Illinois Environmental Protection Agency (EPA), "Permitting Overview," accessed July 6, 2026, https://epa.illinois.gov/topics/forms/permitting.html; FBA, *Local Permitting*, 6.

[9] Michigan Infrastructure Office, "Project Dashboard," accessed July 6, 2026, https://somgovweb.state.mi.us/miinfraprojects/.

[10] On the integration of environmental screening into digital permitting platforms, see FBA, *Local Permitting*, 6; on NTIA's Environmental Screening and Permitting Tracking Tool (ESAPTT) specifically, see NTIA, "Frequently Asked

into digital permitting platforms can expedite reviews without sacrificing rigor and accountability.

- **Data Digitization Models: As-Built Data and Infrastructure Maps.** The second, and often more difficult, challenge is modernizing the data itself. As one participant put it, much infrastructure information "is just sitting in boxes," undigitized and inaccessible. When an ISP asks whether existing facilities are mapped, the answer is too often no, because gathering and digitizing that information is enormously difficult. Yet the permitting and construction process is precisely when accurate location data can be captured. Several cities now require as-built data to be returned to the local government at project closeout, allowing the jurisdiction to build and digitize a record of what was installed and where. Participants emphasized that tracking and reporting back as-built data is critical to accurate and efficient permitting going forward.
    - One success model is **Johnson County, Kansas**, whose award-winning AIMS (Automated Information Mapping System) is the GIS platform that the city of Leawood credits with streamlining its permitting process.[11] AIMS links descriptive data to a map, allowing city staff and permit applicants to identify locations already served—or slated for service—by broadband and other utilities, improving route selection while reducing costs.

  Participants acknowledged that such initiatives are on the ambitious end of the spectrum and noted that creating a "digital twin" of underground infrastructure could present security concerns, as well as data sovereignty concerns where the infrastructure, environmental, or location data being mapped originates on Tribal lands.[12] Even so, participants agreed that accessible, actionable infrastructure data would strengthen the effectiveness of the other models presented here, including the consultant and surge-support approaches.

- **Important Timing Caveat.** Participants stressed that time is of the essence. For BEAD, they expressed concern that system modernization could arrive too late to meaningfully affect near-term progress toward universal connectivity. Standing up a digital permitting platform or a GIS data layer takes time and may not be completed before the construction wave it is meant to ease has already passed. This does not diminish the value of these investments, but it underscores the importance of timely funding and implementation. Ultimately, states will need to be clear-eyed about which benefits are achievable within the BEAD window, and which will accrue over the longer term.

Questions and Answers Version 22: Broadband Equity, Access, and Deployment (BEAD) Program," *BroadbandUSA*, June 16, 2026, 54, https://broadbandusa.ntia.gov/sites/default/files/2026-06/BEAD_FAQs_v22.pdf.

[11] Drew Garner, "Permitting Success: Closing the Digital Divide Through Local Broadband Permitting," *Benton Institute for Broadband & Society*, September 4, 2024, 35, https://www.benton.org/sites/default/files/permitting-success.pdf.

[12] Where as-built, environmental, or location data is captured on Tribal lands, states and providers should respect Tribal data sovereignty—securing explicit, informed consent before such data is aggregated, retained, or repurposed.

Model 3: "Playbooks" to Facilitate Communication and Coordination

Of the root causes identified by participants, the breakdown in communication, coordination, and trust is the one least dependent on funding to address. The model below works by reducing uncertainty: giving providers a clear map of overlapping jurisdictions, giving local governments a template for the conversations they will need to have, and giving both sides a structured forum for coordination. It does not require significant new funding, but it does require leadership—ideally from a governor's or state broadband office—willing to convene stakeholders and standardize engagement.

- **Permitting Playbooks.** Participants endorsed the development of flowcharts to help providers navigate overlapping agency jurisdictions and model "playbooks" to standardize engagement between ISPs and municipalities. The Summit converged around this playbook concept as a tangible, replicable deliverable: a guide outlining what a productive first conversation should cover, what information each side needs to bring, and what each can offer the other. The concept builds on the prior summit's *Permitting Success Report*, which documented one ISP's use of a master license agreement that, from the outset, anticipated the questions a municipality would ask, supplied the provider's answers, and invited the locality's input. This approach transformed what is often an ad hoc, adversarial first encounter into a structured and constructive exchange.[13] Participants acknowledged, however, that a single document only goes so far. As one local official cautioned, a master license agreement is just the first of three layers needed for effective engagement: the master agreement itself, the jurisdiction's construction and design standards, and the terms and conditions attached to individual permits.[14] Participants stressed that, to be effective, such a playbook must be developed collaboratively with local stakeholders and remain customizable. Ideally, the playbook would be created by a state broadband office or governor's office in partnership with local governments—not handed down to them—so that it is embraced as a practical tool rather than dismissed as a top-down mandate.

BEAD reinforces this convening role. The program now requires states to establish permitting roundtables that bring together federal, state, local, and Tribal representatives to surface and resolve permitting issues before they become delays, giving state offices both a standing forum and a clear mandate for coordination.[15]

Several states have already produced the kinds of resources other states can adapt:

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[13] The master-agreement model is detailed in Garner, "Permitting Success," 31–32. For the resulting deployment in Greenwood Village, Colorado, see City of Greenwood Village, "Fiber Initiative," accessed July 6, 2026, https://greenwoodvillage.com/2741/fiber-initiative.

[14] On the layering of a master license agreement with construction and design standards and permit terms and conditions, see Garner, "Permitting Success," 31–32; NTIA, "Permitting Best Practices," 4.

[15] On the BEAD permitting roundtable requirement, see NTIA, "BEAD Subgrantees: Protect Your Rights," May 2026, 2, https://broadbandusa.ntia.gov/sites/default/files/2026-05/BEAD_Subgrantees_-_Protect_Your_Rights.pdf. The requirement directs states to establish permitting roundtables that include federal, state, local, and Tribal representatives.

- **Arkansas** released a 75-page permitting toolkit to help keep projects moving efficiently from award to construction, and launched a bi-monthly BEAD Program Permitting Roundtable that brings together federal and state agencies, the state broadband office, and BEAD awardees to identify and escalate issues before they cause delays.[16]
- **Illinois** developed a starter guide for the BEAD planning process that helps providers navigate the state's jurisdictional variations and operates an environmental permitting portal that pairs electronic submission with a "General Permit" structure to reduce redundant filings.[17]
- **Minnesota** produced a flowchart clarifying which responsibilities fall to the provider, the state, and NTIA. This type of process map removes guesswork from a fragmented system.[18]

Measuring Progress and Demonstrating Return

The models described above share a common premise: That targeted investment—whether of funding, staff, or coordination—can help relieve permitting or EHP bottlenecks slowing broadband deployment. But investment, particularly public investment, carries an obligation to demonstrate results. Where government funds are committed to surge support or to systems and data modernization, accountability requires objective measures that connect dollars spent to both outcomes achieved and progress toward the underlying goal of universal connectivity.

This can be difficult for several reasons that surfaced during the Summit. First, success in permitting is largely invisible: When the process works, deployment simply proceeds, leaving no delay to point to as evidence of value. Measuring the absence of a problem is inherently difficult. Second, comparisons across jurisdictions are problematic because the unit of measurement is not standardized. One city may cap a permit at a fixed length while another places an entire build on a single permit, so a raw "permits issued" count can mislead unless the unit being measured is clearly defined. A credible metrics framework must therefore pair output measures with the context needed to interpret them. It

[16] The Arkansas State Broadband Office, "Arkansas BEAD Program Permitting Toolkit," ARConnect, April 2026, 4, https://broadband.arkansas.gov/wp-content/uploads/2026/04/Permitting-Toolkit.pdf. On the Arkansas BEAD Program Permitting Roundtable, launched in coordination with NTIA, see The Arkansas State Broadband Office, "The Arkansas BEAD Program," ARConnect, accessed July 6, 2026, https://broadband.arkansas.gov/bead/.

[17] On the Illinois BEAD planning starter guide, see Illinois Department of Commerce & Economic Opportunity Office of Broadband, "Broadband in Illinois Starter Guide," BEAD Grantee Resource Hub, last updated April 13, 2026, https://dceo.illinois.gov/content/dam/soi/en/web/dceo/broadband/web/broadband-in-illinois-starter-guide-03162026.pdf. On the Illinois EPA permitting portal and "General Permit" structure, see Illinois EPA, "Permitting Overview," accessed July 6, 2026, https://epa.illinois.gov/topics/forms/permitting.html.

[18] Minnesota Office of Broadband Development, "Grantee Process Map for BEAD Environmental and Historic Preservation Compliance for Each NEPA Project Area," *Minnesota Department of Employment & Economic Development*, March 2026, 1, https://mn.gov/deed/assets/bead-grantee-process-map_tcm1045-731173.pdf.

should also distinguish clearly between permit *issuance* and permit *closeout*. Federal shot-clock requirements tend to address only permit issuance, while the work that typically generates community complaints—construction, rerouting, and restoration—typically happens after permits are approved.

With those caveats in mind, the following measures provide states and stakeholders with a foundation for tracking performance and demonstrating return on investment. They are organized according to the outcomes each is best suited to measure.

Throughput and Timeliness. These measures track whether permits move efficiently from application through completed construction.

- Number of permits issued and number closed out.
- Time to issuance *and* time to close out—ideally measured at each stage of the process from application to issuance, construction, and closeout. Tracking each stage separately allows delays to be localized to a specific stage, ensuring that improvements in permit issuance are not mistaken for improvements on project completion.

Accountability for Invested Funds. These measures connect public dollars to measurable results and are particularly important when government funding supports a model.

- The number and percentage of permits meeting established timelines for both issuance and closeout.
- Funding expended relative to demand or request—that is, whether surge support was deployed where and when it was needed.
- Cost per permit issued and closed out.

Return on Investment for Providers and Authorities. These measures capture the efficiency gains that justify investments in modernization and coordination.

- Reductions in administrative and legal costs for providers and permitting authorities.
- Person-hours required to prepare submissions and applications, serving as a proxy for the administrative burden that digitization and standardization are intended to reduce.

Damage Prevention and Safety Outcomes. For models that invest in 811 and locator capacity, return on investment may also be measured in damages avoided. The Common Ground Alliance's Damage Information Reporting Tool (DIRT) provides the national benchmark, offering an interactive dashboard and companion 811 Center dashboard that enables states to track underground utility damage trends, locate timeliness, and sector-specific performance over time.[19]

[19] On underground-utility damage data and trends, see Common Ground Alliance, "Damage Information Reporting Tool (DIRT) 2024 Analysis and Recommendations," August 2025, 4, https://dirt.commongroundalliance.com/Portals/9/Common-Ground-Alliance-DIRT-Report-2024.pdf; the DIRT Interactive Dashboard (with data from 2022 onward) and the companion 811 Center Dashboard are available at https://commongroundalliance.com/DIRT-Dashboard. CGA's 2024 analysis identified nearly 200,000 incidents of damage to buried utilities and flagged telecom as a high-risk sector for both causing and sustaining damage.

2. Demand-Side Initiatives

Introduction

In our pre-event survey designed to rank challenges to achieving universal broadband, demand-side initiatives, including affordability and adoption, emerged as the most frequently identified top-five priority. Importantly, the Summit brought together a wide range of vantage points to a problem that spans infrastructure economics, consumer behavior, and practical questions related to whether a household can get online and use the connection effectively once it is there.

While Americans increasingly have access to broadband networks at 100/20 Mbps, as discussed above, the rate of home fixed broadband adoption is far below availability rates and has plateaued in recent years. Broadband availability and adoption remain interrelated goalposts for universal connectivity. Demand-side initiatives focused on adoption ensure that consumers actually benefit from BEAD network deployments and that those networks cultivate a long-term revenue-sustaining subscriber base. The expiration of the federal Affordable Connectivity Program (ACP) in May 2024 removed the country's largest and most successful tool for closing the affordability gap, and recent analysis suggests its loss has contributed to stagnating adoption. To date, BEAD deployment awards promise to make real progress on availability, but do little to address the adoption, affordability, and utilization necessary to ensure network sustainability and consumer benefits.

Summit participants highlighted two problems that are often conflated but call for different remedies. The first is a **market concentration** problem: Where a household has only one provider, the absence of competition can keep prices high and quality low for everyone in that area, regardless of income. The second is an **affordability** problem: Even where competitive choices exist, the lowest available price can still exceed what a low-income household can pay. Notably, the market only captures the private benefit to the subscriber, while failing to account for positive externalities arising from broader social and economic value that extends well beyond the household.

These two problems can compound one another—the least-affordable areas tend to be both less competitive and lower-income—but they respond to different tools. Measures that introduce competition lower the market price for everyone. Subsidies and low-cost plan requirements help the households for whom even a competitive market price remains out of reach. A complete demand-side strategy needs both, and the models below address each.

Root Causes

Participants identified the following root causes that make demand-side adoption a persistent hurdle to achieving universal broadband:

Root Cause 1: Lack of Competition in the Provider Market. Separate from the affordability question of what a household can pay is the question of what the market allows a provider to charge.[20] Where there are too few providers—and especially where there is only a single provider—serving an area, the absence of competition can keep prices high and quality low for every household, regardless of income—a market failure distinct from the affordability constraints discussed below.

One state broadband official framed this as a policy challenge of expanding the number of providers so that the price falls for everyone, rather than simply redistributing who bears the cost. Evidence suggests this market failure is both real and widespread. A Federal Reserve Bank of New York study found that the least-affordable city charged among the highest prices for some of the lowest-quality service—a pattern the authors attribute to the absence of a competitive provider marketplace rather than to any feature of the households themselves.[21] FCC data as of June 2025 reinforces this finding: at speeds of 100/20 Mbps, one-quarter of broadband serviceable locations had one or zero fixed terrestrial broadband providers, while well over half had no more than two.[22] Because this is a market structure problem, rather than an affordability problem, it calls for different policy solutions.

Root Cause 2: Affordability and the Absence of a Sustainable Subsidy. The second root cause was the one most frequently raised at the Summit: For many low-income households, the monthly price of fixed service to their homes exceeds what their budgets can bear, even where market prices are competitive. Participants returned repeatedly to the point that the cost "is just too high" and that ACP had made the cost, as one put it, an easier pill to swallow. The Federal Reserve Bank of New York has quantified this disparity: Low- and moderate-income communities spend roughly 2.43% of median household income on broadband, nearly five times the 0.51% share in wealthier areas and

[20] Throughout this section, the market and competition discussions refer to fixed residential terrestrial broadband, consistent with NTIA's framework for measuring availability under BEAD. At the same time, low Earth orbit (LEO) satellite service—from providers such as Starlink and Amazon Leo—is available nearly everywhere and is emerging as a viable competitor, particularly in high-cost rural areas where terrestrial competition is hardest to achieve. We note the tension this creates: NTIA treats locations served only by LEO satellite as unserved yet permits BEAD funds to be awarded to LEO satellite providers for those same locations. We do not resolve that tension here. Instead, we follow NTIA's approach and focus the competition discussion on terrestrial providers, but acknowledge here that LEO satellite is a real and growing presence in the market.

[21] Ambika Nair, "Broadband Affordability: Assessing the Cost of Broadband for Low-And-Moderate Income Communities in Cities," *Federal Reserve Bank of New York*, September 2025, 15–16, https://www.newyorkfed.org/medialibrary/media/outreach-and-education/household-financial-stability/assessing-cost-of-broadband-for-low-and-moderate-income-communities. In Bridgeport, Connecticut, the study's least-affordable city, residents faced higher prices despite being limited to lower-performing copper service, a result the report attributes to the lack of a robust, competitive provider marketplace; over two-thirds of Americans have access to only one or two high-speed providers.

[22] Federal Communications Commission Industry Analysis Division Office of Economics and Analytics, "Internet Access Services: Status as of June 30, 2025," May 8, 2026, 9–10, https://docs.fcc.gov/public/attachments/DOC-421557A1.pdf. Percentages reflect the share of broadband serviceable locations where providers reported availability of terrestrial fixed broadband at 100 Mbps downstream and 20 Mbps upstream; satellite is excluded.

above the FCC's 2% affordability benchmark.[23] The deeper problem is that the country has no durable federal mechanism to address this. ACP was popular and reportedly helped over 20 million households overcome affordability obstacles. Many providers and households found it effective, but it was a one-time appropriation that ran out. Lifeline, the standing federal program, provides a $9.25 monthly benefit that most participants use for wireless service, reaches only a small share of eligible households, and is funded from a shrinking revenue base.[24] Without a reformed and sustainable subsidy, each new program rebuilds the same bridge and watches it wash out—leaving consumers offline and providers with fewer subscribers to sustain the networks BEAD is funding.

Root Cause 3: The Device Barrier. Affordability conversations tend to focus on the monthly bill, but households also need a device capable of making meaningful use of the connection. Roughly 1 in 7 households nationally—and as many as 1 in 4 in some parts of the country—lack a desktop or laptop computer. That figure does not capture the households whose only computer is a decade old and ill-suited to the data-rich tasks now expected of it.[25] This barrier may matter more than is commonly assumed. Recent research finds that computer access is a stronger predictor of beneficial internet use—including job searches, government services, and telehealth—than in-home internet service.[26] Smartphone-only access, which is common among low-income households, is an insufficient substitute. Completing a job application or a benefits form on a phone is difficult, and it narrows both the range of activities people can perform online and the skills they develop. A home device left out of the affordability equation is a gap left in the middle of it.

Root Cause 4: The Shifting Demands of Adoption: Skills, AI, Information Literacy, and Trust. Even where service and a device are in hand, getting and keeping people meaningfully online is human- and time-intensive work. In an AI-driven economy, the definition of meaningful use continues to evolve. Participants who have done this work for 15 years noted that the baseline has shifted—from operating a mouse to navigating AI tools to recognizing increasingly sophisticated scams. Participants emphasized that AI literacy is unreachable without digital literacy first. Adoption is no longer only about technical skills but also about information literacy—the ability to interpret what people encounter online and do so safely. That safety dimension is itself a barrier to adoption. Participants

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[23] Nair, "Broadband Affordability," 1. Low- and moderate-income communities paid 2.43% of median income for broadband versus 0.51% in wealthier areas; in the least-affordable areas, 26.7% of households relied solely on a mobile device.

[24] Jordan Arnold, "Achieving Affordability: State Strategies for Getting Everyone Online," *Benton Institute for Broadband & Society*, September 10, 2025, 7–8, https://www.benton.org/sites/default/files/Achieving-Affordability.pdf. Lifeline subscribership has fallen from 18 million in 2012 to roughly 8.6 million, and the FCC estimates that only about 22% of eligible households participate.

[25] On the device-access gap, see Amy L. Gonzales and Ceciley (Xinyi) Zhang, "First-Level Fundamentals: Computer Ownership Is More Important for Internet Benefits than In-Home Internet Service," *Journal of Computer-Mediated Communication* 30, no. 3 (April 27, 2025): 2, https://doi.org/10.1093/jcmc/zmaf007.

[26] Gonzales and Zhang, "First-Level Fundamentals," 10. Computer access, particularly laptop access, was a stronger predictor of beneficial internet use (job searches, government services, and health-related activities) than in-home internet service or smartphone access, and households with a computer but no home internet were still more likely to use the internet beneficially than households with home internet but no computer.

reported that concerns, especially from older residents and from parents, about online safety, fraud, and the effects of technology on their families are compelling reasons for some households to choose to stay offline. Affordable access alone, without trust, will not close the gap.

Root Cause 5: The Data Gap. Underlying many of these root causes is a measurement problem. The country collects systematic data on broadband availability but far less on the other aspects of the digital divide, such as affordability and utilization. There is no comprehensive public record of what households actually pay. The FCC's broadband "nutrition labels" were a decade in the making and still fall short of empowering ordinary consumers to easily compare plans and terms.[27] Without reliable data on prices, adoption, and skills, consumers can't make informed choices, regulators can't see where the market is failing, and programs can't effectively direct support. Well-intentioned policy remedies that rely on assumptions because of such data deficiencies can miss their intended targets. All of this makes it difficult to define—let alone demonstrate—what success looks like. Several of the models below depend as much on closing this data gap as on identifying new funding solutions.

Models, Strategies, and Solutions

The approaches below are not mutually exclusive, and no single one will close the demand-side adoption gap. They fall into five broad families: (1) introducing competition where an absence of competition keeps prices high, (2) putting a subsidy back in households' hands, (3) requiring providers to offer low-cost plans, (4) addressing the device and skills barriers directly, and (5) identifying the price and adoption data the field has lacked. The first addresses the competition side of the market; the rest address the affordability and utilization sides. As federal programs recede, the most active affordability models are emerging at the state level, including New Mexico, which recently adopted the first state-level replacement for ACP. Below, we identify some potentially replicable models for states to address this challenge.

[27] Nair, "Broadband Affordability," 5. The report's price measure uses address-level based pricing data collected by querying ISP pricing tools—a methodology pioneered by The Markup's "Still Loading" investigation and subsequently applied by other researchers and newsrooms; The Markup was acquired by CalMatters in April 2024, and it is unclear whether the underlying dataset continues to be actively updated. Leon Yin and Aaron Sankin, "How We Uncovered Disparities in Internet Deals," *The Markup*, October 19, 2022, https://themarkup.org/show-your-work/2022/10/19/how-we-uncovered-disparities-in-internet-deals; Sonya Quick, "A Powerful Next-Stage Journalism Venture: CalMatters Acquires The Markup," *CalMatters*, April 18, 2024, https://calmatters.org/inside-the-newsroom/2024/04/calmatters-acquires-themarkup/.

States seeking to replicate this approach should treat the methodology as the replicable element rather than the dataset itself. For example, the Broadband-Plan Querying Tool (BQT), is a similar methodology developed by the ADDRESS project at UC Santa Barbara and described as part of the computer science internet-measurement community's standard toolkit. Haarika Manda et al., "Measuring Broadband Policy Success," *Harvard Law Review*, July 16, 2024, https://harvardlawreview.org/blog/2024/07/measuring-broadband-policy-success/ (applying BQT to audit over 537,000 CAF-funded addresses across 15 states; finding only 55% were actually served and only 33% received service complying with FCC program rules, despite ISP certifications to the contrary; concluding that BEAD will require more rigorous and independent program evaluation than CAF received). The BQT dataset is available to researchers and policymakers upon request at https://address.cs.ucsb.edu/dataset/.

Model 1: Introducing Competition to Lower the Market Price

The most direct way to address the structural market failure described above is to introduce competition where its absence drives up prices. Because this strategy lowers the price the market sets for everyone rather than simply shifting who bears the cost of high prices, it can reach the underlying root cause without an ongoing public subsidy.

States have several tools at their disposal to lower barriers to entry for new providers. They can lower the capital cost of entry by waiving permitting fees or opening shared, open-access middle-mile infrastructure; protecting consumer choice of provider in multi-tenant buildings; or rolling back restrictions that prevent local governments, cooperatives, and other non-traditional providers from offering service. For example, Colorado repealed a 2005 law that required local governments to hold a referendum before providing internet service. More than 120 communities statewide have since moved to offer or support local options—one of which now provides service for $40 per month, or $15 for low-income households.[28] Where a market can support more than one provider, enabling entry fuels competition, which lowers the price the market sets for all households.

Importantly, however, competition is not available everywhere. And even where competition exists, some households will still face affordability constraints. Because the highest-cost areas that BEAD targets are, by definition, currently unserved at 100/20 Mbps today, BEAD-funded networks will face no competitive check on pricing, making it even more important to directly address the demand-side affordability challenges in these communities.

Model 2: State-Funded Subsidies to Replace ACP

Participants discussed the failure to federally renew the ACP and the impact of that failure on both participating consumers and providers. They also discussed critiques of the ACP, lessons learned, and ways the program may need to be refined should there be an ACP-like federal subsidy program in the future.

In the meantime, states may respond to the loss of federal ACP by establishing comparable subsidies of their own. New Mexico recently became the first state to do so. Senate Bill 152, signed in February 2026, establishes the Low-Income Telecommunications Assistance Program (LITAP), which empowers the state Public Regulation Commission to provide up to $30 per month—mirroring the ACP benefit—toward internet service for households earning $45,000 or less.

Two features distinguish New Mexico's model. First, it is funded through the State Rural Universal Service Fund, supported by surcharges on subscribers, rather than the state general fund—so there is

[28] Arnold, "Achieving Affordability," 6 (enhancing competition and consumer choice, including open-access middle-mile infrastructure and the repeal of restrictions on municipal and cooperative providers). On Colorado's 2023 repeal of its 2005 municipal-broadband referendum requirement and Longmont's NextLight network, see Arnold, "Achieving Affordability," 21.

no impact on general state appropriations. For the New Mexico USF, the cost is spread across a broad base, with the per-connection surcharge (as opposed to one based on telecommunications service revenues) being expected to rise only modestly. Second, the program is structured to scale: up to $10 million in its first year, reaching an estimated 27,000 households, then up to $45 million annually thereafter, which the state projects could reach roughly 173,000 households.[29] The state's broadband office identified affordability—not access—as the single largest barrier to subscription. LITAP is built to address that barrier on an ongoing basis rather than as a one-time intervention.

For states with an existing stable universal service fund and the institutional capacity to collect and disburse, New Mexico's model offers a durable, broadly funded path. For states without that infrastructure, it demonstrates that a state can stand up an ACP-style program on its own with a sustainable funding source.

Model 3: Lowering the Price Through Low-Cost Plan Requirements

A second family of models directly lowers the price that providers charge low-income consumers rather than subsidizing the household. New York's Affordable Broadband Act—upheld after a multi-year legal challenge—requires providers with at least 20,000 customers in the state to offer eligible low-income households broadband at capped rates: $15 per month for service of at least 25 Mbps, or $20 per month for at least 200 Mbps.[30] This approach establishes affordability without government funding and shifts advertising and enrollment obligations to providers.

Summit participants, however, were candid about the difficulty of replicating New York's approach. They noted that New York's market was unusually suitable for this approach because a handful of large providers cover most of the state and several already offered qualifying plans. A state with a more fragmented or less competitive provider marketplace may have difficulty complying with such a mandate. They also cautioned that enrollment runs through providers, who may have little incentive to make enrollment easy or to educate low-income consumers about the offering, so uptake can lag without active outreach.

In addition, there are new questions about how such state requirements interact with the BEAD program. NTIA has taken the position that BEAD not only bars both NTIA and the states from setting the rate for a subgrantee's statutorily mandated low-cost service option,[31] but also constrains

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[29] S.B. 152, 57th Leg., 2d Sess. (N.M. 2026) (establishing the Low-Income Telecommunications Assistance Program (LITAP)).

[30] N.Y. GEN. BUS. LAW § 399-ZZZZZ (McKinney 2023); New York State Public Service Commission and N.Y. Department of Public Service implementation materials at New York State ConnectALL Office, "Consumer Resources," accessed July 6, 2026, https://broadband.ny.gov/consumer-resources. The Act was sustained by the U.S. Court of Appeals for the Second Circuit, and the Supreme Court declined review. *New York State Telecommunications Association, Inc., et al. v. James*, No. 21-1975 (2d Cir. Apr. 25, 2024), *cert. denied*, No. 24-161 (U.S. Dec. 16, 2024).

[31] The statutory and regulatory pieces are worth separating. The BEAD statute requires that every subgrantee offer no fewer than one low-cost broadband service option for eligible subscribers. 47 U.S.C. § 1702(h)(4)(B); *see also id.* § 1702(h)(5)(D) (providing that nothing in the subchapter authorizes the Assistant Secretary or NTIA "to regulate the rates charged for broadband service"). The affordability obligation thus remains a statutory mandate. What changed

states' otherwise lawful ability to address broadband rates. The agency's BEAD terms and conditions mandate that states agree, for the duration of the grant program, not to enforce any state law that directly or indirectly regulates the rates, terms, or conditions of any broadband service offered by a BEAD subgrantee throughout the state.[32] Whether NTIA's approach will hold remains unclear. The scope it claims has not been tested in court, and some have questioned the agency's legal authority to condition grants on the non-enforcement of duly enacted state law.[33]

For states weighing this model, NTIA's position creates new uncertainty. New York's statute was sustained on the merits in court and nothing in NTIA's guidance purports to invalidate it. Rather, NTIA's claim seems to be that accepting BEAD funds carries a condition against enforcing such a law against subgrantees, including for households *outside* a subgrantee's BEAD footprint. How that asserted condition interacts with court-upheld state law remains an open question that may ultimately be resolved by litigation, further federal guidance, or other actions from either NTIA or the state.[34]

The result is a model, like New York's, that remains legally available but whose practical reach for any BEAD state and provider is now more complicated. States drawn to a reduced-cost-plan mandate should weigh not only whether their market can absorb it but also the possibility that NTIA will treat it as conflicting with BEAD conditions, along with the attendant uncertainty that posture creates for providers and for the state's own award. Nonetheless, where the provider landscape is favorable and a state is prepared to navigate that federal uncertainty, the model can ensure broad affordability benefits at low public cost.

Model 4: Addressing the Device and Skills Barriers Directly

Because price subsidies alone do not put a working computer or digital skills in a household, a fourth family of models targets those barriers directly. The research is clear that devices deserve standing

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under the June 2025 BEAD Restructuring Policy Notice is who defines the terms of that obligation: the Notice prohibits states from "explicitly or implicitly setting the LCSO rate a subgrantee must offer" and provides that NTIA "will only approve Final Proposals that include LCSOs proposed by the subgrantees themselves." NTIA, "Broadband Equity, Access, and Deployment (BEAD) Program: BEAD Restructuring Policy Notice," June 6, 2025, 7, https://www.ntia.gov/sites/default/files/2025-06/bead-restructuring-policy-notice.pdf. Under the prior framework, states had set knowable, published low-cost rates; under the current approach, the rate is proposed by each provider. At the time of this report, NTIA does not appear to have published the provider-proposed low-cost service options approved in Final Proposals, leaving them largely outside public view.

[32] NTIA, "General Terms and Conditions for the NTIA Broadband Equity, Access & Deployment Program (BEAD) Program Funds," updated November 2025, 22, https://broadbandusa.ntia.gov/sites/default/files/2026-02/BEAD_GTCs_Nov_18_2025.pdf. NTIA has reinforced the prohibition against rate regulation by circulating a document encouraging providers to confirm that the prohibition appears verbatim in their state subgrant contracts and to report to their federal program officer if it does not. See NTIA, "Protect Your Rights," 1.

[33] Drew Garner, "NTIA Encourages ISPs to Ensure State BEAD Contracts Comply With Agency Priorities," *Digital Beat* (blog), May 11, 2026, https://www.benton.org/blog/ntia-encourages-isps-ensure-state-bead-contracts-comply-agency-priorities (identifying questions that remain unresolved).

[34] This has already caused a chilling effect; at least one state advancing a New York-style requirement set its bill aside in 2025 after concluding, following discussions with NTIA, that proceeding could place its BEAD allocation at risk. Patricia Blume, "California's Affordable Broadband Bill Dead For 2025," *Broadband Breakfast*, July 17, 2025, https://broadbandbreakfast.com/californias-affordable-broadband-bill-dead-for-2025/.

alongside service in any affordability strategy, instead of being an afterthought.[35] Digital skills follow the same logic: A connected device is only as useful as the household's ability to navigate it. Success depends not just on digital training but on trust in those providing it—a need that grows more consequential as AI tools become part of everyday online life.

While an exhaustive review of the full range of models falls outside the scope of this report, example initiatives and lessons drawn from the Summit discussion offer valuable guidance:

- **Pairing Device Support with Subsidies.** States structuring a subsidy program can incorporate a device component from the start. For instance, Oregon's 2025 Lifeline reform pairs an increased monthly subsidy with a one-time $100 benefit toward an internet-enabled device.[36] One design detail that matters is the delivery channel. The federal Affordable Connectivity Program offered a comparable one-time device discount, but most participating providers declined to offer it, and the device benefit went largely unused.[37] Device support works best when the entity delivering the device has both the capacity and the incentive to stock, fulfill, and support the hardware—an argument for routing device support through institutions equipped for it rather than assuming service providers will also move devices.
- **Leveraging Workforce Funds for Digital Skills.** The Workforce Innovation and Opportunity Act (WIOA) offers funding that states can direct toward digital-skills instruction in some cases. Its Title II adult education program explicitly names digital literacy as an allowable activity.[38] Recent federal guidance has reinforced this use: A 2025 Department of Labor guidance letter encourages state and local boards to deploy WIOA Title I funds for digital and AI skills training, routed through existing career-services, training, and Governor's Reserve channels.[39]
- **Sustained Support Through Trusted Sources.** Participants stressed that skills and information-literacy work should be an ongoing commitment, and that it is best delivered through trusted local institutions—libraries, community colleges, and cooperatives—that can meet people where they are. Libraries in particular serve a triple role as sources of device loans, public access, and hands-on help. The recurring lesson is that this work needs sustained funding and clear metrics, because the underlying need does not expire.

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[35] Gonzales and Zhang, "First-Level Fundamentals," 11.

[36] Arnold, "Achieving Affordability," 15. Oregon's 2025 reform authorizes raising the state Lifeline subsidy from $10 to $15 per month and adds a one-time $100 benefit toward an internet-enabled device.

[37] Olivia Wein, "New Federal Benefit Provides Affordable Broadband Access," *National Consumer Law Center*, April 18, 2022, https://library.nclc.org/article/new-federal-benefit-provides-affordable-broadband-access.

[38] U.S. Department of Education, Office of Career, Technical, and Adult Education, "Integrating Technology in WIOA," March 24, 2015, 1, https://www.ed.gov/sites/ed/files/about/offices/list/ovae/pi/AdultEd/integrating-technology.pdf.

[39] Lori Frazier Bearden, "Training and Employment Guidance Letter No. 03-25 Encouraging the Use of Workforce Innovation and Opportunity Act Funding to Help Youth and Adults Develop Artificial Intelligence Skills," August 26, 2025, 3, https://www.dol.gov/sites/dolgov/files/ETA/advisories/TEGL/2025/TEGL 03-25/TEGL 03-25.pdf.

Model 5: Building Price and Adoption Data and Consumer Protections

Closing the data gap is itself a model, and a comparatively low-cost one. States can build the price transparency the field lacks and, in doing so, empower consumers to find better deals. Consumer-protection laws—requiring clear up-front pricing, and simple cancellation and renewal notices—have advanced on a bipartisan basis in states such as Virginia and Arkansas, while imposing little cost on the state.

These measures lower costs indirectly by helping consumers compare plans and avoid charges that inflate bills over time. They also help to assemble a pricing record that no comprehensive federal source provides—data that regulators and researchers need in order to understand where affordability measures fail and target the other models accordingly.[40]

Measuring Progress and Demonstrating Return

The models above share a premise: That targeted investment—in subsidies, devices, skills support, transparency, or competition—can relieve affordability and utilization barriers. Measuring and demonstrating results is more difficult here than in other areas of broadband policy because, as the root-cause discussion made plain, the federal government does not systematically collect many of the data points most needed.

Whether any of these metrics can be tracked turns on a question the field has not fully resolved: where the data come from. The answer falls into three categories of data sources, each with limits the root-cause discussion anticipated. First, a few rest on standing public datasets—the FCC's Broadband Data Collection for availability and competition, and the Census Bureau's Household Pulse Survey for device access—but these lag current conditions by months and are rarely granular enough to evaluate a particular program's reach. A second category depends on program administrative records, which exist only to the extent a state builds reporting obligations into program design from the outset; absent that design choice, enrollment, uptake, and cost-per-subscription figures cannot be reconstructed after the fact. A third set, chiefly address-level price and plan data, has no comprehensive public source, but may be assembled using the address-level ISP-pricing methodology in tools such as the Broadband-Plan Querying Tool (BQT) and applied at scale in recent research.

Two practical implications follow. The decision to measure must be made when a program is designed, not when results come due. And because so much of this data does not otherwise exist, a well-built metrics framework helps close the demand-side data gap even as it tracks outcomes. A credible metrics framework can thus serve a dual purpose: tracking outcomes for program evaluation while building the demand-side data the field has lacked.

[40] Nair, "Broadband Affordability," 17; Arnold, "Achieving Affordability," 12 (discussing the limits of existing public price data and price transparency).

Competition Metrics:

- Share of locations with one or fewer terrestrial fixed providers at 100/20 Mbps, tracked over time against a pre-intervention baseline—the most direct signal that entry barriers are falling.
- Overlay of pricing data on top of availability data, tracked over time.

Metrics for ACP-like Subsidy Programs:

- Baseline subscription rate among eligible low-income households.
- Enrollment rate among the eligible population—which is often only a fraction of eligible households—since low awareness and burdensome sign-up processes are recurring failure points. Those shortfalls are the first signal that outreach or program design needs adjustment.
- Share of newly subscribed versus previously subscribed households, distinguishing between households the program brought online and those it merely subsidized at a lower price.
- Cost per active subscription, connecting public dollars to program scale.
- Broadband cost as a share of median household income for low- and moderate-income communities, measured against the FCC's 2% affordability benchmark.

Reduced-Cost Plan Requirement Metrics:

- Baseline subscription rates among eligible low-income households in areas subject to the requirement.
- Number of providers offering a qualifying plan and the speeds and prices of those plans as actually quoted to consumers at the address level. Ideally, these data should be independently verified rather than just provider self-reported—a distinction researchers found material.[41]
- Uptake rate among eligible households.

Device Adoption Program Metrics:

- Units distributed or subsidized per program dollar.
- Share of devices meeting a defined minimum specification adequate to current tasks.
- Baseline device-access rates against which program reach can be assessed.

Digital Literacy, AI Training, and Skills Metrics:

- Completion and retention rates in digital skills, AI training, and information literacy programs.
- Skills-outcome quality beyond completion—whether participants can navigate AI tools, identify scams, or complete consequential online tasks.

[41] Manda et al., "Measuring Broadband."

3. Workforce Development and Scaling

Introduction

Summit participants agreed that the BEAD program, together with private investment and the rapid expansion of AI infrastructure, is creating a historic surge in labor demand linked to broadband deployment. Estimates suggest tens of thousands of new workers will be required to meet deployment deadlines. The Summit sought to identify the root causes of the broadband workforce challenge and examine scalable workforce development models with measurable outcomes to sustainably meet this growing demand.

Root Causes

Participants identified the following primary root causes that make broadband workforce demands such a persistent hurdle to achieving universal connectivity:

Root Cause 1: Limited Communication and Mobilization Around Workforce Needs. As a threshold matter, participants identified a disconnect that likely masks both the scale of the broadband labor force challenge and its potential to disrupt progress toward universal broadband. While states are generally attuned to labor market conditions, participants observed that many of the major ISPs deploying broadband infrastructure have not, to date, raised workforce shortages as an urgent concern. Participants explained that the disconnect is largely structural: Many providers do not build their own networks; instead, construction is completed by contractors and subcontractors who experience the most acute labor shortages but often have little, if any, direct engagement with state broadband offices. One participant recounted conversations with contractors who report years of backlogged work that could be completed if they could recruit enough trained workers. Compounding this blind spot is a significant data gap. No comprehensive source currently exists to measure workforce needs specific to broadband infrastructure deployment. While federal labor market data are available, they rely on outdated job classifications that don't neatly map to real-time broadband infrastructure needs.[42]

Root Cause 2: Lack of Trained Labor Force Pipeline and Quality Jobs to Meet the Demand. Participants agreed that broadband workforce shortages are real and growing, even as some disagreed about the precise nature of the problem. A 2024 market study commissioned by the Fiber Broadband Association (FBA) and the Power & Communication Contractors Association (PCCA) estimated that the industry will need to fill roughly 28,000 new construction jobs and 30,000 new technician jobs over the next decade, with an additional 56,000 and 64,000 workers, respectively, needed to replace

[42] Participants discussed earlier NTIA-led efforts to compile broadband workforce data for each state in the BEAD program but noted that those reports are now out of date, no longer accessible, and were based on public federal data that maps poorly onto the broadband labor force.

those who retire or otherwise leave the field.[43] That replacement need reflects a second, demographic pressure: a "retirement cliff." According to the Pew Charitable Trusts, roughly 1 in 5 telecommunications workers are now over the age of 55, and the industry will need roughly 120,000 replacement workers by 2032 independent of any new project demand.[44] On top of that, hyperscaler data-center construction, which is expanding rapidly as AI infrastructure investment concentrates in the United States, competes for the same pool of electricians, technicians, and construction workers.[45] Participants observed that hyperscalers have deeper pockets, run their own training programs, and operate free of BEAD's program constraints. In short, they absorb workers in the short term, but too often release them after a project without the broader, transferable skills that would keep them in the industry—limiting the development of a sustainable workforce.

Not all participants framed the challenge as a pipeline shortage. Labor representatives at the Summit maintained that the binding constraint is neither a lack of workers nor awareness of these jobs, but a shortage of quality jobs. From this perspective, wages for entry-level broadband technicians have stagnated or declined in real terms, and the career ladders that once allowed entry-level technicians to advance into specialized roles, such as splicing, have eroded as providers have shifted their labor base from in-house construction workforces to contractors and subcontractors.[46] This perspective holds that, if employers offered stable, well-paying jobs with clear pathways for advancement, a substantial pool of qualified and experienced labor—including recently laid-off legacy telecom workers, many of whom are not yet ready to retire—would be available to meet workforce demands.

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[43] Mark Bridgers, Wayne Gould, and Jay Rendos, "Survey: Broadband Market Workforce Needs," Continuum Capital on behalf of the Power & Communication Contractors Association and Fiber Broadband Association, June 26, 2024, 11, https://fiberbroadband.org/wp-content/uploads/2024/08/PCCA_FBA_6-26-2024_vFinal_1.pdf. While this analysis was conducted in 2024, the underlying labor pressures it identified have persisted. This is true even as the BEAD program's shift toward technology neutrality has altered state funding awards. Revised allocations now rely less on labor-intensive fiber and more on LEO satellite and fixed wireless deployments—technologies that require far fewer hours and a lower skill ceiling per location. Nevertheless, a significant portion of BEAD awards are still dedicated to fiber and other terrestrial infrastructure projects. Doug Mohney, "BEAD Funding Moves Forward," *Fiber Broadband Association* (blog), April 2, 2026, https://fiberbroadband.org/2026/04/02/bead-funding-moves-forward/ (calculating, based on an industry analysis of Final Proposals as of April 2026 that roughly 65% of BEAD-eligible locations will be served by fiber, followed by LEO satellite (20.6%), licensed fixed wireless (11.2%), HFC (2.2%), and unlicensed fixed wireless (0.9%)). Labor demands remain concentrated on a narrower set of higher-skill roles—splicers, equipment operators, aerial linemen, drill operators—precisely the workers most in contention with data-center builds and most affected by attrition.

[44] Colby Humphrey and Lexi West, "Demand for Broadband Workforce Expected to Rise to Meet BEAD Requirements," The Pew Charitable Trusts, October 30, 2025, https://www.pew.org/en/research-and-analysis/issue-briefs/2025/10/demand-for-broadband-workforce-expected-to-rise-to-meet-bead-requirements (drawing on GAO and BLS data).

[45] On data-center-driven demand for electricians and skilled trades, see Heartland Forward, "Preparing America to Build: The Heartland's Skilled Workforce in an Era of Historic Investment," *Pulse of the Heartland* (blog), November 13, 2025, https://heartlandforward.org/?pulse=preparing-america-to-build-the-heartlands-skilled-workforce-in-an-era-of-historic-investment.

[46] This trend is reflected in the falling share of telecommunications workers represented by a union, from 26% in 2000 to 11% in 2024. Humphrey and West, "Demand for Broadband Workforce."

The two framings are not mutually exclusive: The pipeline is inadequate, and the quality and durability of available jobs ultimately determine whether trained workers stay in the industry at all. Both dynamics bear directly on how to best scale the workforce, and whether that expansion can occur in time to meet BEAD's deployment deadlines.

Root Cause 3: Lack of Consistent, Timely Funding. A final root cause is the misalignment between workforce funding timelines and deployment needs. Even when funding is committed, participants flagged that it often arrives late or shifts as training priorities evolve, making it difficult for community college programs and other stakeholders to plan and sustain the workforce pipelines they have built. Programs launched in anticipation of promised funds can be left without the resources needed to continue, while workers trained during one funding cycle may leave the industry before the next cycle begins. Because developing a meaningful training program takes time, funding that lags the deployment curve will do little to ensure that workers are available when BEAD construction peaks. Building the workforce needed for timely broadband deployment will require consistent, targeted, and predictable funding that anticipates demand rather than responds to it.

To that end, participants applauded the current administration's support for registered apprenticeship expansion as a centerpiece of its workforce agenda, along with the naming of telecommunications and information technology by several Department of Labor (DOL) grant programs as priority sectors.[47] Participants did not, however, view these programs as a substitute for potential funding for broadband-specific workforce initiatives through remaining BEAD funds, subject to NTIA guidance. The DOL programs are national, competitive, and spread across seven priority industries with no assurance that awards will reach the specific communities where BEAD construction is concentrated. By contrast, BEAD funds can be targeted precisely to the locations and timeframes where deployment demand is heaviest, drawing on existing state benchmarks. They can also be deployed on the state's own construction timeline rather than a federal grant cycle—a meaningful advantage given the narrow BEAD construction window. And they can address broadband-specific needs that apprenticeship-expansion grants may not reach, including short-cycle technician training, recruitment pipelines, and support for small rural contractors. As such, participants viewed the funding streams as complementary: States and stakeholders would use each for what it is best suited to fund, rather than viewing the existence of one as a reason to forgo the other.

Models, Strategies, and Solutions

No single model addresses these root causes or resolves the broadband workforce challenges on its own; in fact, the strongest approaches combine multiple strategies across the workforce pipeline, from awareness and recruitment to training and employment. These multi-pronged approaches also reinforce a recurring lesson from the Summit: Programs are most effective when educators,

[47] Exec. Order No. 14,278, 90 Fed. Reg. 17,525, 17,525 (Apr. 28, 2025). For current Employment and Training Administration funding opportunities, see https://www.dol.gov/agencies/eta/grants/apply/find-opportunities.

employers, government, and labor are engaged as integrated partners rather than treated as separate links in a chain. This section examines four categories of models, drawing on examples that states and stakeholders can consider as they address broadband workforce demand:

Model 1: Sector Partnerships to Align Training with Employer Demand

As an organizing framework, Summit participants consistently endorsed sector partnerships: standing collaborations that convene industry, government, education and labor around a defined broadband workforce challenge facing a state or region. Participants stressed the importance of this kind of public-private partnership approach, and that employers must be meaningfully involved in program design rather than positioned as passive downstream recipients of trained workers. When employers help specify the training from the start, they are far more likely to hire the graduates, because the program has effectively been built to their needs and standards.

Ohio offers a highly developed model. Its *Strengthening Ohio's Broadband & 5G Workforce* strategy brought together more than two dozen partners from industry, education, and government, anchored by The Ohio State University, to address the broadband workforce challenge. Together, the partners identified three key gaps for the partnership to address: limited awareness of broadband careers, insufficient education and training programs, and limited awareness of available funding sources.[48]

Our conversation surfaced several lessons for building successful sector partnerships. First, participants emphasized the need for a comprehensive workforce-needs assessment at the outset. Sector partnerships could serve as a vehicle for state-level data collection that goes beyond ISPs to include the contractors and subcontractors who experience the most acute labor shortages. Closing this gap is key to overcoming the information disconnect cited above.

Second, participants noted that workforce policy typically resides outside of the state broadband office. Successful sector partnerships, therefore, typically require high-level support from the Governor's office as well as coordination across state agencies and offices with relevant workforce, education, and economic development responsibilities.

Third, participants emphasized the importance of industry engagement and buy-in. There is no enforceable mechanism requiring a BEAD subgrantee to hire trainees who complete a program. While awardees that are predominantly local entities, such as those in Louisiana, may be more inclined to support workforce initiatives, encouragement is not alone a guarantee of improved hiring outcomes.

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[48] Ohio Governor's Office of Workforce Transformation, "Strengthening Ohio's Broadband & 5G Workforce," BroadbandOhio, September 2021, 5–7, https://broadband.ohio.gov/explore-broadband/strengthening-ohios-broadband-5g-workforce. Several states have taken a similar approach. For example, Texas has built a comparable structure around its Building the Broadband Workforce Grant Program. Texas Broadband Development Office, "Building the Texas Broadband Workforce Grant Program," Comptroller.Texas.gov (The Texas Comptroller's Office), accessed July 6, 2026, https://comptroller.texas.gov/programs/broadband/funding/workforce.

Model 2: Recruitment and Raising Awareness of Broadband Careers

If sector partnerships set the structure, the next challenge is filling the funnel. Participants identified limited awareness of broadband careers as a foundational constraint and converged on the value of early, hands-on exposure. Recommended models start early with education programs in middle and high schools, incorporating industry-validated credentials and safety training from the outset. Several participants observed that the erosion of shop and vocational education has left many young people without meaningful exposure to the trades, making both student engagement and parent buy-in essential. Many families still default to a four-year-college pathway, even as they question the economic value of that route. At the same time, participants identified two opportunities for reframing careers in the trades: First, skilled trades have gained renewed recognition as young people question the return on investment in a four-year degree. Second, the current moment—with AI displacing white-collar work—creates an opening to position fiber and field-technician careers as durable, "AI-proof" work.

The Summit identified several early outreach models to build early awareness of broadband careers and boost recruitment in the field:

- **NTCA's BOLD (Broadband Opportunities and Leadership Development) Toolkit.** Created in 2023 by NTCA–The Rural Broadband Association in partnership with the National Rural Education Association, the BOLD Toolkit helps rural broadband providers and K-12 schools collaborate to build early awareness of local telecom careers.[49] The toolkit provides best practices on when to introduce career exploration, which occupations to highlight, and how providers can engage students through career days, job-shadowing, ride-alongs, internships, guest lectures, and hands-on demonstrations. It also profiles concrete member programs others can replicate, including one Wisconsin provider's youth mentorship event with hands-on fiber and network sessions, and a South Carolina provider's career fair that reached more than 2,000 eighth-grade students.
- **Ohio's High School Tech Internship Program.** Run by the Governor's Office of Workforce Transformation, this program offers a structured pathway from secondary school into technology careers, including broadband deployment. It reimburses Ohio employers for hosting paid, technology-focused internships for high-school students, with broadband and 5G among the eligible role categories alongside software, data, cloud and IT infrastructure, cybersecurity, and advanced mobility.[50] By placing students in real entry-level roles while still

[49] Joshua Seidemann, "BOLD: Broadband Opportunities and Leadership Development" (NTCA–The Rural Broadband Association, April 2023), 2, https://www.ntca.org/sites/default/files/documents/2023-04/SRCBOLDToolkit_0.pdf; Joshua Seidemann, "Partnerships and Creativity Lead Career Development," *NTCA - the Rural Broadband Association* (blog), September 13, 2023, https://www.ntca.org/newsroom/blog/partnerships-and-creativity-lead-career-development.

[50] Ohio Governor's Office of Workforce Transformation, "High School Tech Internship Program," December 10, 2025, https://workforce.ohio.gov/initiatives/initiatives/hstechinternshipprogram. Employers can recover up to 75% of intern wages—capped at $5,000 per intern—for students who work at least 120 hours at a minimum of $12 per hour. The program is delivered through competitively selected regional intermediaries that serve as a single point of contact for schools, students, and employers, handling everything from recruitment to closeout.

in high school, the program exposes them to high-demand technology careers they might not otherwise encounter or consider.

- **Mobile Demonstration Units.** One participant described a high-investment but potentially high-impact recruiting model: a mobile demonstration unit that travels to schools and community events for live, hands-on demonstrations of broadband work, culminating in a "draft day"-style event where students can signal their interest in entering the skilled trades. Approaches like this aim to rebuild the early, hands-on exposure to technical careers that had diminished with the decline of vocational education.

Because the shortage is significant enough that no source of labor can be left untapped, participants emphasized an explicit "all-of-the-above" recruitment strategy that reaches beyond traditional labor pools to historically underrepresented populations. One state, for example, discussed funding certification programs for people who are incarcerated but noted that employer willingness to hire graduates, particularly for home installations, has been a binding constraint. Several participants stressed that recruitment alone is insufficient without wraparound supports. In states with low workforce-participation rates, barriers such as childcare and transportation costs keep willing workers out of the workforce. Funding these supports directly is itself a potential intervention: One participant described previous plans to use BEAD funds to underwrite wraparound services, including childcare and transportation assistance, to help recruited workers complete training and remain on the job.

Model 3: Establishing and Scaling Education and Training Programs

Recruitment must be matched by training capacity that can scale to meet demand. Summit participants identified a range of education and training models—from community college partnerships to trade-association credentialing programs—that offer adaptable approaches for states seeking to expand their broadband workforce:

- **Louisiana's ConnectLA & Community College Model.** Beginning in 2022, the Louisiana State Broadband Office partnered with the Louisiana Community and Technical College System (LCTCS), whose campuses serve communities across the state's parishes, to build fiber-optic and telecommunications training pathways. The state encouraged BEAD grant recipients to collaborate with LCTCS colleges in developing their workforce plans. An initial $10 million investment launched the effort, and more than 850 individuals have since completed broadband-related training across the system.[51] The strategy is built around a deliberate "learn here, work here" approach that positions broadband construction and

[51] Amanda McElfresh, "LCTCS Powers Louisiana's Broadband Boom with Cutting-Edge Fiber Optics Training for Students across the State," *The Advocate*, February 16, 2025, https://www.theadvocate.com/sponsored/baton_rouge/lctcs/lctcs-powers-louisiana-s-broadband-boom-with-cutting-edge-fiber-optics-training-for-students-across/article_dc5d4538-ea71-11ef-a749-7f0e4853795e.html; NTIA, "Case Study: Bossier Parish Community College | Fiber Optic Technician Bootcamp in Bossier Camp, Louisiana," *BroadbandUSA*, accessed July 6, 2026, https://broadbandusa.ntia.gov/news/latest-news/case-study-bossier-parish-community-college-fiber-optic-technician-bootcamp.

maintenance as a career a worker can pursue without leaving their communities. This approach is well-suited to Louisiana, where most awardees and contractors are locally based.

- **NTCA's Broadband Academy at Northwood Tech.** Developed in partnership with NTCA–The Rural Broadband Association, this fully online program at Wisconsin's Northwood Technical College offers digital-badge credentials—including Broadband Customer Service Specialist (Level 1) and Broadband Installer (Level 2)—that can be paired with hands-on, on-the-job experience at a local provider. Students may complete individual courses or the full sequence, giving rural ISPs a flexible, industry-recognized pathway for training and certifying technicians.[52]
- **FBA OpTIC Path.** The Fiber Broadband Association's Optical Telecom Installer Certification offers roughly 144 hours of classroom instruction and hands-on skills training delivered through community colleges, technical schools, and veteran and Job Corps programs nationwide. Graduates earn a three-year FBA certification qualifying them to install, test, and troubleshoot fiber systems through to the home. The program has expanded to roughly 70 community colleges and training institutions across 40 states with the goal of training about 1,200 technicians a year.[53]
- **Arkansas Fiber Academy.** A partnership among Arkansas Community Colleges, the state Office of Skills Development, and the Arkansas State Broadband Office, the Academy offers accelerated, hands-on programs across multiple campuses in four tracks—fiber optic technician, aerial lineman, telecommunications tower technician, and underground drilling technician. State grant funding covers tuition, and graduates of the fiber technician track sit for the FBA OpTIC Path certification.[54]
- **New Mexico Broadband Certification Classes.** In January 2026, the New Mexico Office of Broadband Access and Expansion launched free monthly broadband certification classes across the state, funded with $2 million in congressionally directed federal spending. The five-day program, which can run on a recurring basis, covers introductory installation, fiber- and copper-based cable installation, and technician training, providing a low-barrier entry point into broadband careers.[55]

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[52] Northwood Technical College, "Broadband Academy," accessed July 6, 2026, https://www.northwoodtech.edu/continuing-education-and-workforce-training/broadband-academy/.

[53] Fiber Broadband Association, "FBA OpTIC Path™," accessed July 6, 2026, https://fiberbroadband.org/education-and-certification/fba-optic-path/. On the program's current footprint—roughly 70 community colleges and training institutions across 40 states, with a goal of training about 1,200 technicians a year—see Fiber Broadband Association, "Fiber Broadband Association OpTIC Path™ Workforce Development Program Reaches New Schools, States and Success," *Training Industry*, January 8, 2025, https://trainingindustry.com/press-release/it-and-technical-training/fiber-broadband-association-optic-path-workforce-development-program-reaches-new-schools-states-and-success/.

[54] Arkansas Community Colleges, Arkansas Office of Skills Development, and Arkansas State Broadband Office, "Arkansas Fiber Academy," accessed July 6, 2026, https://www.arkansascc.org/arkansasfiberacademy.

[55] New Mexico Office of Broadband Access & Expansion, "Broadband Workforce Training Opportunities," Connect New Mexico Office of Broadband Access & Expansion, accessed July 6, 2026, https://connect.nm.gov/workforce-training-opportunities.html; Lexi West, "How States Can Address Broadband Worker Shortages," The Pew Charitable

- **Cherokee Nation Fiber Technician Program.** Established in 2019, the Cherokee Nation's Fiber Technician Program combines fundamental and technical instruction in fiber and broadband technologies. Alongside free tuition, students receive training supplies and a $10-per-hour stipend, enabling them to earn while they train. Graduates leave with up to seven micro-credentials recognized by Oklahoma's higher education system. The program illustrates how Tribal Nations can leverage their own resources to build locally rooted workforce pipelines.[56]

Across these models, participants consistently emphasized that credentials should be stackable and transferable across employers and sectors—data centers, utilities, and ISPs alike—so that workers can move as labor demand shifts without losing career momentum. Some programs have intentionally embedded this flexibility. One Virginia community college, for example, paired its fiber-optic technician credential with commercial driver's license training, while a Louisiana technical college integrated fiber-optics certification into its existing information technology associate degree and heavy-equipment operator program. These cross-disciplinary pathways empower a worker to carry skills across the construction, utility, and telecom sectors.[57] Participants noted that skill-verification systems exist but are inconsistently adopted. They cautioned that retention-tied training incentives—which require that a worker remain with an employer for a specified period after training—can reduce employee poaching but must be designed carefully to avoid restricting future worker mobility.

Model 4: Registered Apprenticeships and Intermediary Models

Summit participants expressed strong support for apprenticeships as a training model that combines classroom instruction with paid, on-the-job experience. At the same time, they noted that small employers often lack the administrative capacity to create and manage registered apprenticeship programs. Participants highlighted intermediary models as a promising solution, whereby a trade association or other organization serves as a back-office layer, handling paperwork and compliance so that small employers can participate without standing up the apparatus themselves. One leading example of such a model is the **Telecommunications Industry Registered Apprenticeship Program (TIRAP)**, led by the Wireless Infrastructure Association (WIA). TIRAP has established competency-based standards across 16 telecommunications occupations, with mentor sign-off and

Trusts, June 16, 2026, https://www.pew.org/en/research-and-analysis/articles/2026/06/16/how-states-can-address-broadband-worker-shortages.

[56] Cherokee Nation Career Services, "Fiber Technician Program," accessed July 6, 2026, https://www.cherokee.org/all-services/career-services/career-readiness-act-vocational-training-programs/fiber-technician-program/; West, "How States Can Address Broadband Worker Shortages."

[57] West, "How States Can Address Broadband Worker Shortages" (describing Southwest Virginia Community College and Northshore Technical Community College programs).

formal review from the U.S. Department of Labor. The TIRAP program has become a widely recognized credentialing pathway, expanding to over 100 employers.[58]

Union-affiliated programs offer another established pathway, anchored by the Communications Workers of America (CWA), the largest union representing telecommunications workers, and the International Brotherhood of Electrical Workers (IBEW). In addition to partnerships with telecom employers around career progression, employer programs for mentorship, and on-the-job training, CWA has built formal registered apprenticeship programs in several states and offers an OSHA-10 Construction training taught by telecom technicians.[59] Its District 9 Apprenticeship and Training Trust Fund in California—a joint partnership with the American Communications Contractors Association—operates a registered apprenticeship offering roughly 4,500 hours of paid, employer-based training together with college-level classroom instruction, college credit, and certifications in fiber splicing, structured cabling, and OSHA safety standards. The program builds on a Joint Apprenticeship Training Committee that has trained inside cabling technicians for more than two decades and recently expanded to include fiber.[60]

Participants also flagged opportunities presented by several recent U.S. Department of Labor grant programs to expand and modernize apprenticeship programs.[61] These include DOL's Pay-for-Performance Incentive Payments Program, a $145 million grant initiative announced in February 2026 that awards cooperative agreements to expand registered apprenticeships in targeted industries, including telecommunications[62]—and an $85 million state-directed funding opportunity announced in April 2026 to support apprenticeship expansion and modernization.[63] Eligible occupations include fiber optic, broadband, and tower technicians. Participants viewed these programs as complementary to—not substitutes for—potential funding for broadband-specific workforce initiatives supported by remaining BEAD funds, subject to applicable NTIA guidance.

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[58] TIRAP, "Telecom Apprenticeship Occupations," Telecommunications Industry Registered Apprenticeship Program, accessed July 6, 2026, https://www.tirap.org/.

[59] Communications Workers of America, "CWA Broadband Training and Workforce Development Initiatives," accessed July 6, 2026, https://cwa-union.org/broadband-training.

[60] CWA District Nine Apprenticeship & Training Trust Fund, "About - CWA D9 Apprenticeship," accessed July 6, 2026, https://cwaattf.org/about/. The program is a joint labor-management partnership of CWA and the American Communications Contractors Association (ACCA), with classroom instruction through the Chabot–Las Positas Community College District.

[61] Exec. Order No. 14,278, 90 Fed. Reg. at 17,526 (directing the Secretaries of Labor, Education, and Commerce to develop a plan to reach and surpass one million new active apprentices). For current Employment and Training Administration funding opportunities, see https://www.dol.gov/agencies/eta/grants/apply/find-opportunities.

[62] U.S. Department of Labor Employment and Training Administration, "FOA-ETA-26-19: Pay-for-Performance (PfP) Incentive Payments Program," Grants.gov, March 16, 2026, https://www.grants.gov/search-results-detail/361087. The announcement names Telecommunication among the designated target industries for Registered Apprenticeship expansion.

[63] U.S. Department of Labor, Employment and Training Administration, "US Department of Labor Announces Availability of $85M in Grant Funding to Support Registered Apprenticeship Expansion, Modernization," *U.S. Department of Labor Newsroom*, April 13, 2026, https://www.dol.gov/newsroom/releases/eta/eta20260413.

Measuring Progress and Demonstrating Return

The workforce models described above rest on a shared premise: That targeted investment—in recruitment, training, apprenticeships, and partnerships—can relieve the labor bottleneck threatening to slow broadband deployment. Federal and state funding have proven essential to the success of broadband workforce development programs.[64] Like any public investment, of course, these programs must be able to demonstrate results.

Participants were candid that workforce programs are difficult to measure, and that the field lacks both comprehensive data and implementable metrics for assessing success. Participants discussed emerging federal approaches, including recent U.S. Department of Labor Programs as well as the Department of Education Workforce Pell Grant program ("Workforce Pell"), which extends Pell grant eligibility to short-term programs that states certify as preparing students for high-skill, high-wage, or in-demand occupations leading to stackable, portable credentials.[65] These grants tie program eligibility to demonstrated outcomes rather than program inputs. Even so, participants identified several challenges in applying outcome-based measurement to broadband workforce programs.

Three measurement problems surfaced repeatedly. First, the basic questions remain unsettled: How do you count jobs, and what counts as success? The default measure—a "day-one hire" rate—is widely regarded as insufficient, but no broadly accepted alternative has taken its place. Second, the outcomes that matter most are also the hardest to observe. Tracking workers after they complete a program is inherently difficult and career trajectories are typically lost once a trainee is placed. As a result, while longitudinal tracking holds promise, it has proven very difficult to implement in practice. Third, the employer-centric framework underlying most workforce measurement is a poor fit for broadband. The goal is to equip workers with stackable, transferable skills that allow them to move among employers and sectors as demand shifts. Following a single employer's roster, therefore, risks understating rather than capturing program success.

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[64] Before BEAD, Ohio's Broadband & 5G Sector Partnership worked with WIA and The Ohio State University and received a $3 million state award to design and distribute curriculum and training across the state and to raise career awareness among middle and high school students. Office of the Governor: State of Ohio, "Husted Announces OSU, Wireless Infrastructure Association Partnership as Next Step in Ohio's Broadband Workforce Strategy," *Governor's Office of Workforce Transformation*, March 16, 2022, https://governor.ohio.gov/administration/lt-governor/031622. Recently, states have also stepped in to provide direct funding. For example, Texas's Building the Broadband Workforce Grant Program launched with $24.6 million from its voter-approved Broadband Infrastructure Fund, targeting registered-apprenticeship and paid-internship training for 2,800 Texans in fiber optics. Texas Broadband Development Office, "Building the Texas Broadband Workforce."

[65] Workforce Pell was established by H.R. 1833, 119th Cong. (2025), and amends Title IV of the Higher Education Act. The U.S. Department of Education issued the implementing final rule on May 19, 2026, with a legal effective date of July 1, 2026. U.S. Department of Education, Office of Communications and Outreach, "U.S. Department of Education Issues Final Rule to Create New Workforce Pell Grant Program," *U.S. Department of Education Newsroom*, May 18, 2026, https://www.ed.gov/about/news/press-release/us-department-of-education-issues-final-rule-create-new-workforce-pell-grant-program.

With those caveats in mind, the following measures offer states and stakeholders practical options for tracking performance and demonstrating return on investment. They are organized according to the aspect of workforce development each is best suited to measure.

Completion and Credentialing. These measures track whether training programs successfully prepare and credential workers.

- **Credential attainment**. The number and percentage of trainees who complete apprenticeships, certification programs, practicums, or field-training programs. One benchmark, drawn from the Workforce Pell standard, is a verified completion rate of at least 70% within 150% of the program's expected duration.
- **Measurable skill gains.** Documented academic, technical, or occupational progress during training—such as passing a certification exam or completing a year of an apprenticeship—so that progress can be tracked before final job placement.

Placement and Employer Demand. These measures assess whether training programs are aligned with employer need.

- **Job placement rate and direct placement targets.** Verified placement rates—for example, the Workforce Pell benchmark of at least 70% employment within 180 days of program completion, or a program-specific goal, such as Texas's target of training 2,800 individuals in fiber optics through registered apprenticeships.
- **Employer engagement and demand.** Evidence that a program is built to meet the specific hiring requirements of employers in the state or region, which both demonstrates that the training reflects actual workforce needs and increases the likelihood that graduates secure employment.

Sustained, Quality Employment. These measures shift the lens from the moment of hire to the durability and quality of the job.

- **Job duration and retention**. Sustained employment over time, rather than a one-time "day-one hire" count, capturing whether workers remain employed in good jobs offering competitive wages and benefits. As noted above, participants acknowledged that such measurement may be difficult to implement, stressing that for this approach to work, employers must not only have skin in the game but also be part of the feedback loop.

Return on Investment. This measure connects public dollars to economic outcomes for the worker.

- **Value-added earnings.** A return-on-investment measure similar to the Workforce Pell standard, under which graduates' median earnings must exceed 150% of the federal poverty line by an amount greater than the total cost of the training program. Participants cautioned that such measures are extremely difficult to implement given the challenges presented by longitudinal tracking.

4. Default Risk and Connecting Remaining Locations

Introduction

BEAD, together with the programs that preceded it and significant private investment, has brought the country closer to universal broadband at 100/20 Mbps than at any point in history. But BEAD's deployment awards will not reach every home. Like any program of this scale and complexity, at least some BEAD defaults will be unavoidable and require a deliberate response. In all events, we know that some last-mile locations will remain unconnected when BEAD's Final Proposal deployment awards conclude—whether missed in the mapping process, newly built, or lost to default in BEAD or another support program.

Several stakeholders have proposed setting aside a portion of the roughly $22 billion in remaining BEAD funds to address defaults and connect remaining locations. The Vernonburg Group, for example, has recommended a $7.6 billion "rainy day" fund to cover RDOF defaults, unconnected locations not yet captured, and BEAD cost overruns and defaults.[66] However, the statute as written and NTIA guidance to date do not provide a ready mechanism to do so. At least two questions remain unresolved: (1) how remaining funds could be used to deploy broadband to the unconnected locations not captured in states' Final Proposals, and (2) how those funds could be used if a BEAD provider encounters unexpected cost increases or fails to perform.

Because no fully developed processes yet exist to entirely address these circumstances, Summit participants sought to build a framework rather than catalog existing models. They developed a set of guiding principles, organized in phases, for minimizing defaults, preserving good-faith projects that encounter unforeseen challenges, and connecting the missed or defaulted locations that BEAD's deployment awards will leave behind—all while protecting the integrity of taxpayer funds. The root causes of this challenge along with a proposed framework and principles for NTIA and Congress as they develop these processes, are discussed below.

Root Causes

Summit participants identified several structural and economic conditions that make defaults and stranded locations an unavoidable aspect of the program:

Root Cause 1: BEAD's Single-Round Program Design. Here, the fundamental challenge is structural. By statute, BEAD provides a single round of deployment funding: A state identifies its eligible unserved and underserved locations through the challenge process, fixes that list in its Final

[66] Paul Garnett and Greg Guice, "An Updated Estimate on the Size of a BEAD Rainy Day Fund," *Vernonburg Group* (blog), February 26, 2026, https://www.vernonburggroup.com/blog/an-updated-estimate-on-the-size-of-a-bead-rainy-day-fund. The firm's methodology and its prior estimate are described in Paul Garnett and Greg Guice, "Estimating the Size of a BEAD Rainy-Day Fund Focused on Bolstering Last Mile Connectivity Projects," *Vernonburg Group* (blog), November 14, 2025, https://www.vernonburggroup.com/blog/bead-rainy-day-fund.

Proposal, and funds deployment to those locations. The statute itself does not create a mechanism to "true up" the list to capture locations that were missed, mischaracterized on the map, or built after the challenge process. Nor does it clearly authorize the use of remaining—or clawed back—BEAD funds to ultimately connect a location whose provider defaults. Congress could have designed the program with iterative funding rounds but did not. As one participant observed, low-hanging fruit that becomes apparent after the line is drawn cannot easily be picked up because, thus far, the program's design has no mechanism to reach it.

Root Cause 2: Maps Out of Sync with Conditions on the Ground. The FCC map is a snapshot taken at a fixed point in time, and states award funding based on that snapshot. By the time awards are made and construction begins, conditions on the ground will inevitably have changed. New housing will have been built, some locations will have been served by other means, and others believed to be served will prove not to be. The result is a gap between what the map reflected and the reality on the ground. After accounting for BEAD awards, one analysis identified approximately 1.1 million unserved and underserved locations not currently funded by any federal broadband program.[67] CostQuest has separately estimated that roughly 2.1 million broadband-serviceable locations not identified in BEAD Final Proposals will remain unserved or underserved.[68] Maps will always lag reality, and BEAD contains no built-in statutory mechanism to reconcile that gap as deployment proceeds.

Root Cause 3: Legitimate Cost Increases Without a Completion Pathway. Deployment costs have changed since bids were prepared, sometimes for reasons outside a provider's control. For example, pole attachment fees have risen sharply in some areas, and surging demand from data centers has driven up fiber costs across the board. When project margins disappear, a provider may conclude that walking away and paying any penalty is the rational financial choice. RDOF—the closest analogue to BEAD in structure and purpose—has seen defaults on roughly 37% of its awarded locations, representing more than 1.9 million locations and nearly $3.3 billion in funding.[69] Some BEAD subrecipients have already elected not to move forward, and participants expect additional defaults, particularly given the cost pressure created by the Benefit of the Bargain round.

The Summit discussion distinguished macro-driven cost increases, which may warrant a policy and funding response, from cost increases resulting from a provider's own mismanagement, which do not. The deeper problem, however, is that broadband support programs historically lacked effective mechanisms to address legitimate cost overruns or pivot to reconnect locations after defaults occur.

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[67] Alex Karras and Michael Santorelli, "Updated Analysis Estimates 1.1 Million Locations Could Remain Unfunded After BEAD," *Broadband Expanded* (blog), February 9, 2026, https://broadbandexpanded.com/posts/unservedafterbeadfeb2026. The analysis reports 1,342,667 unserved units once the number of units at each location, such as the individual units in a multi-tenant building, are counted.

[68] Fiber Broadband Association, "Fiber for Breakfast Week 14: The State of Broadband — What the Data Really Reveals," *Fiber for Breakfast* (blog), April 8, 2026, https://fiberbroadband.org/2026/04/08/fiber-for-breakfast-week-14-the-state-of-broadband-what-the-data-really-reveals/ (summarizing remarks from CostQuest Associates CEO Jim Stegeman).

[69] Janie Dunning, Drew Garner, and Reid Sharkey, "New Dataset Reveals Impact of RDOF Defaults on Each State: Lessons for Public Broadband Investment," *Digital Beat* (blog), February 18, 2025, https://www.benton.org/blog/new-dataset-reveals-impact-rdof-defaults-each-state. Only some of these locations became eligible for BEAD funding.

When the FCC claws back a defaulted RDOF award, the funds returned are not available to redeploy, leaving affected locations without a clear path to service. The Capital Projects Fund illustrates a similar failure. One state reported that some providers pursuing otherwise sound projects encountered genuinely unforeseeable costs, such as underground construction forced by pole attachment conditions, and their projects were ultimately canceled because no mechanism existed to provide the additional funding to complete them. The constraint, in other words, is not simply a lack of funding. It is also the absence of workable mechanisms to keep good-faith projects moving when costs unexpectedly change.

Root Cause 4: Uncertainty in Scale, Timing, and Process. Finally, this challenge is inherently difficult to plan for because neither its scale nor its timing can be known. No one can say how many BEAD subrecipients will ultimately default, whether RDOF's experience is a reliable analogue, or when defaults will surface—some may arise years into a multi-year build. That uncertainty makes it difficult to design the timing and structure of responses in advance, and it argues for a framework flexible enough to absorb defaults whenever and at whatever scale they occur.

A Phased Framework to Minimize Defaults and Connect All Locations

Participants organized the framework around three phases that track the life cycle of the problem: minimizing defaults before they occur, salvaging good-faith projects when the risk of default arises, and connecting the locations that remain—including both defaulted locations and those not originally identified as eligible. The phases are sequential in logic but not mutually exclusive; a state may be operating in all three simultaneously across different projects.

Throughout the discussion, participants returned to two recurring tensions. First, the mere existence of a cleanup fund creates moral hazard, because a rational provider will seek to draw on it whether or not its need is genuine. Second, the current emphasis on reducing federal spending creates an adversarial backdrop for any proposal involving additional funding. The framework attempts to take both concerns seriously.

Phase 1: Conditions for Success to Minimize Defaults

The first phase focuses on preventing defaults rather than responding to them. Before a state requests access to additional deployment funds, it should be able to demonstrate that it set its projects up to succeed. Participants framed this as establishing the "conditions for success," and agreed upon the following principles:

- **Structure agreements correctly.** Grant agreements should incorporate risk assessments, milestone-based monitoring, and early-warning mechanisms from the outset, so that problems surface while there is still time to address them.
- **Calibrate compliance to a "Goldilocks" standard.** A compliance regime can fail in two directions. If requirements are too burdensome, providers default from compliance rather

than construction costs; if it is too lax, problems may not be discovered until an audit. The objective is a regime rigorous enough to catch problems early, but light enough not to become a cause of default in its own right. As one participant observed, every portfolio includes providers that inspire confidence and others that must be helped across the finish line. The practical question is how to get as many of the right ones across the finish line as possible.

- **Monitor proactively and predictively.** Rather than waiting for missed milestones, states should track provider forecasts in real time, compare progress against milestones, and flag deviations early. Participants framed this as "enhanced technical assistance"—forward-looking problem identification rather than punitive oversight—supported by layered monitoring across multiple data streams to predict trouble before it becomes non-compliance.
- **Provide state-funded technical assistance.** States can stand up robust technical-assistance teams to help subgrantees meet compliance requirements, subject to the state broadband office capacity and ability to access remaining BEAD funds. As discussed in the permitting section of this report, this could be done through state-funded tiger teams or qualified consultants retained through master services agreements. Participants noted that relevant expertise already exists in the marketplace and funding these services would improve compliance, strengthen performance, and deter potential waste, fraud, and abuse.
- **Hold providers responsible for their own capacity.** Conditions for success are not solely the state's responsibility. Providers must hire competent compliance and project-management staff. Participants acknowledged the tension here: Under pressure from state offices that were themselves under pressure from NTIA, providers sharpened their bids so aggressively that some may have left themselves with too little budget for the personnel needed to keep projects on track.

Across all of these, participants agreed that NTIA and the states share responsibility for ensuring these conditions are in place, reinforcing default prevention as a joint federal-state effort rather than leaving it entirely to individual states.

Phase 2: Saving Good-Faith Projects at Risk

When a project nevertheless runs into trouble, the second phase focuses on investigating the problem and keeping a good-faith provider from defaulting. Participants identified a central design challenge: distinguishing legitimate cost overruns from illegitimate ones. On paper, the two can appear identical. For example, a tripling of attachment fees may indicate rent-seeking by the pole owner, while rising fiber costs driven by data-center demand reflect a genuine programmatic cost increase. Experience from other support programs suggests that successful implementation requires a mechanism to identify and fund legitimate cost overruns without rewarding manufactured claims.

Participants recommended that NTIA give states flexibility—subject to reasonableness review and oversight—to keep good-faith projects afloat, including by supplementing an award to cover verified cost overruns. To draw on that flexibility, a state should demonstrate that it performed a risk assessment, that the overrun is supported by verifiable evidence and arose in good faith, and that

continuing with the existing provider is the most efficient path to project completion. When cost increases are justified, participants argued that they should be allowed as budget modifications—whether individual or program-wide—as opposed to noncompliance or default.

Rather than establishing rigid numerical thresholds, participants favored developing a common framework of questions, metrics, and evidence for states to apply on a fact-specific, project-by-project basis. States possess the ground-level understanding necessary to gather the relevant facts and evaluate the communities impacted, local economic conditions, project costs, and competitive landscape. Participants generally favored an approach in which states determine what constitutes legitimate economic distress and NTIA reviews that decision for reasonableness, rather than one in which NTIA prescribes set determinations or outcomes in advance.

Two additional principles shaped this phase. The first, as one state participant articulated, is to "stick with the provider you have" whenever possible. Once a provider is selected and is acting in good faith, working through unforeseen difficulties while protecting taxpayer funds is generally preferable to rebidding, which introduces additional costs and delays. That said, participants acknowledged that bad-faith providers exist and not every project can be salvaged.

The second is that states should not make these judgments in isolation. A community of practice for cost benchmarking should become a critical feature of this phase, building on existing structures. States already exchange information informally about provider behavior and cost claims, and participants urged states to formalize, support, and preserve these coalitions. Working together, states can assess what providers tell them across jurisdictions, comparing things like undergrounding costs, pole-attachment fee increases, and supply chain pressures. Existing technical-assistance resources can also anchor this work. The Pew Charitable Trusts, for instance, prepares technical-assistance memoranda upon request, summarizing how states address a given issue. Participants proposed a more real-time complement: a state could report, for example, that a provider is making a particular claim and rapidly poll other states where that provider holds awards to determine whether similar circumstances exist. Such a mechanism would be especially valuable for providers operating across multiple states, helping to distinguish systemic cost increases from provider-specific issues and justified funding needs from illegitimate requests.

Phase 3: Connecting the Remaining Locations

The third phase addresses broadband serviceable locations that still remain unserved or underserved after the first two phases have run their course. These fall into two categories: defaulted BEAD-eligible locations where a provider subgrantee fails to perform, and non-BEAD locations omitted from Final Proposals—whether they were missed in mapping or left out because of defaults in other broadband programs. In both cases, they are likely to include the highest-cost, hardest-to-reach locations.

Designing a cleanup process involves at least three distinct policy choices, each with tradeoffs. Participants supported an approach in which NTIA establishes the outer bounds of each pathway, authorizes both, and permits the states to choose which option addresses the specific circumstances

at hand to ensure the remaining locations get connected.[70] Participant discussions identified the following potential pathways to connecting unserved locations:

Pathway Choice 1: Negotiation Versus Competitive Rebid. When a default occurs, a state could be authorized to negotiate directly with interested providers that participated in its subgrantee selection process, identifying who can serve the location best and fastest without convening an entirely new competitive process. Providers have already approached at least one state proactively to express interest in picking up defaulted locations, suggesting a negotiated path is feasible. The alternative is a formal competitive rebid. The BEAD statute requires a competitive process for awarding last-mile deployment funds,[71] and a rebid most cleanly preserves that structure, though it adds time and administrative burden. Some states may have the capacity and wherewithal to run an entirely new subgrantee selection process; others may be better served by a negotiated approach. The choice should turn on the state's circumstances, the number of locations involved, and the availability of interested providers—not on a uniform federal requirement.

Pathway Choice 2: Immediate Action Versus a Set Date. A state could be authorized to respond to defaults as they arise, engaging providers as soon as a default is confirmed rather than waiting for a scheduled cleanup round. This preserves optionality and avoids leaving locations in limbo for years while a fixed date approaches. A set date, by contrast, offers predictability and allows states time to accumulate a meaningful pool of defaulted locations before launching a process. The appropriate approach may depend on how defaults emerge over time. If they are spread across years, a rolling approach serves affected communities faster; if they cluster near construction deadlines, batching them may be more efficient. Either way, states are best positioned to make those determinations.

Pathway Choice 3: Rolling Awards Versus Batched Awards. If a state addresses defaults as they arise, providers receive a steady stream of smaller opportunities. If the state aggregates defaults and releases them in batches, it may attract larger providers interested in scale. Rolling awards connect communities faster but can be more difficult to administer and generate less competitive interest for isolated locations. Batched awards can draw a stronger field but delay service for communities that defaulted early. Again, the right structure depends on local conditions, and states should have the flexibility to choose the pathway best suited to connecting their remaining locations.

A common theme ran through all three phases: With the BEAD program now in its implementation phase, NTIA's role shifts from prescribing detailed requirements into one of reviewing state decisions and providing oversight. Because the scale, timing, and shape of the remaining problem cannot be predicted in advance, no single framework will fit every state. Participants therefore strongly endorsed

[70] Summit participants urged that any applicable outdated cost caps should be updated to realistically reflect the true current costs of connecting these hardest-to-reach locations.

[71] The BEAD statute requires a competitive process for awarding last-mile deployment funds. *See* 47 U.S.C. § 1702. Participants observed that "competitive" is not defined narrowly and that a rolling, project-area bidding process could satisfy the requirement.

durable but flexible NTIA guidance that establishes clear outer bounds, identifies the questions states should answer, and leaves the specific design and application choices to them.

Measuring Progress and Demonstrating Return

Because the goal of this work is both to prevent defaults and to connect the locations that remain, success must be measured in two directions: backward, by whether defaults were minimized and good-faith projects preserved, and forward, by whether remaining locations ultimately receive broadband service. Participants emphasized that the most useful metrics combine leading indicators—signals that surface a problem early enough to act on—with outcome measures that track durable connectivity rather than a one-time count of homes passed. Public reporting of compliance-monitoring data promotes accountability by allowing states to learn from one another while giving the public visibility into how funds are being stewarded.

The following measures offer a foundation, organized by what each is best suited to capture.

Default Prevention and Early Warning. These measures track whether projects remain on course and whether emerging problems are caught in time to prevent default.

- Construction progress against milestone schedules, tracked in real time.
- Financial and operational early-warning indicators, such as missed milestones and liquidity signals, intended to surface likely defaults 12 to 24 months before they occur.
- A clear process and shared definition of when non-compliance crosses the line into default.

Defaults and Funds at Risk. These measures quantify the scale of the problem as it unfolds.

- The number and percentage of subrecipients that default.
- The amount of funding associated with defaulted awards.
- The number and percentage of at-risk projects preserved and locations connected through budget modifications rather than lost to default.

Connecting Remaining Locations. These measures track progress toward universal connectivity itself.

- Broadband-serviceable locations connected, separated by category—defaulted BEAD locations versus non-BEAD locations.
- Broadband-serviceable locations that remain unconnected, tracked over time as the denominator that should steadily decline toward zero.
- Cost per location connected through any subsequent negotiation or rebid round, recognizing that these are likely to be the highest-cost locations.
- Committed service tier by cost per location, to evaluate long-term value and assess the relationship between subsidy level and infrastructure capacity across remaining locations.

APPENDICES

APPENDIX A: Summit Participants*

Alex Minard, Vice President & Lead Legislative Counsel, NCTA – The Internet & Television Association

Alisa Valentin, Broadband Policy Director, Public Knowledge

Amy Huffman, Policy Director, National Digital Inclusion Alliance

Angela Siefer, Executive Director, National Digital Inclusion Alliance

Angelina Panettieri, Legislative Director for Information Technology and Communications, National League of Cities

Angie Bailey, Director of the Broadband Infrastructure Office, North Carolina Broadband Infrastructure Office

Arthur Ortegon, Partner, Wilkinson Barker Knauer, LLP

Ben Brubeck, Principal and CEO, Government Affairs Solutions, LLC (representing PCCA)

Bill Cheng, Justice Fellow, Georgetown Law Institute for Technology Law and Policy

Brian Ford, Vice President, Federal Regulatory, NTCA

Brian Mitchell, Principal Consultant, ITG Communications

Ceilidh Gao, Senior Research Associate, Communications Workers of America

Cole McAndrew, Senior Policy Analyst, Virginia Office of Broadband

David Burns, Assistant Executive Director at the Conference, U.S. Conference of Mayors

Drew Garner, Director of Policy Engagement, Benton Institute for Broadband & Society

Eric Frederick, Chief Connectivity Officer, Michigan High-Speed Internet Office

Francella Ochillo, Adjunct Professor & Policy Consultant, Johns Hopkins University

Gigi Sohn, Senior Fellow and Public Advocate, Benton Institute for Broadband & Society

Glen Howie, Director of the Arkansas State Broadband Office, Arkansas State Broadband Office

Greg Guice, Chief Policy Officer, Vernonburg Group

Jake Varn, Officer, Broadband Access Initiative, The Pew Charitable Trusts

Jenna Alsayegh, Assistant Vice President of Strategic Initiatives & Partnerships, US Telecom

Jennifer Epperson, Deputy General Counsel, North Carolina Office of the Governor

Jessica Dine, Policy Analyst, Open Technology Institute

Jill Springer, Principal Consultant, Infrastructure and Planning, Quadra Partners

Joe Kane, Director of Broadband and Spectrum Policy, Information Technology and Innovation Foundation

Jordan Arnold, Director, Washington State Broadband Office

Josh Seidemann, Vice President, Policy and Industry Innovation, NTCA

Judson Cary, Sr. Assistant Attorney General – Broadband, Colorado Attorney General's Office

Lori Greco, Right-of-Way Manager, City of Mesa, Arizona

Lucy Moore, Director, Workforce Strategy, Julius

Lukas Pietrzak, Director of Public Policy, Fiber Broadband Association

Marissa Mitrovich, Vice President of Public Policy, Fiber Broadband Association

Natalie Roisman, Executive Director, Georgetown Law Institute for Technology Law and Policy

Nell Geiser, Research Director, Communications Workers of America

Nick Alexander, Senior Policy Advisor, Quadra Partners

Rebecca Dilg, Director, Utah Broadband Center

Revati Prasad, Executive Director, Benton Institute for Broadband & Society

Sarah Morris, Senior Principal, HR&A Advisors

Seamus Dowdall, Senior Legislative Director for Telecommunications & Technology and Veterans & Military, National Association of Counties

Sophia Bock, Principal Associate, The Pew Charitable Trusts

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**Participation in the Summit does not imply endorsement of this report's findings.*

APPENDIX B: Summit Agenda

Agenda: May 21, 2026, Universal Broadband Summit	
	
9:00 AM	**Arrival & Breakfast**
9:15 AM	**Welcome, Introductions, & Summit Overview**
9:45 AM	**Level Set: Universal Broadband State of Play**
10:00 AM	**Key Challenges: Root Causes (part 1)** 1. *Permitting* 2. *Demand Side: Adoption & Affordability*
10:50 AM	**Coffee & Snack Break**
11:00 AM	**Key Challenges: Root Causes (part 2)** 3. *Workforce Development & Scaling* 4. *Default Risk & Remaining Unserved Locations*
12:00 PM	**Lunch Break**
1:00 PM	**Solutions: Models and Metrics (Simultaneous breakout sessions)** 1. *Permitting* 2. *Demand Side: Adoption & Affordability* 3. *Workforce Development & Scaling* 4. *Default Risk & Remaining Unserved Locations*
2:15 PM	**Synthesis: Reviewing & Refining Recommendations** Readout of Breakout Sessions
4:15 PM	**Gap Analysis & Look Ahead**
4:30 PM	**Closing Reception**

APPENDIX C: At-A-Glance Matrix

Four Universal Broadband Challenges

Root causes, models and frameworks, and metrics for each of the four challenges the Summit identified. Each is developed in full in the sections of our report.

	ROOT CAUSES	MODELS & FRAMEWORKS	METRICS
1 · Permitting Reform *Meet requirements, expedite construction*	**Capacity constraints.** Permit volume outstrips office capacity, felt most acutely in rural communities. **Analog systems & fragmented data.** Paper processes persist alongside undigitized as-built records. **Coordination and trust.** Provider–authority communication breaks down early.	**Targeted surge support.** Funding and personnel sent where and when demand spikes. **Digitization.** Modernizing both the permitting process and infrastructure-mapping data. **Permitting playbooks.** Collaborative guides that standardize ISP–authority conversations.	**Throughput & timeliness.** Time to grant and to close out, paired with accountability measures tying public dollars to outcomes and, where relevant, damage-prevention and safety gains.
2 · Demand-Side Initiatives *Affordability, adoption, devices, skills*	**Limited competition.** Single-provider areas keep prices high and quality low. **Affordability.** No durable federal subsidy since ACP expired in 2024. **Device & digital-skills barriers.** Households lack adequate hardware or digital literacy. **Data gap.** No comprehensive public record of what households pay.	**Increased competition.** Lower entry barriers so market price falls for everyone. **State-funded subsidies.** ACP-style benefits funded at the state level. **Low-cost plan requirements.** Capped-rate plans for eligible low-income households. **Devices & digital skills.** Pair affordable service with support for devices and training by trusted navigators.	**By program type.** Competition, subsidy, low-cost-plan, device, and digital-skills measures—designed to track outcomes while closing the demand-side data gap itself.
3 · Workforce Development *Build and scale the labor pipeline*	**Communication & data gaps.** Shortage falls on contractors, uncaptured by current data. **Pipeline & job quality concerns.** Insufficient trained workers; a question of job quality. **Inconsistent & delayed funding.** Training dollars arrive after construction peaks.	**Sector partnerships.** Employers in the room to align training with hiring demand. **Recruitment & awareness.** Early exposure and outreach to non-traditional labor pools. **Credentialed training programs.** Community-college, union, and trade-association pathways. **Registered apprenticeships.** Paid on-the-job training via administrative intermediaries.	**Pipeline to placement.** Completion and credentialing, placement and employer demand, sustained and quality employment, and return on investment.
4 · Default Risk & Remaining Locations *Minimize defaults, connect the rest*	**Single-round design.** No mechanism to true up or redeploy funds on default. **Maps lag ground truth.** Fixed snapshots diverge as construction proceeds. **Legitimate cost increases.** Rising pole and equipment costs push providers to walk away. **Uncertain scale and timing.** Defaults cannot be predicted in advance.	*A phased framework:* **Phase 1 — Prevent.** Structured agreements and predictive monitoring to stop defaults early. **Phase 2 — Preserve.** Save good-faith projects while protecting taxpayer funds. **Phase 3 — Connect.** Reach remaining locations, with state flexibility.	**Early warnings & served locations.** Leading indicators that surface trouble early—milestone progress and financial early-warning signals—paired with outcome measures of defaults, funds at risk, and locations actually connected.

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