NORTH STATE CONNECTED

Spring 2026







Building a Local Broadband Workforce in California's North State

NORTHEASTERN CALIFORNIA CONNECT CONSORTIUM

UPSTATE CALIFORNIA CONNECT CONSORTIUM

California State University Chico
North State Planning and Development Collective

Acknowledgments

This report is funded by the California Public Utilities Commission (CPUC) through Resolution T-17778, which dispersed over $10 million in Consortia Account grant funding from the California Advanced Services Fund (CASF) to more than a dozen broadband consortia across the State of California. Funds received by the Northeastern California Connect Consortium (NECCC) and Upstate California Connect Consortium (UCCC) were requested for a period of five years starting in 2023 and have been extended an additional year to ensure the completion of all objectives. The North State Planning and Development Collective is the regional coordinator for the NECCC and UCCC and has produced this report in fulfillment of grant objectives.

The North State Planning and Development Collective (NSPDC, the Collective) is a division of Chico State Enterprises (CSE), a 501(c)(3) nonprofit auxiliary organization that operates on behalf of California State University, Chico (Chico State) to advance its educational mission. NSPDC supports communities in planning and preparing for resilient growth. With expertise in community engagement, network development, applied social and economic research, and data management and analysis, NSPDC has established strong partnerships with public agencies and private organizations across Northern California and beyond. Its staff bring experience in grant development, complex project coordination, and financial management. Through this work, the Collective provides professional resources throughout Chico State's 12-county service region and beyond in support of its academic, community-focused, and service-oriented mission.

The Collective would like to extend its appreciation to the following individuals who assisted with the development and production of this report:

Jason Schwenkler	Executive Director	Sabrina Oregel	Outreach Coordinator
Hayley Stone	Assistant Director	Thomas Mitchum	Tribal Liaison
Lily McGlothern	Project Manager	Emma Pham	Research Assistant III
Liza Tedesco	Project Manager	Isabell Calderon	Research Assistant II
Ben Vandersluis	Production Manager	Janae Bartolome	Research Assistant II
Lorilei Angle	GIS Analyst	Liam Driscoll	Research Assistant I

We would also like to thank the many organizations who helped provide valuable insight on their challenges with broadband connectivity, adoption, and recruitment, especially:

Butte-Glenn Community College District
City of Chico
City of Corning
Darling H20 Consulting
DigitalPath Inc.
Habematolel Pomo of Upper Lake
Health Alliance of Northern California
North Valley Fiber
Shasta-Tehama-Trinity Adult Education Consortium
Siskiyou County Arts Council
SiskiyouWorks
Volcano Communications Group

All photos in this report are used with creative commons licenses. Contact NSPDC for more information.

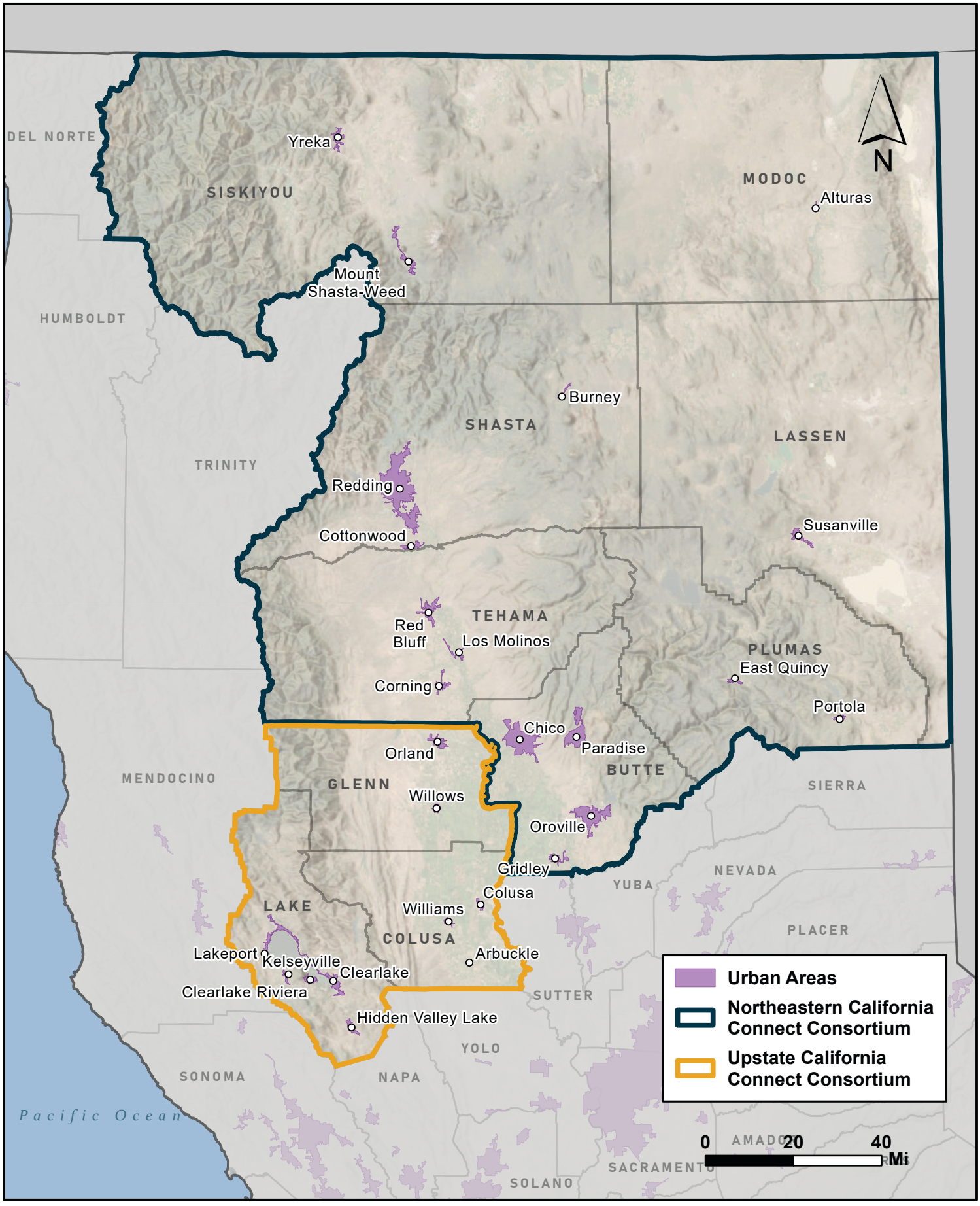
NORTHEASTERN CALIFORNIA CONNECT CONSORTIUM

UPSTATE CALIFORNIA CONNECT CONSORTIUM

California State University Chico
North State Planning and Development Collective

Version 1.2.1
30 April 2026

Northeastern and Upstate California Connect Consortia Regions



Acronyms

Acronym	Meaning	Acronym	Meaning
AJC	American Job Center	**GIC**	Geographical Information Center
BEAD	Broadband Equity Access and Deployment Program	**GSCA**	Golden State Connect Authority
CAEP	California Adult Education Program	**ISP**	Internet Service Provider
CASF	California Advanced Services Fund	**IT**	Information Technology
CBO	Community-Based Organization	**LEP**	Line Extension Projects
CCC	California Community Colleges	**MMBI**	Middle Mile Broadband Initiative
CCCCO	California Community Colleges Chancellor's Office	**MOU**	Memorandum of Understanding
CED	Center for Economic Development	**NECCC**	Northeastern California Connect Consortium
COR	Course Outline of Record	**NSPDC**	North State Planning and Development Collective
CPUC	California Public Utilities Commission	**NTIA**	National Telecommunications and Information Administration
CSE	Chico State Enterprises	**OJT**	On-the-Job Training
CTE	Career Technical Education	**PCCA**	Power and Communication Contractors Association
CWDB	California Workforce Development Board	**PPE**	Personal Protective Equipment
DSL	Digital Subscriber Line	**RFP**	Request for Proposals
EDC	Economic Development Council	**SBDC**	Small Business Development Center
EDD	Employee Development Department	**SME**	Subject Matter Expert
ETP	Employment Training Panel	**SWP**	Strong Workforce Program
ETPL	Eligible Training Provider List	**UCCC**	Upstate California Connect Consortium
FBA	Fiber Broadband Association	**USDA**	U.S. Department of Agriculture
FCC	Federal Communications Commission	**WBL**	Work-Based Learning
FFA	Federal Funding Account	**WDB**	Workforce Development Board
FTTP	Fiber-to-the-Premises	**WIOA**	Workforce Innovation and Opportunity Act
GAO	U.S. Government Accountability Office		

Contents

Executive Summary 6
- About This Project 6
- The Consortia Regions Defined 7
- Alignment with California Jobs First 9
- Structure of the Report 10
- Key Findings 11
- Recommendations by Stakeholder Group 12

Existing Conditions 13
- Statistics on Broadband Speed and Coverage 13
- Barriers 16
- ISPs in the Consortia Regions 17
- Current Broadband Initiatives in the NECCC and UCCC Regions 18

Workforce Supply Chain 22
- Introduction 22
- Estimating Workforce Shortages 22
- Occupations in the Region 25
- Programs in the Region 31
- ISP Survey: Employer Demand, Skill Needs, and Constraints 33
- Workforce Conclusions 36

Challenges and Needs 37
- Primary Data Collection 37
- Overview of Primary Data 39
- Findings from Primary Data 44
- Interview Highlights 45

Strategies, Tools, and Resources 48
- Summary of Strategies, Tools, and Resources 48
- Industry Employers 50
- Training & Education Providers 55
- Workforce Development & Placement Organizations 58
- Local & Tribal Governments 61
- Community & System Support Partners 63
- Funding Opportunities Supporting Multiple Stakeholder Groups 66

References 68

Appendices 72
- Appendix A: Historical Statistics on Broadband Speed and Coverage 73
- Appendix B: Broadband Cost Analysis 77
- Appendix C: ISPs in the Consortia Regions 78
- Appendix D: Core and Core+1 Programs 80
- Appendix E: Stakeholder Survey Questions and Responses 87
- Appendix F: ISP-Specific Survey Questions and Responses 112
- Appendix G: Interview Questions by Stakeholder Group 117
- Appendix H: Interview Codebook and Definitions 119

Executive Summary

About This Project

The California Advanced Services Fund (CASF), under the management of the California Public Utilities Commission (CPUC), has been funding broadband expansion initiatives since 2008 to help California close its digital divide. The stated goal of CASF is to provide broadband service to 98 percent of households in each consortium region by December 31, 2032, where "served" households are offered broadband service at speeds of at least 25 megabits per second (Mbps) download and 3 Mbps upload by a facility-based provider (California Public Utilities Commission [CPUC], 2025c, pp. 7, 14). As of December 2023, 97.5 percent of all California households are served at these speeds, and three individual consortia already serve at least 98 percent of their households (CPUC, 2025c).

Table 1: Broadband Deployment by Consortium, 2023 Data

	All Households	Served Households		Unserved Households		Priority Unserved Households	
Consortium	Number	Number	Percent	Number	Percent	Number	Percent
Bay Area (no consortium)	1,533,899	1,527,853	99.61%	997	0.06%	5,049	0.33%
Broadband Consortium of the Pacific Coast	648,795	617,051	95.11%	3,621	0.56%	28,122	4.33%
Central Coast Broadband Consortium	306,566	303,040	98.85%	419	0.14%	3,107	1.01%
Central Sierra Economic Development District	100,486	89,766	89.33%	2,412	2.40%	8,307	8.27%
Connected Capital Area Broadband Consortium	817,892	815,636	99.72%	104	0.01%	2,152	0.26%
East Bay Consortium Region (no consortium)	1,345,574	1,340,712	99.64%	359	0.03%	4,501	0.33%
Gold Country Broadband Consortium*	369,907	356,535	96.39%	2,477	0.67%	10,896	2.95%
Inland Empire Regional Broadband Consortium	1,797,631	1,711,303	95.20%	4,839	0.27%	81,488	4.53%
Inyo-Mono Broadband Consortium	23,813	19,504	81.90%	600	2.52%	3,708	15.57%
Los Angeles Digital Equity Action League	3,992,840	3,882,638	97.24%	18,766	0.47%	91,436	2.29%
North Bay/North Coast Broadband Consortium	480,906	462,090	96.09%	2,827	0.59%	15,989	3.32%
Northeastern California Connect Consortium	292,660	272,742	93.19%	4,867	1.66%	15,053	5.14%
Orange County (no consortium)	1,294,221	1,258,242	97.22%	4,530	0.35%	31,450	2.43%
Redwood Coast Consortium Region	94,846	89,345	94.20%	1,043	1.10%	4,457	4.70%
San Joaquin Valley Regional Broadband Consortium	1,600,565	1,587,149	99.16%	1,837	0.11%	11,579	0.72%
Southern Border Broadband Consortium	1,429,755	1,394,323	97.52%	7,279	0.51%	28,153	1.97%
Upstate California Connect Consortium	61,933	57,995	93.64%	741	1.20%	3,197	5.16%
California Statewide	16,192,289	15,785,863	97.49%	58,292	0.36%	348,134	2.15%

Note. Deployment data come from CPUC, 2025c, CASF 2024 Annual Report, Table 10.
* Includes Tahoe Basin Project.

Broadband infrastructure projects continue to develop across the state, bringing with them a host of job opportunities and a demand for specialized labor. However, the *Broadband Workforce Development Guidebook* reported a "serious risk" that workforce supply may not be sufficient to complete these new broadband networks; according to the report, a shrinking labor pool, lack of standardized training programs, and lack of trusted industry credentials may result in workforce bottlenecks and delayed or failed projects (Fiber Broadband Association [FBA] & Cartesian, 2023, pp. 3, 6). A separate report cited roughly 2,040 construction jobs and 1,610 technician jobs needed in California between 2025 and 2032, plus an estimated additional 12,580 to compensate for retirement

and attrition. All told, that's a statewide demand of 16,230 workers needed to meet California's ambitious goals (Continuum Capital, 2024, p. 33).

This report evaluates immediate and near-future broadband workforce needs for the NECCC and UCCC regions. It examines the documented workforce demands of internet service providers (ISPs) and related contractors operating in the region, as well as the availability of existing training and educational programs that could supply specialized workers to support planned infrastructure buildouts both locally and beyond. Where gaps are identified, the report assesses regional capacity to establish, expand, or strengthen relevant training pathways. To inform this analysis, we draw on prior reports, industry handbooks, and other relevant literature; public-facing data from state and federal agencies; and proprietary occupation data from Lightcast.

Additionally, this report draws upon findings from a survey the Collective distributed to five distinct stakeholder groups seeking to identify broadband-related needs and possible means of addressing those needs in the consortia regions. Those stakeholder groups are (1) Industry Employers, (2) Training & Education, (3) Workforce Development & Placement Organizations, (4) Local & Tribal Governments, and (5) Community & System Support Partners. These groups are defined in more detail in the Primary Data Collection section.

Together, these data sources and survey findings inform the actionable recommendations presented in this report to support broadband workforce development across the NECCC and UCCC regions.

The Consortia Regions Defined

Both the NECCC and UCCC received their first grants in December 2011 under Resolution T-17349 and have been serving the counties in their regions ever since. Taken together, these consortia regions comprise ten inland counties in the northernmost part of California: seven belong to the NECCC region, and three to UCCC.

Northeastern California Connect Consortium

The Northeastern California Connect Consortium comprises seven inland counties in rural Northern California: Butte, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Tehama. The NECCC region occupies much of the valley flatlands and alpine mountains between Sacramento and the Oregon border, with its most populous cities being Chico (Butte County) and Redding (Shasta County). In January 2025, NECCC had a total population of 551,956, accounting for 1.4 percent of California's population and 16.5 percent of California's land area (California Department of Finance, 2025; U.S. Census Bureau, 2011).

The NECCC region is primarily rural in nature, with much of the land area being agricultural fields, pasture, and national forests. While much of the region occupies flat landscapes in the northern Sacramento Valley, other parts of the region occupy steep and mountainous terrain, making it both challenging and expensive to expand transportation and utility infrastructure in the region.

As of December 2023, the NECCC region reported 292,660 total households across all 7 counties, of which 93.2 percent were served with speeds of at least 25 Mbps down and 3 Mbps up. Based on these data, the NECCC must serve an additional 14,065 households to meet CASF's 98.0 percent goal by the end of 2032, not accounting for future population change in the intervening years.

Upstate California Connect Consortium

The Upstate California Connect Consortium comprises three counties in rural Northern California: Colusa, Glenn, and Lake. The consortium region occupies a blend of farmland in the northern Sacramento Valley, just west of the Sacramento River, and extending west into the hilly Coast

Ranges just north of the Napa/Sonoma wine country. UCCC's most populous cities are Clearlake (Lake County) and Orland (Glenn County). In January 2025, UCCC had a total population of 118,649, accounting for 0.3 percent of California's population and 2.4 percent of California's land area (California Department of Finance, 2025; U.S. Census Bureau, 2011).

Like NECCC, the UCCC region is also primarily rural in nature, with much of the land area being agricultural fields or hilly pasture, and even national forest (in the region's northern/northwestern corner). Much of the region occupies flat landscapes in the northern Sacramento Valley, with towns and small cities surrounded by rice fields and orchards along the I-5 corridor. Further to the west the terrain is more hilly than flat, with roads that are both scenic and meandering. This can create a sense of remoteness and isolation; from UCCC's largest city of Clearlake, it takes close to two hours to drive to Sacramento, and over three hours to reach San Francisco.

As of December 2023, the UCCC region reported 61,933 total households across all 3 counties, of which 93.6 percent were served with speeds of at least 25 Mbps down and 3 Mbps up (CPUC, 2025, Table 10). Based on these data, the UCCC must serve an additional 2,699 households to meet CASF's 98.0 percent goal by the end of 2032, not accounting for future population change in the intervening years.

Tribes in the NECCC and UCCC Regions

The NECCC and UCCC regions are home to many Tribal groups, with 23 Tribes represented across the NECCC's 7 counties and 10 additional Tribes in the UCCC's 3 counties. Since Tribes are generally underserved by broadband providers, and since broadband infrastructure buildouts often impact traditional Tribal lands, it has been essential for the Collective to seek Tribal input as the NECCC and UCCC consortia strive to meet CASF's goals. We are honored to include their voices in this report.



Table 2: Tribes in the NECCC and UCCC Regions

Consortium	County	Tribe
NECCC	**Butte**	Berry Creek Rancheria of Tyme Maidu Indians
	Butte	Enterprise Rancheria Estom Yumeka Maidu
	Butte	Mooretown Rancheria of Maidu Indians of California
	Butte	Mechoopda Indian Tribe of Chico Rancheria
	Butte	Konkow Valley Band of Maidu Indians
	Lassen	Susanville Indian Rancheria
	Lassen	Honey Lake Maidu
	Lassen	Wadatkuta Band of the Northern Paiute
	Modoc	Alturas Rancheria of Pit River Indians
	Modoc	Cedarville Rancheria of Northern Paiute Indians
	Modoc	Fort Bidwell Indian Community of Paiute
	Modoc	Klamath Tribes
	Modoc	Modoc Nation
	Plumas	United Maidu Nations
	Plumas	Greenville Rancheria of Maidu Indians
	Shasta	Pit River Tribe
	Shasta	Redding Rancheria
	Shasta	Wintu Tribe of Northern California
	Shasta	Winnemem Wintu Tribe
	Siskiyou	Karuk Tribe
	Siskiyou	Quartz Valley Indian Community
	Siskiyou	Shasta Nation
	Tehama	Paskenta Band of Nomlaki Indians
UCCC	**Colusa**	Kletsel Dehe Wintun Nation
	Colusa	Cachil Dehe Band of Wintun Indians
	Glenn	Grindstone Rancheria of Wintun-Wailaki Indians
	Lake	Koi Nation of the Lower Lake Rancheria
	Lake	Scotts Valley Band of Pomo Indians
	Lake	Big Valley Band of Pomo Indians
	Lake	Middletown Rancheria of Pomo Indians of California
	Lake	Habematolel Pomo of Upper Lake
	Lake	Elem Indian Colony of Pomo Indians of the Sulphur Bank Rancheria
	Lake	Robinson Rancheria Pomo Indians of California

Note. This list of Tribes is provided by the Office of Tribal Relations at California State University, Chico.

Alignment with California Jobs First

This broadband workforce study is an extension of the *North State Regional Strategies: Regional Plan Part 2*, the regional economic plan developed through the California Jobs First initiative (North State Planning and Development Collective [NSPDC], 2024). The project builds on the plan's vision of a resilient and opportunity-filled North State by evaluating the workforce capacity needed to achieve broadband infrastructure goals across the NECCC and UCCC regions.

The *North State Regional Strategies* vision illustrates a future where communities are resilient and residents have access to quality jobs and education while fostering a more sustainable future. The

region's vision recognizes that social, economic, and ecological systems are interdependent and that the path to prosperity must balance economic stewardship with innovation, entrepreneurship, and equitable opportunity. To achieve this vision, the plan outlines six interrelated models of growth: the mission-driven, regenerative, opportunity, caring, recovery, and stewardship aspects of the North State economy. Together, these represent a framework for regional resilience. The mission-driven economy promotes innovation and private enterprise aligned with community values. The regenerative economy emphasizes sustainable management of forests, farms and natural resources. The opportunity economy ensures access to education, training, and good jobs. The caring, recovery, and stewardship economies focus on public health, disaster resilience, and long-term sustainability.

Within this framework, broadband connectivity plays a foundational role in enabling equitable participation in education, healthcare, business, and civic life. *North State Regional Strategies* identifies broadband as essential infrastructure that supports both community well-being and economic competitiveness, particularly in rural areas. However, the plan also highlights persistent barriers such as interjurisdictional coordination, challenging terrain, and prohibitive costs that restrict infrastructure development and constrain equitable access.

This broadband workforce study directly addresses those challenges by evaluating the labor supply, training resources, and workforce development capacity needed to meet the broadband deployment goals across the NECCC and UCCC regions. By aligning broadband infrastructure expansion with workforce development initiatives, this project advances the *North State Regional Strategies* vision by reinforcing the opportunity, mission-driven, and stewardship economies to foster a more resilient and connected North State.

Structure of the Report

This report moves from regional context to high-level findings followed by detailed analysis and actionable strategies. We begin with an executive summary that introduces the project, defines the NECCC and UCCC regions, situates the work within California's broader broadband and economic development goals, and briefly summarizes key findings and recommendations by stakeholder group. This opening section establishes both the purpose of the study and its central conclusion: that broadband workforce challenges in the North State are driven less by scale of demand and more by alignment, capacity, and coordination constraints.

The body of the report first presents existing conditions, including broadband availability, household connectivity patterns, regional barriers, current ISP landscape, and a detailed inventory of ongoing broadband infrastructure projects. This section provides the baseline understanding of where broadband service stands in the region and the structural geographic, economic, and institutional factors that shape both deployment and adoption. We then transition to a workforce supply chain analysis, which combines statewide workforce estimates, regional projections, occupation trends, and an inventory of training and education programs to assess the region's capacity to meet broadband labor demand.

Building on this foundation, the report presents primary data findings from surveys and interviews with employers, educators, workforce organizations, governments, and community partners. These findings highlight recurring themes such as skill mismatches, rural labor constraints, and limited coordination across systems. The report synthesizes these insights into a set of workforce conclusions that frame the core challenge as one of misalignment between modest but persistent employer demand, generalized training pathways, and limited coordination capacity across regional systems.

The final major section presents strategies, tools, and resources, organized by stakeholder group. Rather than prescribing a single solution, the report outlines a coordinated set of actions for employers, training providers, workforce systems, governments, and regional partners, supported by implementation guidance and funding pathways. Appendices provide supporting data, including detailed broadband statistics, ISP inventories, training program lists, and survey instruments, allowing readers to trace findings back to their underlying data sources.

Key Findings

The contents of this report yield five key findings about broadband infrastructure expansion projects and their related workforce pool in the consortia regions.

Table 3: Key Findings

1. Broadband Workforce Demand is Steady and Local, but Capacity is Limited. Broadband workforce demand is modest but persistent, concentrated in technical, construction, and project management roles. ISPs generally plan to hire small numbers per role over the near term rather than expand rapidly. Hiring needs are project-driven and vary by geography and funding timelines. Employers report difficulty finding qualified local workers for field-based roles and importing labor is often impractical in rural areas. Workforce capacity constraints slow deployment and maintenance work even when funding and projects are available.
2. Field Readiness Matters More Than Formal Degrees. Employers prioritize hands-on experience, technical competence, and reliability over academic credentials. The most difficult roles to fill require applied skills such as fiber installation and splicing, network construction, troubleshooting, and equipment operation. Degrees are not a primary hiring requirement; certifications and safety credentials are valued but secondary to demonstrated field readiness. On-the-job training remains the dominant pathway into broadband work, and retention challenges persist as newly trained workers are recruited into higher-paying opportunities elsewhere.
3. Training Supply Does Not Align with Broadband Workforce Needs. Broadband-specific training options in the region remain limited, and program availability is uneven. Education and training providers express interest in expanding offerings, but capacity is constrained by funding, instructor availability, equipment costs, and curriculum approval timelines. Where programs exist, enrollment can be moderate to strong, indicating latent demand. Training institutions typically expand programs in response to sustained employer demand; inconsistent demand signals and limited dedicated funding slow program development and scale.
4. Coordination Gaps, Not Unwillingness, Limit Workforce Development. Stakeholders across sectors support collaboration, partnerships, and apprenticeship models, but coordination is limited in practice. Workforce organizations report few active relationships with broadband employers and limited tracking of broadband-specific outcomes. Local and Tribal governments cite staff capacity constraints, competing priorities, and unclear roles in workforce development for a largely private-sector industry. Education providers face challenges aligning training timelines with employer needs. Dedicated coordination capacity and shared planning mechanisms are required to translate broad interest into functional workforce pipelines.
5. Rural, Tribal, and Post-Disaster Communities Face Compounded Challenges. Workforce and deployment constraints are most acute in rural, Tribal, and disaster-impacted areas, where small labor pools, geographic isolation, and infrastructure conditions intersect. Limited training access, transportation barriers, and inconsistent connectivity reduce participation in workforce pathways. Post-wildfire rebuilding can create opportunities to upgrade infrastructure, but also introduces coordination complexity and higher costs. Workforce strategies must be place-based and adaptable to avoid widening disparities across communities with fundamentally different conditions and capacities.

Recommendations by Stakeholder Group

Based on the findings of this study, strengthening the broadband workforce in the North State will require coordinated action across multiple stakeholder groups. The following recommendations outline the primary role each group can play in addressing the structural challenges identified in this report. This section defines what each stakeholder group must prioritize; actionable steps and implementation approaches are discussed in detail in the Strategies, Tools, and Resources section.

Table 4: Summary of Strategies by Stakeholder Group

Stakeholder Group	Strategy
Industry Employers	**Provide a recurring "demand signal"** by sharing projected roles, locations, and minimum requirements (even ranges), so training partners can justify cohorts and equipment despite incremental hiring patterns.
	Define and use a shared "field-ready" baseline (what a new hire must do safely on day one) and validate it with work samples/task lists so training aligns to real jobsite expectations.
	Commit to low-lift work-based learning (pooled internships, pre-apprenticeship slots, structured OJT) with a common supervisor checklist, allowing small employers to participate without building their own program infrastructure.
	Reduce fixed training costs by donating/sponsoring consumables (fiber, connectors, enclosures) or lending equipment for mobile labs/shared cohorts.
	Treat retention as an operating requirement by publishing wage progression steps and using mentorship/supervisor feedback loops to reduce the churn that drains rural employer capacity after training investments.
Training & Education Providers	**Deliver training in short, repeatable, lab-heavy blocks** (noncredit where possible) that prioritize hands-on readiness over seat-time, reflecting employer preference for applied competence over degrees.
	Integrate broadband skill modules into existing programs (construction, electrical, IT) rather than waiting for full new program approvals, reducing the lag caused by curriculum timelines and instructor constraints.
	Use shared lab capacity to reduce fixed costs and expand rural access by pooling equipment, rotating lab kits, or using mobile labs so hands-on training can reach smaller communities without every site building a permanent broadband lab.
Workforce Development & Placement Organizations	**Publish a training inventory and seat-capacity view** (what programs are available, when, where, how many seats) so employers and workforce partners can plan placements instead of relying on informal networks.
	Align cohorts to project timing by running smaller, more frequent intakes when needed and coordinating start dates with known deployment windows, limiting talent loss from trained workers who seek employment elsewhere.
	Build a shared intake-and-placement pipeline for broadband roles by screening for field realities (transport, schedule feasibility, readiness for outdoor work) and pairing placements with supportive services (tools/PPE, travel assistance) to improve completion and retention.
Local & Tribal Governments	**Reduce rural training overhead** by providing public facilities for training delivery (Tribal facilities, fairgrounds, schools, public works yards) and supporting permitting/logistics for temporary or mobile labs, so hands-on training can reach smaller communities without permanent buildouts.
	Use procurement and project agreements to enable local pipelines (where legally feasible) by requiring a simple workforce-readiness addendum that names the recruitment approach and whether OJT or apprenticeship will be used, without imposing one-size-fits-all mandates.
	Support place-based and Tribal-led pathway design as resilience capacity by aligning workforce planning with local governance and sovereignty contexts and connecting workforce strategy to disaster recovery and long-term community stability goals (not only near-term hiring).
Community & System Support Partners	**Operate the regional coordination entity and maintain a single source of truth** that keeps partners aligned (who is training what/when/where, who is hiring for what under which prerequisites, and who to contact), so participation does not depend on personal relationships and rural/Tribal partners can plug in consistently.
	Operate shared recruitment, screening, and navigation to supports by coordinating outreach and using a common intake screen for reliability barriers (transportation, childcare, schedule realism, readiness for outdoor work) and connecting participants quickly to supportive services that reduce drop-off.
	Manage pooled placements and the performance feedback loop by coordinating shared work-based learning administration (templates, paperwork, matching, supervisor rubrics) and tracking outcomes that reflect real constraints (supervisor-rated readiness and early retention), then feeding results back to training and workforce partners for rapid adjustment.

Existing Conditions

Statistics on Broadband Speed and Coverage

Fixed Consumer Broadband Deployment

Across the North State consortia regions, broadband infrastructure reaches the vast majority of households, but important gaps remain, particularly in more rural and geographically isolated counties. Overall, 93.2 percent of households in the NECCC region and 93.6 percent in the UCCC region are served by fixed broadband, indicating broad baseline availability across both regions.

However, this high-level coverage includes substantial variation at the county level. In NECCC, more rural counties such as Modoc (80.9 percent), Lassen (83.4 percent), and Siskiyou (85.4 percent) lag significantly behind more populated counties like Butte (96.7 percent) and Tehama (95.5 percent). This uneven distribution reflects the well-documented challenges of deploying infrastructure in sparsely populated, mountainous, and remote areas, where higher costs and lower return on investment can slow expansion.

Table 5: NECCC Fixed Consumer Broadband Deployment, December 2023

County	All Households	Served Households	Percentage Served
Butte	104,132	100,696	96.70%
Lassen	13,896	11,593	83.43%
Modoc	5,836	4,723	80.93%
Plumas	17,402	14,898	85.61%
Shasta	92,097	87,078	94.55%
Siskiyou	28,260	24,123	85.36%
Tehama	31,037	29,631	95.47%
NECCC Total	**292,660**	**272,742**	**93.19%**

Note. These data were published by CPUC in 2025 using data from the Federal Communications Commission (FCC) (2024). See full FCC citation in references section. A matching table showing consortia-level data was also published in the CASF 2024 Annual Report (CPUC, 2025c).

The UCCC counties show slightly more consistency, with all three counties exceeding 92 percent coverage. Taken together, these findings suggest that while the region has achieved a high standard of baseline coverage, the remaining unserved population is found in harder-to-reach rural and frontier areas, where deployment barriers are higher.

Table 6: UCCC Fixed Consumer Broadband Deployment, December 2023

County	All Households	Served Households	Percentage Served
Colusa	10,370	9,566	92.25%
Glenn	13,512	13,072	96.74%
Lake	38,051	35,357	92.92%
UCCC Total	**61,933**	**57,995**	**93.64%**

Note. These data were published by CPUC in 2025 using data from the Federal Communications Commission (FCC) (2024). See full FCC citation in references section. A matching table showing consortia-level data was also published in the CASF 2024 Annual Report (CPUC, 2025c).

Internet Service to Households by Technology Type

Census data on household connectivity, including breakdowns by types of broadband technologies, tell a more complex story. In the NECCC region, 90.5 percent of households report having some form of broadband connection, compared to 87.2 percent in UCCC. Cellular data plans are the most widespread form of connectivity in both regions, with over 80 percent of households in NECCC and nearly 80 percent in UCCC reporting access. However, a notable share of households (13.9 percent in NECCC and 16.5 percent in UCCC) rely on cellular service alone. This reliance suggests that, for many households, mobile broadband serves as a substitute rather than a complement to fixed broadband, which may limit access to high-speed, reliable connections needed for work, education, and telehealth.

Wired broadband (including cable, fiber, and DSL) is less prevalent, with 65.0 percent of households in NECCC and 57.0 percent in UCCC reporting access, and only a small percentage relying on wired connections exclusively. Satellite internet plays a relatively small but important role, particularly in remote areas, where it may be one of the only viable options.

Historical trends suggest a pattern in these data: as infrastructure and service for all broadband technologies becomes more available, the share of the population using those connections generally increases. At the same time, portions of the population that are solely dependent on one type of broadband technology tend to decrease, indicating that most users have access to multiple broadband technologies simultaneously. In short, as broadband access increases, single-technology dependency generally decreases.[1] See Appendix A for historical data illustrating broadband service trends in the consortia regions.

Table 7: Internet Service to Households by Technology Type, 2024

	Any		Alone	
	NECCC	UCCC	NECCC	UCCC
Broadband of Any Type	90.5%	87.2%		
Cellular Data Plan	82.5%	78.4%	13.9%	16.5%
Wired Broadband	65.0%	57.0%	5.9%	5.4%
Satellite Internet	14.2%	16.3%	1.3%	1.8%
Other Service Alone			0.2%	0.8%

Note. Collective staff use the shorthand "Wired Broadband" to refer to the Census Bureau's category "Broadband such as cable, fiber optic or DSL" in table B28002. The category "Other Service" includes broadband technologies not specifically listed in table B28002, including fixed wireless. "Any" connection type means the household has a connection service to the listed technology, regardless of other broadband connection service they may have. Households with broadband connection service "Alone" have no alternate broadband connection service. Source: U.S. Census Bureau. (2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

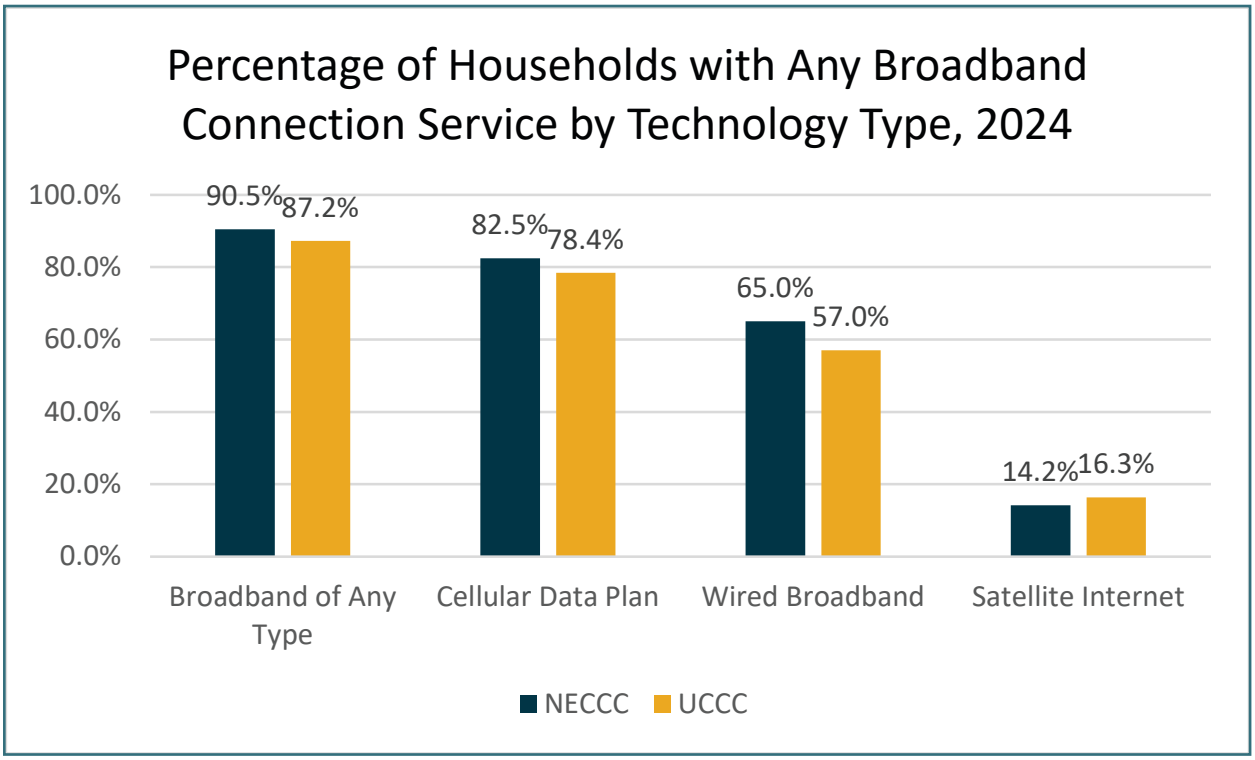
Implications for Broadband Access

Taken together, these data highlight a key distinction between availability and meaningful access. While most households are technically "served," not all households are connected, and many that are connected rely on technologies that may not provide the speed, reliability, or capacity needed for modern application and system functionality.

The persistence of unserved households in rural counties, combined with the relatively high reliance on cellular-only connections, suggests that the region must focus on improving broadband quality, affordability, and adoption in addition to expanding infrastructure.

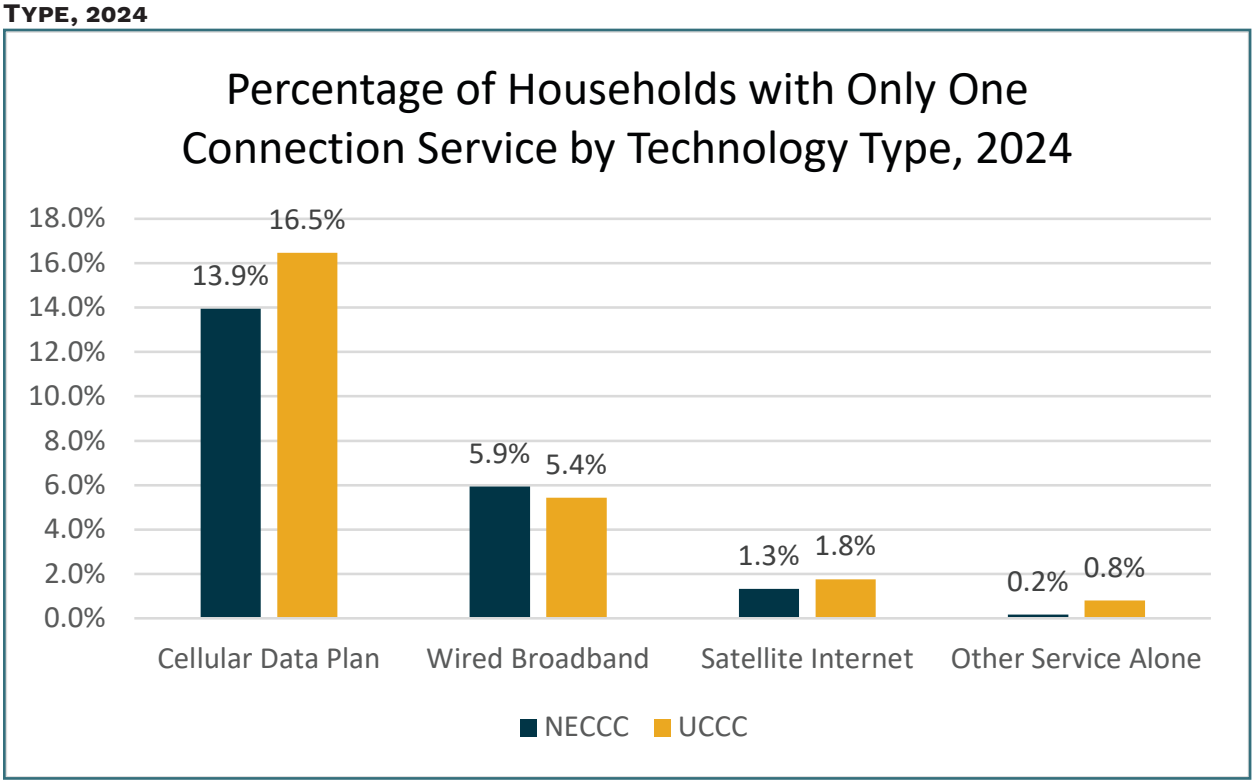
1. There is a minor but notable exception to this general trend: in UCCC counties specifically, households served by "Other Service Alone" have actually increased over the past few years. This may indicate a recent increase in fixed wireless service in the UCCC area.

Figure 1: Percentage of Households with Any Broadband Connection Service by Technology Type, 2024



Note. Households included in these metrics may have multiple broadband connection services using multiple technology types. Source: U.S. Census Bureau. (2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

Figure 2: Percentage of Households with Only One Broadband Connection Service by Technology Type, 2024



Note. Households included in these metrics are dependent on the broadband technology indicated and have no other means of broadband access. Source: U.S. Census Bureau. (2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

Barriers

Barriers to Broadband Expansion in the North State

Broadband expansion in the North State is constrained by a set of reinforcing barriers that are widely observed in rural deployment contexts and specifically documented in the *North State Regional Strategies*: coordination, terrain, and cost (NSPDC, 2024, pp. 40–42).

Broadband projects frequently cross county and community boundaries. The *Regional Strategies* notes that when projects extend beyond a single jurisdiction, lack of coordination between jurisdictions can delay projects. In practice, this shows up as misaligned priorities and timelines, inconsistent processes, and additional administrative effort to keep multi-jurisdiction projects moving.

The North State's geography increases engineering complexity and makes build schedules more vulnerable to disruption. The *Regional Strategies* identifies terrain as a barrier to building infrastructure, and further notes that fires and winter storms can destroy existing infrastructure, creating both replacement needs and deployment delays.

Cost is a structural constraint in rural regions because per-mile construction costs are high while customer density is low.[2] The *Regional Strategies* ties cost barriers directly to terrain and sparse population density, noting that low density can result in low revenue generation for ISPs. This makes it difficult for ISPs to increase infrastructure development and sustain service in rural and remote areas. It also explicitly recognizes that cost is a barrier to end users as well, which affects adoption even where infrastructure is present.

California's statewide broadband strategy includes large-scale infrastructure initiatives (including the state's open-access middle-mile effort as part of the Broadband for All initiative), but rural last-mile deployment still faces the same on-the-ground constraints described above: coordination complexity, geography-driven costs, and disaster-related risk (California Department of Technology, 2025).

North State Broadband Workforce Considerations

Nationally, federal and industry investments are expected to increase demand for skilled telecommunications workers, and multiple analyses warn that workforce availability may be a limiting factor for deployment timelines. The U.S. Government Accountability Office (GAO) reports that additional skilled telecommunications workers will be needed to deploy broadband, with stakeholder concerns about worker availability as investment accelerates (GAO, 2022). Similarly, the National Telecommunications and Information Administration (NTIA) *Internet for All Workforce Planning Guide* treats workforce readiness as a core implementation requirement, encouraging states and regions to plan for recruitment, training capacity, and supportive partnerships to deliver projects at scale (NTIA, 2022). Recent nonpartisan analysis also flags workforce shortages and misaligned training timelines as potential risks to meeting deployment goals as BEAD implementation proceeds (Pew Charitable Trusts, 2025).

Within the North State, the *Regional Strategies* emphasizes flexible, place-based workforce approaches. Work-based learning models and partnerships among employers, education, and workforce entities can help meet acute regional needs. The regional plan also highlights the importance of designing programs around rural realities such as long commutes and limited child care.

2. Recent regional analysis further underscores the scale of the financial challenge. A county-level cost model developed using CASF and FFA data estimates that the total cost to achieve universal broadband coverage across the consortia region is substantial, with per-household costs in many rural areas exceeding levels that are financially viable for providers without public subsidy (Bartolome, 2025). See Appendix B for a brief summary of Bartolome's findings.

A Note on Data for Targeting Investment

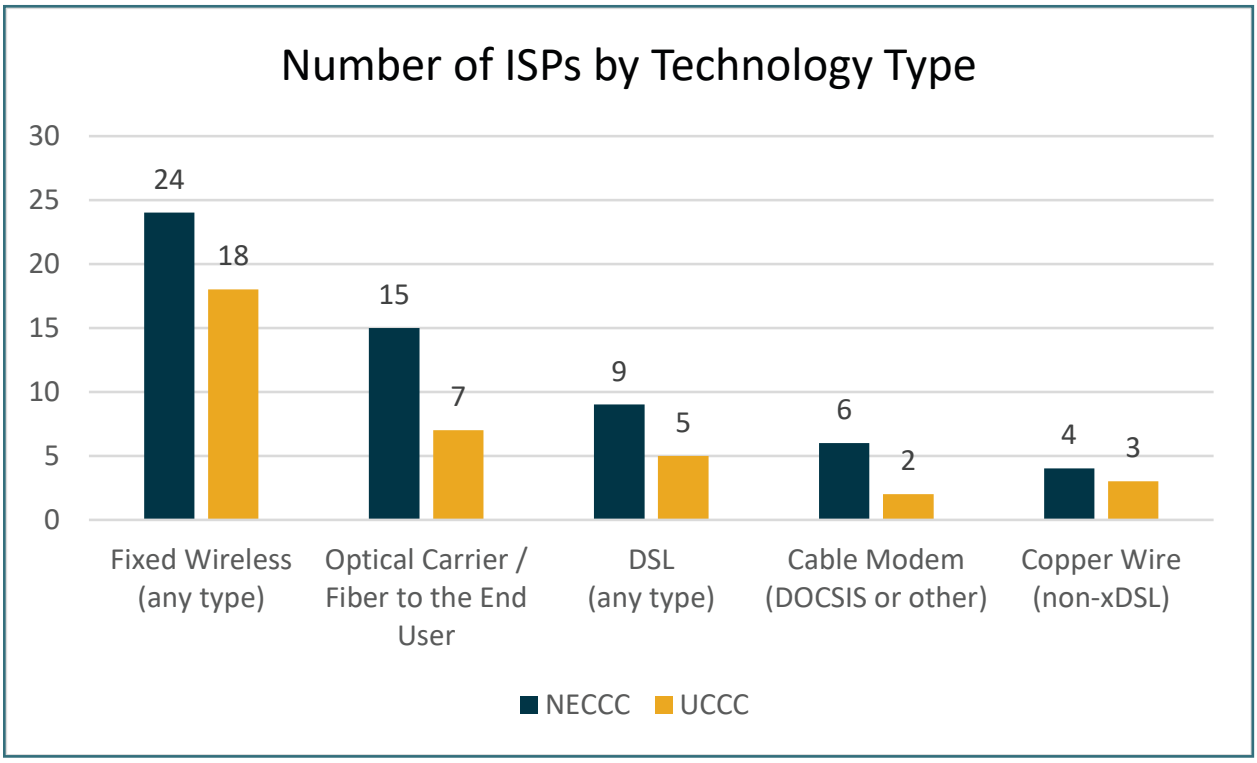
Data quality is not identified as one of the three key barriers in the *North State Regional Strategies*, but data integrity matters for implementation efficiency. The Federal Communications Commission (FCC) Broadband Data Collection and associated map update processes are intended to improve the accuracy and granularity of available data over time, including through challenge processes that allow stakeholders to dispute inaccuracies (FCC, 2025).

ISPs in the Consortia Regions

There are 41 unique ISPs serving locations in NECCC counties and 28 unique ISPs serving locations in UCCC counties. Of these ISPs, 26 serve locations in both the NECCC and UCCC regions. Additionally, many of these ISPs offer broadband through multiple fixed broadband technology types. As shown in the figure below, fixed wireless is the most common broadband technology provided by ISPs in these consortia, followed by fiber and DSL. Broadband service by cable modem and copper wire technologies are the least common broadband technologies offered by these ISPs.

It is important to note that many of these ISPs operate in limited geographic areas. ISPs counted in this list should be understood as serving at least one community within a consortium, and not necessarily providing broad regional coverage. As a result, the number of providers does not necessarily indicate widespread service availability or capacity, but instead reflects dispersed and frequently localized service areas across the region. For a complete list of each ISP and the technologies they use, see Appendix C.

Figure 3: Number of ISPs by Technology Type



Note. Since many ISPs offer broadband through multiple technology types, the sum of each consortium's ISPs across all technology types is greater than the number of unique ISPs in each consortium. See Appendix C for details. Collective staff have grouped technology codes (TechCodes) together to represent general technology types. Code groupings are as follows: DSL (any type) = TechCodes 10, 11, 12, 20; Copper Wire (non-xDSL) = TechCode 30; Cable Modem (DOCSIS or other) = TechCodes 40, 41, 42, 43, 44; Optical Carrier / Fiber to the End User = TechCode 50; Fixed Wireless (any type) = TechCodes 70, 71, 72. Satellite and mobile technologies are not included. Data shown is accurate as of December 31, 2023. Source: California Public Utilities Commission. (2024). *California Interactive Broadband Map* [Interactive map].

Current Broadband Initiatives in the NECCC and UCCC Regions

Broadband infrastructure investment has accelerated across Northern California as part of the state's commitment to expanding affordable, high-speed internet access. The following sections describe each of the major ongoing broadband projects in the region, including the counties they affect, their start and end dates, budgets, technologies, and overall impacts on connectivity in rural Northern California.

Table 8: California Middle-Mile Broadband Initiative (MMBI) – Siskiyou Build

Location	NECCC, Siskiyou County
Start / End Dates	Construction: May 2024 to December 2026 Network Activation: January 2027
Budget	$70 million (updated from an initial $52 million)
Served Population (Benefit)	3,500 unserved households
Technology	Open-access middle-mile fiber (288-count)

The Siskiyou Build of the California Middle-Mile Broadband Initiative (MMBI – Siskiyou Build) is one of the most significant projects currently underway in the region. Managed by the California Department of Technology (CDT) in partnership with Siskiyou Telephone, this project is constructing approximately 163 miles of open-access fiber between Orleans, Yreka, and Happy Camp in Siskiyou County. The $70 million network began construction in May 2024 and is scheduled for completion by December 2026, with activation beginning in January 2027. While the primary construction takes place in Siskiyou County, the new middle-mile infrastructure will directly benefit all seven NECCC counties by providing essential backhaul connectivity for future last-mile projects and lowering wholesale transport costs (CDT, 2023 & 2024).

Table 9: Golden State Connect Authority – Tehama County Broadband Network

Location	NECCC, Tehama County
Start / End Dates	Awarded: December 19, 2024 Construction: 2025–2027
Budget	$74.8 million
Served Population (Benefit)	3,996 unserved locations
Technology	FTTP open-access last-mile infrastructure

The Golden State Connect Authority (GSCA) Tehama County Broadband Network represents another transformative project for the region. Funded through the CPUC's Federal Funding Account (FFA), the project received $74.8 million in December 2024. Construction is scheduled for 2025 through 2027, deploying open-access fiber-to-the-premises (FTTP) service to approximately 3,996 unserved locations throughout Tehama County. In addition to directly serving Tehama residents, the network will provide improved regional transport capacity that benefits surrounding Shasta and Butte Counties, forming a key component of the NECCC's interconnected broadband system (GSCA, 2024).

Table 10: City of Chico / North Valley Fiber (Phase 1)

Location	NECCC, Butte County
Start / End Dates	Groundbreaking: summer 2025 First Customers Expected: October 2025
Budget	$12.7 million
Served Population (Benefit)	9,040 households and businesses
Technology	FTTP municipal network

The City of Chico North Valley Fiber project in Butte County began construction in summer 2025 and expects its first customers online by October 2025. The $12.7 million project will deploy municipal fiber-to-the-premises service to roughly 9,040 homes and businesses within Chico and adjacent unincorporated areas. Designed as a city-owned network, the initiative will strengthen broadband infrastructure not only within Butte County but also along corridors extending into Glenn and Tehama Counties, where shared utility routes will enable additional private investment (KRCR News, 2025).

Table 11: Comcast – Butte-Colusa Expansion

Location	NECCC & UCCC, Butte & Colusa counties
Start / End Dates	Awarded: January 15, 2025 Construction: through 2026
Budget	Over $8 million
Served Population (Benefit)	445 locations in Butte County 260 locations in Colusa County
Technology	Fiber last-mile infrastructure

Comcast's Fiber Expansion Project was awarded over $8 million in January 2025 under the CPUC's FFA program. This project is divided between Butte and Colusa Counties, reaching about 445 unserved households in Butte and 260 in Colusa, with construction running through 2026. Comcast's project will extend gigabit-capable fiber to underserved neighborhoods, promoting competition and reliability in both consortia regions (Comcast California, 2025).

Table 12: Cal-Ore Telephone – Modoc & Siskiyou

Location	NECCC, Modoc & Siskiyou counties
Start / End Dates	Awarded: June 2023 Expected ReConnect Window: 2–4 years
Budget	$25 million
Served Population (Benefit)	757 people, 45 businesses, 14 farms, and 4 schools
Technology	FTTP

In the far northern section of the NECCC region, Cal-Ore Telephone's ReConnect Round 4 FTTP Project (funded by the USDA) received $24,997,848 in June 2023. The project is deploying fiber-to-the-premises service across Modoc and Siskiyou Counties, connecting 757 residents, 45 businesses, 14 farms, and 4 schools over a two- to four-year build schedule. Beyond the direct service areas, improved connectivity is expected to benefit adjacent Lassen County, which shares network transport infrastructure with Modoc (USDA, 2023).

Table 13: Plumas-Sierra Telecommunications (PST) – Lassen & Plumas

Location	NECCC, Lassen & Plumas counties
Start / End Dates	Ongoing Work: 2019–2026 Janesville/Milford fiber expected by end of 2026
Budget	$2.72 million
Served Population (Benefit)	Project clusters range from dozens to thousands of premises cumulatively.
Technology	Fiber last-mile and fixed wireless in select PST areas; historic middle-mile fiber.

In Lassen and Plumas Counties, Plumas-Sierra Telecommunications (PST) line extension projects (LEPs) are extending fiber access to rural and mountain communities including Plumas Pines, Graeagle, Janesville, Milford, Herlong, and Doyle. These projects are funded through multiple CASF rounds, totaling approximately $2.72 million in new investments, building on a historic $1.72 million middle-mile CASF award from 2010. Construction spans from 2019 through 2026, with new residential fiber expected online by the end of 2026. These builds will directly improve connectivity

in Lassen, Plumas, and parts of Sierra County, enhancing digital access in these Sierra Nevada communities.

Table 14: City of Redding / Redding Electric Utility – Inter-Sub Fiber Project

Location	NECCC, Shasta County
Start / End Dates	FY 2023–24
Budget	$4.64 million
Served Population (Benefit)	Indirect. Enhances reliability for city utility operations while supporting future broadband expansions.
Technology	Municipal fiber transport network.

The City of Redding Inter-Sub Fiber Project, listed in the city's 2023–2028 Capital Improvement Plan (Project REU-2019-03), represents a key backbone upgrade in Shasta County. This $4.64 million project constructs new municipal fiber lines interconnecting city substations, improving both electric grid reliability and broadband infrastructure. The build, which began in FY 2023–24, will indirectly support regional broadband expansion in neighboring Tehama and Trinity Counties, allowing service providers to interconnect through the city's network (City of Redding, 2024).

Table 15: Golden State Connect Authority – Glenn County Broadband Network

Location	UCCC, Glenn County
Start / End Dates	Awarded: December 19, 2024 Build Window: 2025–2027.
Budget	$22.3 million
Served Population (Benefit)	1,233 unserved locations.
Technology	FTTP open-access last-mile network

The Golden State Connect Authority Glenn County Broadband Network was awarded approximately $22.3 million through the CPUC's Federal Funding Account (FFA) in December 2024. Construction, set for 2025–2027, will deploy open-access fiber-to-the-premises service to about 1,233 unserved locations across Glenn County. This project not only expands access for Glenn residents but also supports inter-county fiber routes extending into Colusa and Butte Counties, improving overall regional connectivity (Golden State Connect Authority, 2024).

Table 16: Lake County – Three FFA Last-Mile Projects

Location	UCCC, Lake County
Start / End Dates	Approved: January 30, 2025 Construction timelines established per grant agreements.
Budget	$14.6 million across three projects. • AT&T Lake-1: $2.2 million • AT&T Lake-1E: $4 million • Mediacom Lake County Grant Build: $8.4 million
Served Population (Benefit)	About 7,000 residents to benefit overall. • AT&T Lake-1: 3,027 • AT&T Lake-1E: 1,671 • Mediacom Lake County Grant Build: 2,249
Technology	Primarily FTTP

In Lake County, three significant projects make up the Lake County FFA Broadband Initiative for 2025. Approved by the CPUC on January 30, 2025, these builds collectively received about $14.6 million, representing nearly half of the county's total $28.4 million broadband allocation. The first project, AT&T Lake-1 Fiber, will provide new FTTP service to 620 unserved locations. The second, Mediacom Lake County Grant Build, received over $8 million to reach 1,037 unserved homes. Combined, the three projects will benefit more than 7,000 residents across the Clear Lake Basin

and surrounding rural areas. Construction is expected to begin in 2025 with completion targeted for 2027 (California Public Utilities Commission, 2025a).

Table 17: California Middle-Mile Broadband Initiative (MMBI – Statewide Network)

Location	Consortium: All Consortia Statewide
Start / End Dates	Design and Procurement: began 2022 Construction: continues 2024–2026; target completion December 2026 Initial Activation: January 2027
Budget	Approximately $3.25 billion authorized under Senate Bill 156 (2021). As of mid-2024, CDT reported $2.9 billion committed and over 6,500 miles under contract statewide.
Served Population (Benefit)	Indirect. The network provides open-access middle-mile infrastructure that will enable thousands of future last-mile projects, ultimately supporting broadband access for millions.
Technology	Open-access, high-capacity middle-mile fiber (288-count backbone) forming part of a 10,000-mile statewide network.

Finally, the California Middle-Mile Broadband Initiative (MMBI) continues to underpin broadband development in both the NECCC and UCCC regions. Managed by the California Department of Technology, the MMBI is building more than 10,000 miles of open-access fiber backbone across the state. Segments traverse or border Butte, Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, Colusa, Glenn, and Lake Counties, providing the critical backhaul necessary for all regional last-mile projects. Construction began in 2022 and is scheduled for completion by December 2026, with network activation starting January 2027. The MMBI will dramatically reduce backhaul costs, expand redundancy, and facilitate long-term scalability across both consortia regions (California Department of Technology, 2024).

Conclusion

Taken together, the initiatives described above represent a significant expansion of broadband infrastructure across the NECCC and UCCC regions. These projects span both middle-mile and last-mile deployment, with a strong emphasis on fiber-based and open-access networks that are designed to support long-term scalability and regional connectivity.

While these projects directly connect tens of thousands of residents, businesses, farms, and schools, their broader significance lies in how they reshape the region's underlying broadband system. The expansion of middle-mile infrastructure will reduce transport costs and improve network resilience, while last-mile investments will extend service into historically underserved and remote communities. Together, these efforts establish a more durable and interconnected broadband foundation across Northern California.

At the same time, the scale and timing of these projects introduce new demands on the regional workforce. Because many projects are occurring concurrently and are concentrated in rural and geographically complex areas, the availability of skilled labor becomes a critical factor influencing project timelines and long-term system performance. As a result, infrastructure expansion and workforce capacity are closely linked: the success of these investments will depend not only on funding and engineering, but also on the region's ability to develop and sustain a workforce capable of supporting deployment, maintenance, and future growth.

Workforce Supply Chain

Introduction

In the wake of the COVID-19 Pandemic, there has been a surge in the public's awareness of the digital divide and its impact on everyday life for many Americans, especially communities that are primarily rural, low-income, or predominantly Black, Hispanic, or Tribal (GAO, 2022). This rise in awareness has led to a parallel surge in efforts to significantly expand broadband access at local, state, and federal levels. For the purposes of this study, these efforts include California's Middle Mile Broadband Initiative (MMBI), statewide efforts to achieve "Broadband For All," and the federal Broadband, Equity, Access, and Deployment (BEAD) program. These coordinated efforts bring billions of funding dollars, thousands of skilled labor jobs, and ambitious timelines to achieve near-total broadband access by the early 2030s (usually 2031 or 2032).

However, the promise of project completion and the creation of new jobs is dependent on the availability of skilled workers to complete the labor. Multiple reports express concern that the recent surge in broadband expansion projects will be met with delays as projects encounter labor shortages and procedural bottlenecks in an industry already facing workforce decline (Continuum Capital, 2024; FBA & Cartesian, 2023; GAO, 2022). These reports generally agree on two main points: (1) the telecommunications workforce is aging, with retirements outpacing new hires; and (2) broadband expansion projects employ several types of workers that are also needed in projects for other industries, resulting in cross-industry competition for the same labor pool.

Although these reports concur that the broadband labor pool is historically declining and that competing demand is expected to strain the existing workforce, they do not necessarily agree on the severity of the labor shortage or its implications. The GAO report takes a cautious approach, stating that their findings of a labor shortage were "mixed" while acknowledging the concerns of industry stakeholders, such as the impact of cross-industry competition (GAO, 2022). The Continuum and FBA reports – both affiliated with the Fiber Broadband Association – depict a more dire outlook, characterizing the recent surge of broadband funds as more of a "disruptive force" than a help, and declaring the increase in demand as being "far beyond what the current workforce can support" (Continuum Capital, 2024; FBA & Cartesian, 2023). Despite these differences, it is significant that none of the three reports deliver a particularly positive view of the broadband workforce and its ability to meet the recent surge in demand for broadband infrastructure expansion.

The above reports have focused on nationwide (GAO and FBA) and statewide (Continuum Capital) levels of analysis. This section of the report seeks to evaluate the status of the local workforce supply chain for broadband expansion efforts. First, we provide estimates of local workforce shortages to support these projects. Next, we track historical workforce trends across target broadband-related occupations in the consortium region. Based on these general occupation types, we identify educational and vocational programs in the region that may produce new workers in those occupations. Lastly, we consider input from a workforce survey administered to ISPs in the region before closing this section with our conclusions.

Estimating Workforce Shortages

For the purposes of calculating the workforce needed to complete the current and upcoming volume of broadband expansion projects, no recent labor demand estimates exist below the state level. The only available numerical estimates for broadband workforce demand come from a report

made by Continuum Capital (Continuum) for the Fiber Broadband Association (FBA) and the Power and Communication Contractors Association (PCCA). The Continuum report includes broadband workforce estimates for each state, including California, pictured below.

Table 18: California Broadband Workforce Size & Need

Construction & Technician Position	Workforce Estimate	2025–2032 Need	10 Yr Ret. & Attr. Need
Superintendent/General Foreman	1,100	120	400
Foreman	2,200	240	800
Lineman	5,500	600	2,000
Apprentice*	5,500	600	2,000
Field Crew Fiber Splicer	600	60	190
Groundman / Helper / Laborer	2,800	300	1,000
Operator / HDD Operator	1,100	120	400
Construction Field Total	**18,800**	**2,040**	**6,790**
Tower Equipment Installers and Repairers	900	100	400
Telecom Technician (Non-Specific)**	1,400	150	600
Telecom System Troubleshooter**	700	80	900
Telecom System Testing**	700	80	900
Premises Installation Tech**	6,900	750	1,490
Underground Fiber Drop Technician**	1,400	150	700
Aerial Drop Technician**	2,800	300	800
Technician Total	**14,800**	**1,610**	**5,790**

Note. * Apprentice position captures entry level, lower experience, and lower skill field trades performing lineman, splicer, helper, and operator functions. ** Interior and other fiber splicing skills and need are incorporated into technician positions. Source: Continuum Capital. (2024). *Broadband market workforce needs: Research summary.*

All told, Continuum estimates a combined labor need of 16,230 workers for California's statewide broadband expansion efforts, including 3,650 needed from 2025–2032 and an additional 12,580 to adjust for retirement and attrition in the coming decade.

Workforce Size & Need Estimation Methods

We can approximate the North State's broadband workforce size and need using Continuum's estimates of California's statewide values. We do so by developing a ratio that represents NECCC and UCCC's unserved households as a percentage of California's total unserved households, and then applying those ratios to Continuum's statewide estimates to approximate corresponding workforce demand for the consortia regions. By focusing on the percentage of unserved households as the ratio for each consortium, we turn our focus away from those households that are already served, highlighting the remaining infrastructure demand.

Table 19: Consortium Unserved Households as a Ratio of California Unserved Households

	Total Unserved Households	Consortium Unserved Households, Percent of State
California	406,426	
NECCC	19,920	4.901%
UCCC	3,938	0.969%

Note. The number of total unserved households is calculated by combining CPUC's "unserved" and "priority unserved" categories into a single group. Source: California Public Utilities Commission. (2025d). *CPUC Annual Collected Broadband Data.*

This approach has several limitations. First, the Continuum study was published prior to 2025, and as such does not account for significant shifts in federal funding and agency norms, which may impact programs such as BEAD. Second, this approach treats the household as the key indicator of broadband labor volume, but several other factors may influence actual workforce demand such as population density, unique geography and terrain features, and the presence of existing infrastructure; there is not necessarily a perfect correlation between unserved households and the scale of projects needed to reach those households. Due to these limitations, the broadband workforce estimates we provide for the consortia regions are intended as a reference point to demonstrate ongoing need. We do not recommend treating these estimates as steadfast predictions for planning purposes.

Workforce Size & Need Estimates

Through the above methods we calculate that the NECCC and UCCC consortia account for 4.901 percent and 0.969 percent of California's total unserved households, respectively. In the following tables we display itemized estimates of NECCC and UCCC existing workforce and projected needs. All told, we estimate that the NECCC region has a combined labor need of roughly 796 workers, including 179 needed between the years 2025 and 2032, and an additional 617 to adjust for retirement and attrition in the coming decade. Using the same method, we estimate that the UCCC region has a combined labor need of roughly 157 workers, including 35 needed between the years 2025 and 2032, and an additional 122 to adjust for retirement and attrition in the coming decade.

Table 20: NECCC Broadband Workforce Size & Need by Ratios of Total and Unserved Households

Construction & Technician Position	Workforce Estimate	2025–2032 Need	10 Yr Ret. & Attr. Need
Superintendent/General Foreman	53.9	5.9	19.6
Foreman	107.8	11.8	39.2
Lineman	269.6	29.4	98.0
Apprentice*	269.6	29.4	98.0
Field Crew Fiber Splicer	29.4	2.9	9.3
Groundman / Helper / Laborer	137.2	14.7	49.0
Operator / HDD Operator	53.9	5.9	19.6
Construction Field Total	**921.4**	**100.0**	**332.8**
Tower Equipment Installers and Repairers	44.1	4.9	19.6
Telecom Technician (Non-Specific)**	68.6	7.4	29.4
Telecom System Troubleshooter**	34.3	3.9	44.1
Telecom System Testing**	34.3	3.9	44.1
Premises Installation Tech**	338.2	36.8	73.0
Underground Fiber Drop Technician**	68.6	7.4	34.3
Aerial Drop Technician**	137.2	14.7	39.2
Technician Total	**725.4**	**78.9**	**283.8**

Note. * Apprentice position captures entry level, lower experience, and lower skill field trades performing lineman, splicer, helper, and operator functions. ** Interior and other fiber splicing skills and need are incorporated into technician positions.

Table 21: UCCC Broadband Workforce Size & Need by Ratios of Total and Unserved Households

Construction & Technician Position	Workforce Estimate	2025–2032 Need	10 Yr Ret. & Attr. Need
Superintendent/General Foreman	10.7	1.2	3.9
Foreman	21.3	2.3	7.8
Lineman	53.3	5.8	19.4
Apprentice*	53.3	5.8	19.4
Field Crew Fiber Splicer	5.8	0.6	1.8
Groundman / Helper / Laborer	27.1	2.9	9.7
Operator / HDD Operator	10.7	1.2	3.9
Construction Field Total	**182.2**	**19.8**	**65.8**
Tower Equipment Installers and Repairers	8.7	1.0	3.9
Telecom Technician (Non-Specific)**	13.6	1.5	5.8
Telecom System Troubleshooter**	6.8	0.8	8.7
Telecom System Testing**	6.8	0.8	8.7
Premises Installation Tech**	66.9	7.3	14.4
Underground Fiber Drop Technician**	13.6	1.5	6.8
Aerial Drop Technician**	27.1	2.9	7.8
Technician Total	**143.4**	**15.6**	**56.1**

Note. * Apprentice position captures entry level, lower experience, and lower skill field trades performing lineman, splicer, helper, and operator functions. ** Interior and other fiber splicing skills and need are incorporated into technician positions.

Occupations in the Region

The Continuum and GAO reports each use specific occupation codes to approximate the potential workforce availability of broadband-related occupations. Both lists are similar in their inclusion of technical, managerial, and construction-related roles, but the exact occupation codes used in each report are almost entirely distinct from each other. These occupation codes are shown in the table below, with codes from the Continuum report on the left and codes from the GAO report on the right.



Table 22: Broadband Occupations used in Continuum and GAO Reports

Continuum Report		GAO Report	
49-9051	Electrical Power-Line Installers and Repairers	49-9051	Electrical Power-Line Installers and Repairers
49-9052	Telecommunications Line Installers and Repairers	49-9052	Telecommunications Line Installers and Repairers
11-9021	Construction Managers	15-1241	Computer Network Architects
13-1051	Cost Estimators	17-1021	Cartographers and Photogrammetrists
15-1242	Database Administrators	17-1022	Surveyors
17-2051	Civil Engineers	17-2071	Electrical Engineers
19-5011	Occupational Health and Safety Specialists	17-3031	Surveying and Mapping Technicians
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers
47-2061	Construction Laborers	49-2022	Telecommunications Equipment Installers and Repairers
47-2073	Operating Engineers and Other Construction Equipment Operators	49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment
47-2111	Electricians	49-2097	Audiovisual Equipment Installers and Repairers
47-4011	Construction and Building Inspectors		
47-5032	Explosives Workers, Ordnance Handling Experts, and Blasters		
49-3042	Mobile Heavy Equipment Mechanics, Except Engines		
51-4121	Welders, Cutters, Solderers, and Brazers		
53-3032	Heavy and Tractor-Trailer Truck Drivers		

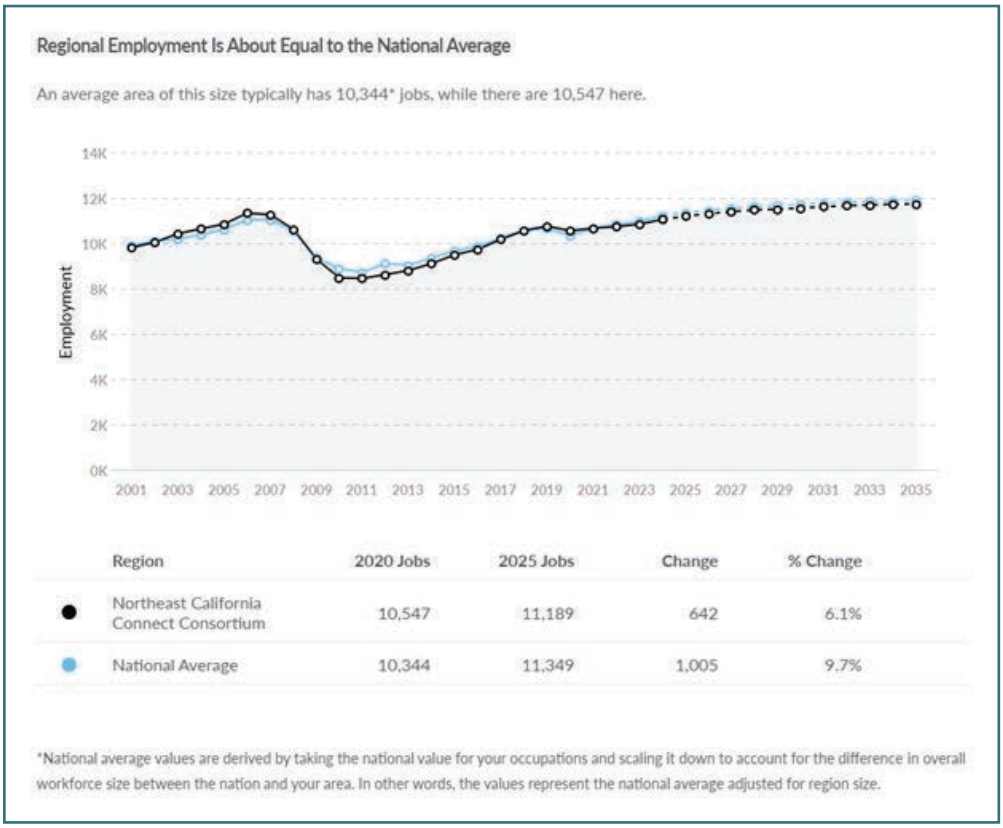
Note. Collective staff have made adjustments to these occupation code lists, updating SOC-2010 codes to match newer SOC-2018 codes.

The differences between the two lists underscore the inherent difficulties in estimating the necessary labor for broadband infrastructure expansion projects, as these projects require the coordination of many different occupations and skillsets. The occupational discrepancies are also symptomatic of a current lack in industry standardization, as pointed out in the Broadband Workforce Development Guidebook (FBA & Cartesian, 2023). Both the Continuum and GAO reports note that these occupations are not unique to the broadband industry, but are also in demand for other non-broadband industries. This means that broadband employers face competition from other industries to hire workers from these occupations.

Occupation Employment Trends

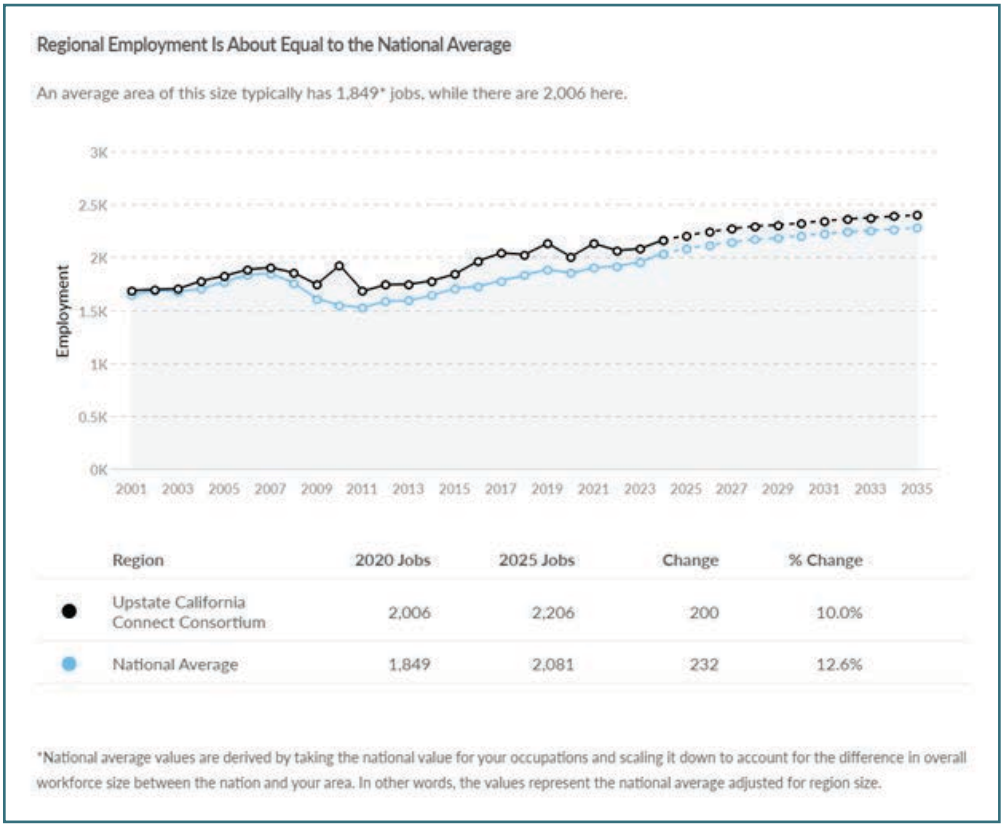
Since specific occupation lists can vary when approximating the broadband workforce, we use four different combinations of the above SOC codes (in the above table) to provide a multi-angle perspective on the consortium region's broadband employment trends. The four combinations are: 1) SOCs from the Continuum report alone; 2) SOCs from the GAO report alone; 3) SOCs from the Continuum and GAO reports combined, without duplicating SOCs that are shared in common; and 4) only the SOCs that the Continuum and GAO reports have in common. All charts depict data starting in 2001 and projected to 2035, using 2020 and 2025 as reference years for recent industry change.

Figure 4: NECCC Employment Trends Using Continuum's Broadband SOCs



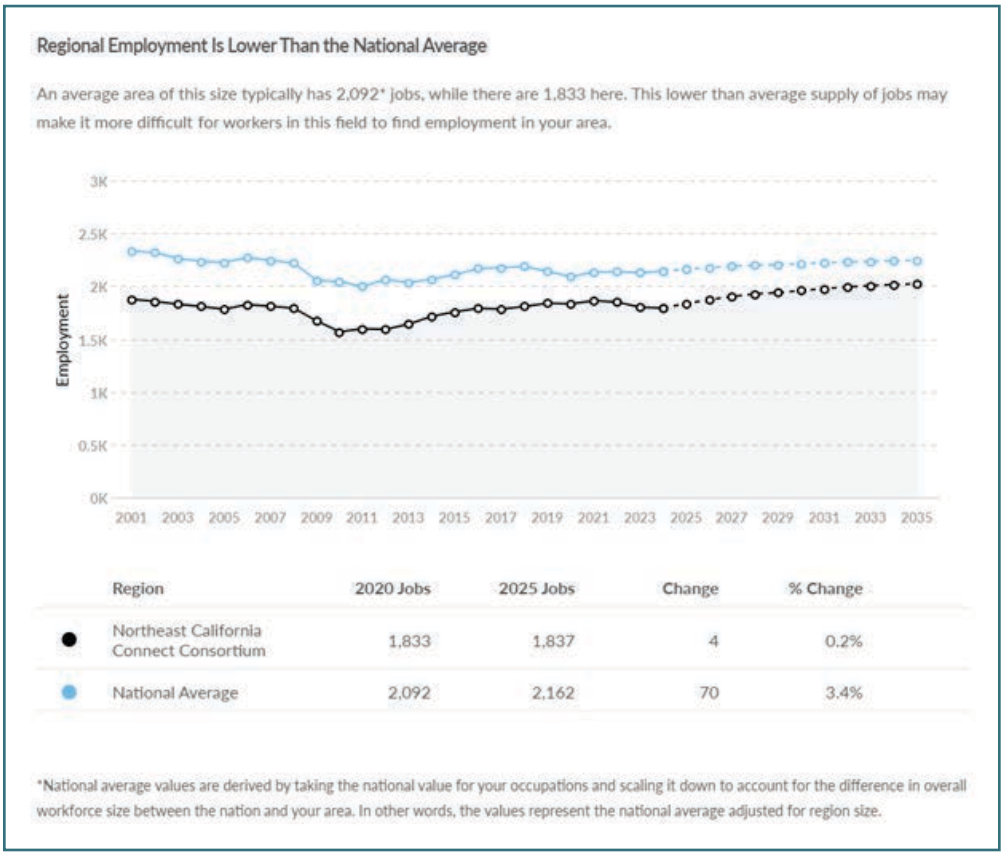
Note. The chart shows employment for 16 SOC codes used to approximate the broadband workforce in the Continuum report. Source: Lightcast Analyst. (2025, October 28). *Occupation Overview*. Retrieved 28 October 2025.

Figure 5: UCCC Employment Trends Using Continuum's Broadband SOCs



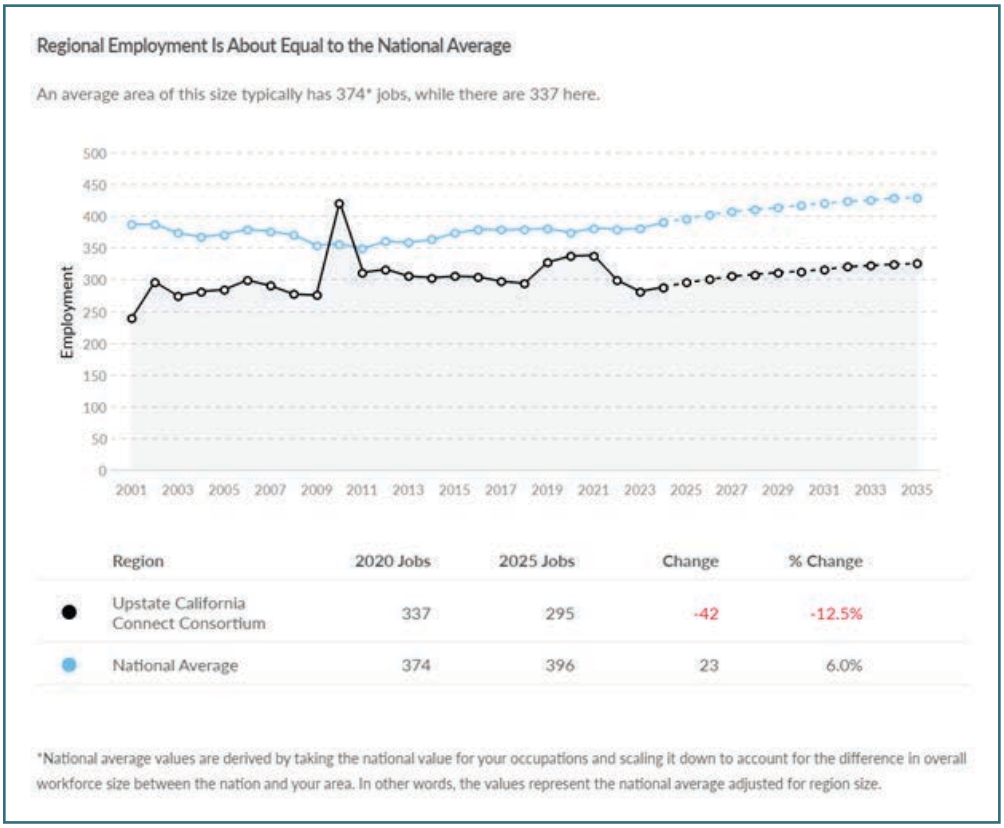
Note. The chart shows employment for 16 SOC codes used to approximate the broadband workforce in the Continuum report. Source: Lightcast Analyst. (2025, October 28). *Occupation Overview*. Retrieved 28 October 2025.

Figure 6: NECCC Employment Trends Using GAO's Broadband SOCs



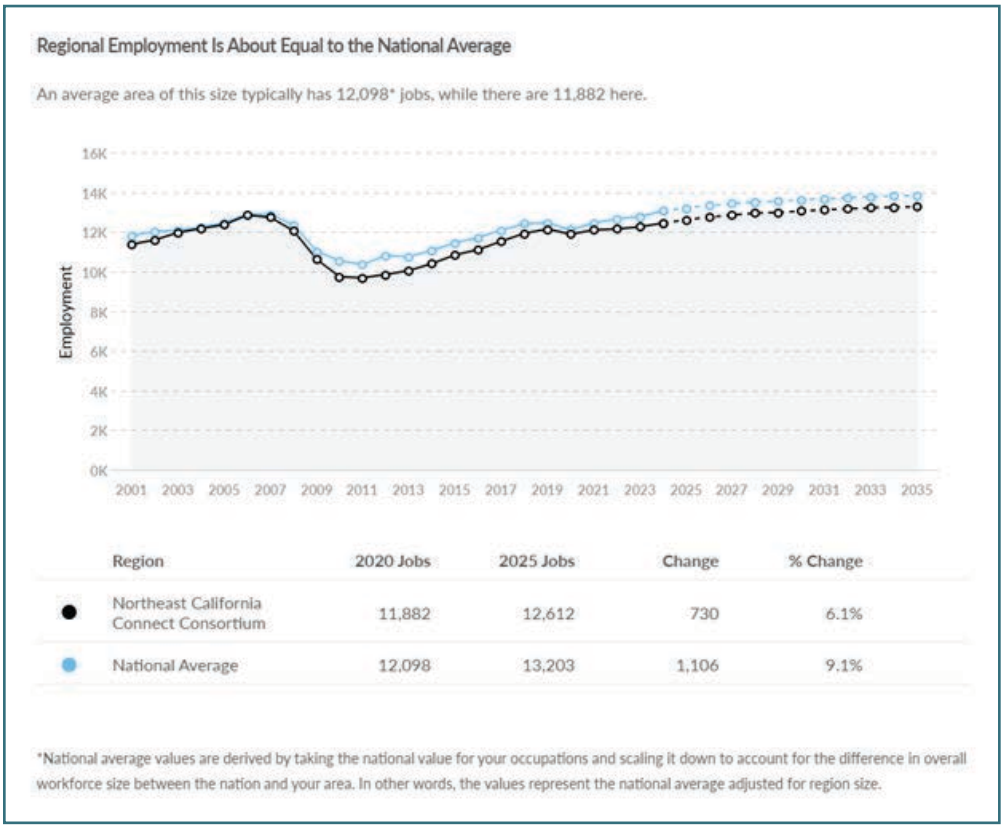
Note. The chart shows employment for 11 SOC codes used to approximate the broadband workforce in the GAO report. Source: Lightcast Analyst. (2025, October 28). *Occupation Overview*. Retrieved 28 October 2025.

Figure 7: UCCC Employment Trends Using GAO's Broadband SOCs



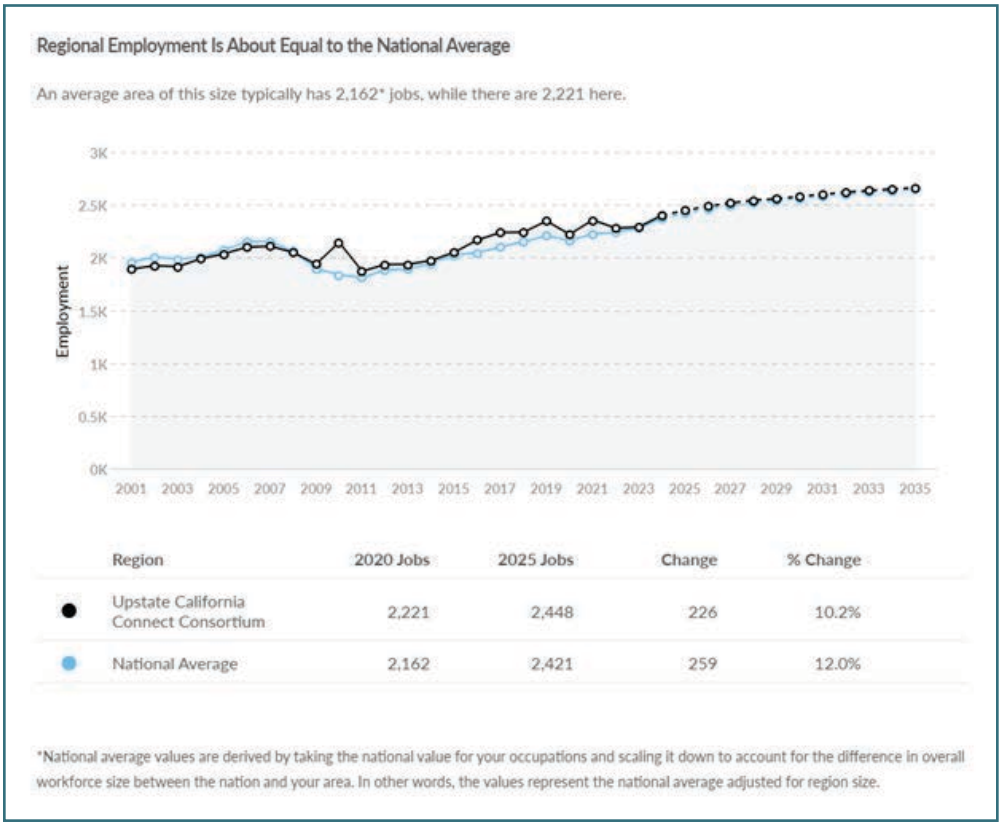
Note. The chart shows employment for 11 SOC codes used to approximate the broadband workforce in the GAO report. Source: Lightcast Analyst. (2025, October 28). *Occupation Overview*. Retrieved 28 October 2025.

Figure 8: NECCC Employment Trends Using Continuum and GAO's Broadband SOCs Combined



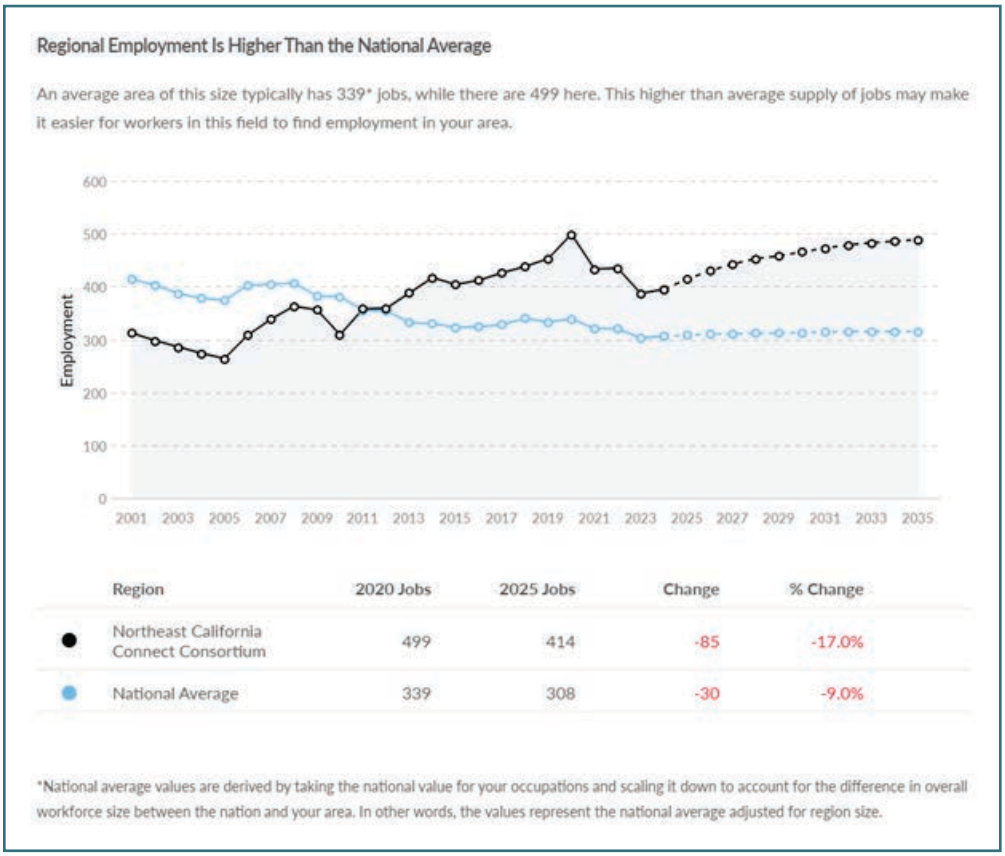
Note. The chart shows employment for 25 unique SOC codes used to approximate the broadband workforce in both the Continuum and GAO reports. Source: Lightcast Analyst. (2025, October 28). *Occupation Overview*. Retrieved 28 October 2025.

Figure 9: UCCC Employment Trends Using Continuum and GAO's Broadband SOCs Combined



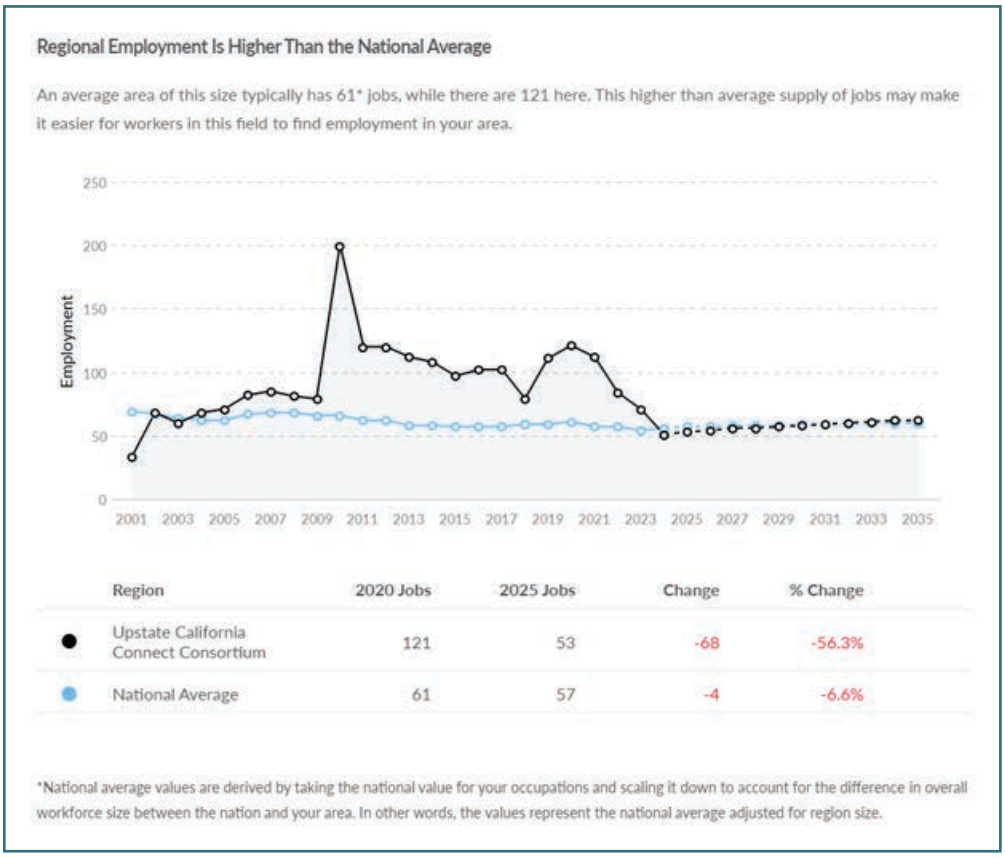
Note. The chart shows employment for 25 unique SOC codes used to approximate the broadband workforce in both the Continuum and GAO reports. Source: Lightcast Analyst. (2025, October 28). *Occupation Overview*. Retrieved 28 October 2025.

Figure 10: NECCC Employment Trends Using Continuum and GAO's Shared Broadband SOCs



Note. The chart shows employment for two shared SOC codes that appeared in broadband occupation lists for both the Continuum and GAO reports. Source: Lightcast Analyst. (2025, October 28). *Occupation Overview*. Retrieved 28 October 2025.

Figure 11: UCCC Employment Trends Using Continuum and GAO's Shared Broadband SOCs



Note. The chart shows employment for two shared SOC codes that appeared in broadband occupation lists for both the Continuum and GAO reports. Source: Lightcast Analyst. (2025, October 28). *Occupation Overview*. Retrieved 28 October 2025.

Programs in the Region

Related General Programs

Because of the wide variety of occupations that overlap with broadband employment, there are several training and educational programs in and around the region that have potential to produce new workers for broadband projects.

Our survey of nearby programs divides our findings into two lists based on geography. The first list we call "Core" programs: any related program that is offered in the region, provided the program's parent institution has at least one campus in the main counties that constitute that consortium. These are programs that can easily be attended by consortium residents. The second list we call "Core+1" programs: any related program that is offered near the consortium region, provided that program's parent institution has at least one campus in a county adjacent to the main counties that constitute that consortium, and provided that program does not already appear in the list of core programs. These are programs that can be reasonably attended by consortium residents who are able to commute to neighboring counties.

(Counties bordering the NECCC region include Colusa, Del Norte, Glenn, Humboldt, Mendocino, Sierra, Sutter, Trinity, and Yuba. Counties bordering the UCCC region include Butte, Mendocino, Napa, Sonoma, Sutter, Tehama, and Yolo.)

A summary of the institutions in each consortium's Core and Core+1 counties can be found in the tables below. Common broadband-related programs found at these institutions tend to include civil or electrical engineering, welding technology, construction management, and computer sciences. Lists of specific programs in the Core and Core+1 categories can be found in Appendix D.

Figure 12: Map of NECCC Core Counties, with Core+1 Counties Highlighted

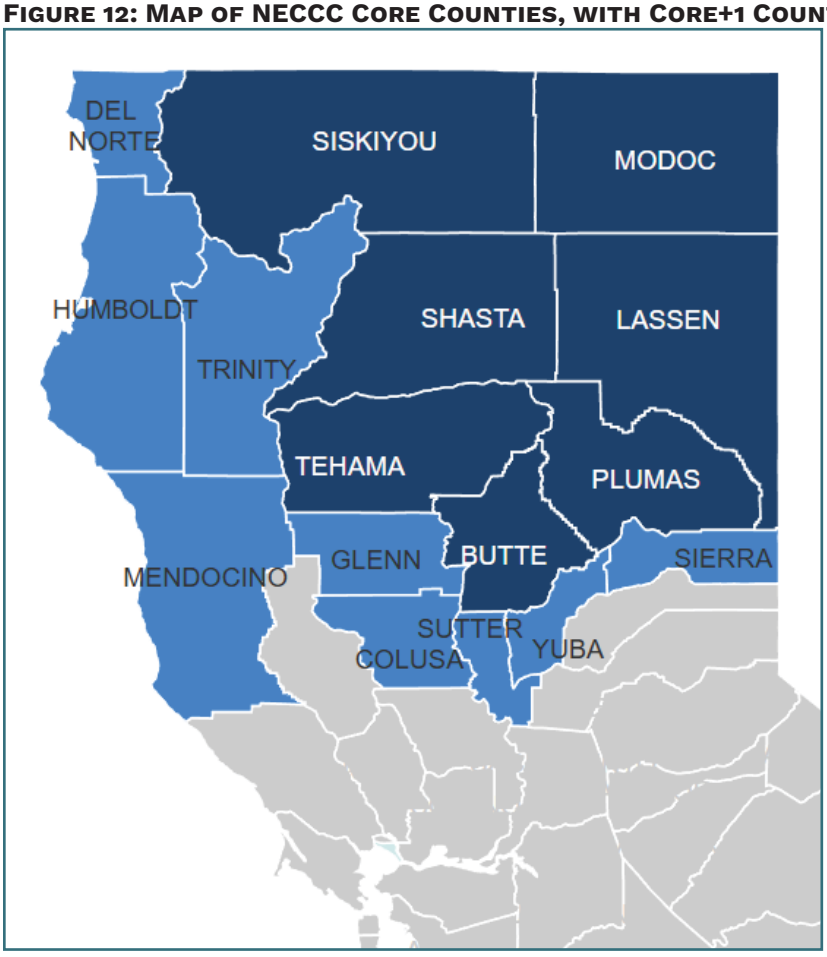


Table 23: NECCC Institutions

Core	Core+1
American Career Training	California State Polytechnic University-Humboldt
Butte College	College of the Redwoods
California State University-Chico	Klamath Community College
College of the Siskiyous	Mendocino College
Feather River Community College District	Rogue Community College
Lassen Community College	Woodland Community College
Northwest Lineman College	Yuba College
Shasta College	
Simpson University	

Figure 13: Map of UCCC Core Counties, with Core+1 Counties Highlighted

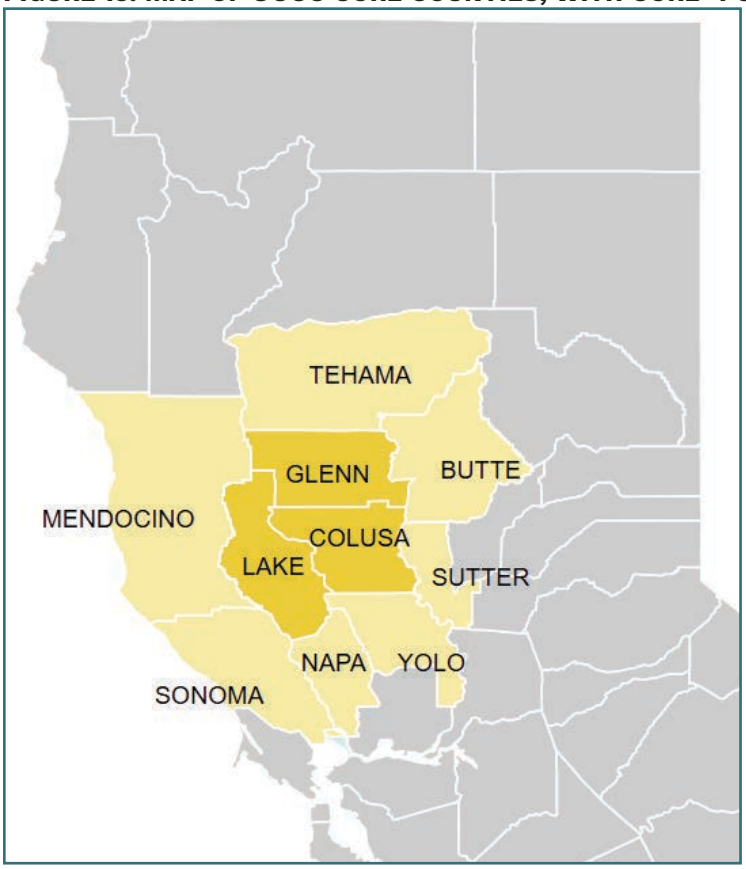


Table 24: UCCC Institutions

Core	Core+1
Butte College	California State University-Chico
Mendocino College	Napa Valley College
Woodland Community College	Northwest Lineman College
	Sacramento City College
	Santa Rosa Junior College
	Shasta College
	Sonoma State University
	University of California-Davis
	Yuba College

Specialized Programs

Two training organizations in the North State offer specialized electrical lineworker training, which has applications in the broadband and telecommunications industry: Northwestern Lineman College (NLC), whose California campus is located in Oroville, Butte County; and American Career Training (ACT) in Redding, Shasta County. As of this review, NLC offers at least one course that includes fiber optics, while no comparable offering was identified on ACT's publicly available materials. However, both training centers note that their graduates regularly go on to work on telecommunications-related projects. NLC and ACT are thus the most relevant sources of broadband-related specialized training in the consortia regions.

This said, there remains a shortage of specialized programs for fiber-optic certifications, specifically. The broadband industry has long struggled to establish standardized training programs for its fiber-optic needs, resulting in a lack of such training programs and their accompanying trusted industry credentials. As a result, the industry has largely relied on in-house onboarding and on-the-job training to meet industry hiring needs, but the *Broadband Workforce Development Guidebook* indicates this solution is unsustainable and insufficient to meet the needs of the recent surge in broadband projects (FBA & Cartesian, 2023, pp. 3 & 11). It therefore comes as no surprise that there are no specialized fiber-optic programs in the rural consortia regions or their surrounding counties. There are only a handful of such programs in California, the nearest being in the Sacramento and Bay Areas; NECCC and UCCC residents could potentially attend one of these programs, but the distance required is far from ideal.

This signals an opportunity for the development of specialized fiber-optic programs in the consortium region. One example is the Fiber Broadband Association's OpTIC Path™ program, a standardized course and certification developed to address the industry's need for standardized training curriculum and certification. Having launched in May 2022, the program includes 144 hours of classroom instruction and 2,000 hours of apprenticeship. OpTIC Path is currently being rolled out to all 56 states and territories. This provides an opportunity for existing institutions in and around the consortia regions to partner with the FBA to establish an OpTIC Path program in Northern California, providing much-needed workers to support broadband expansion projects in coming years.

ISP Survey: Employer Demand, Skill Needs, and Constraints

To better understand employer-side workforce needs, the project conducted a separate targeted survey of ISPs operating across the Northeastern and Upstate California Connect Consortium regions. Those results have been analyzed alongside additional ISP input from our larger needs gap survey and subsequent interviews. Survey responses reflect a mix of small and mid-sized providers serving multi-county, predominantly rural service areas.

Hiring Demand and Roles

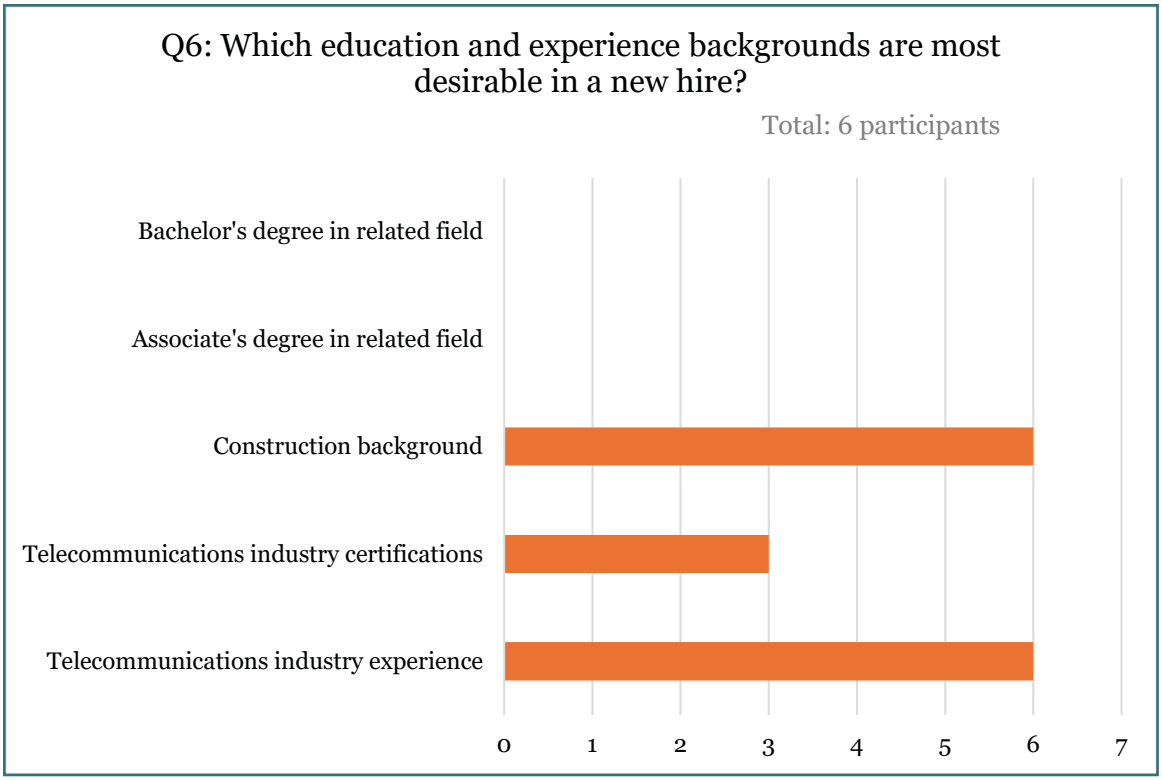
Surveyed ISPs reported modest but consistent hiring needs over the next one to two years. Demand is concentrated in a small number of operational roles rather than large-scale workforce expansion. The most frequently identified hiring needs include project managers and supervisors, fiber installers and splicers, construction and line workers, and network and field technicians. Most providers indicated plans to hire one to five workers per role. This suggests that workforce demand is project-driven and incremental, rather than cyclical or speculative.

Skill Gaps and Hiring Challenges

ISPs consistently reported difficulty finding candidates with hands-on, field-ready technical skills, particularly for construction, fiber installation, and network operations. Skills most often described

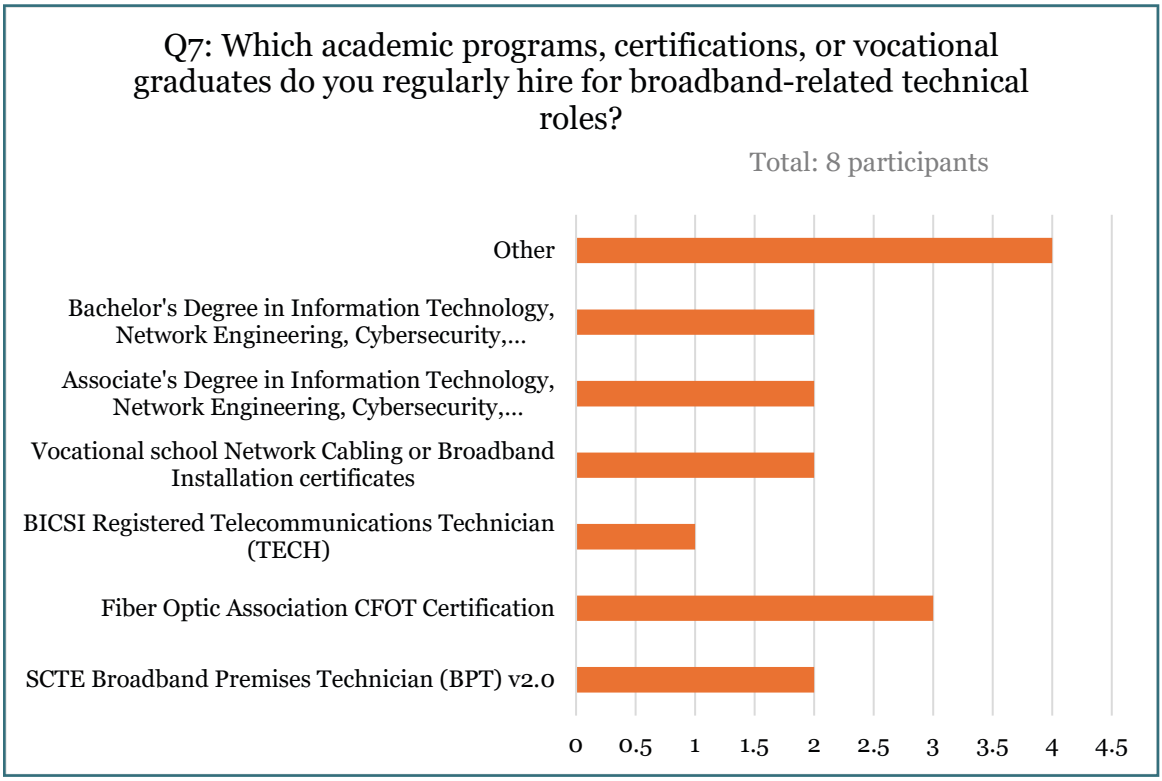
as difficult to hire for include: fiber-optic splicing and installation, network troubleshooting, and construction techniques and equipment operation.

Figure 14: Skilled Backgrounds Wanted by ISPs



By contrast, formal academic credentials were not a primary hiring criterion. Providers emphasized that practical experience, reliability, and willingness to learn outweigh associate's or bachelor's degrees. Industry experience and construction backgrounds were rated as more desirable than formal education.

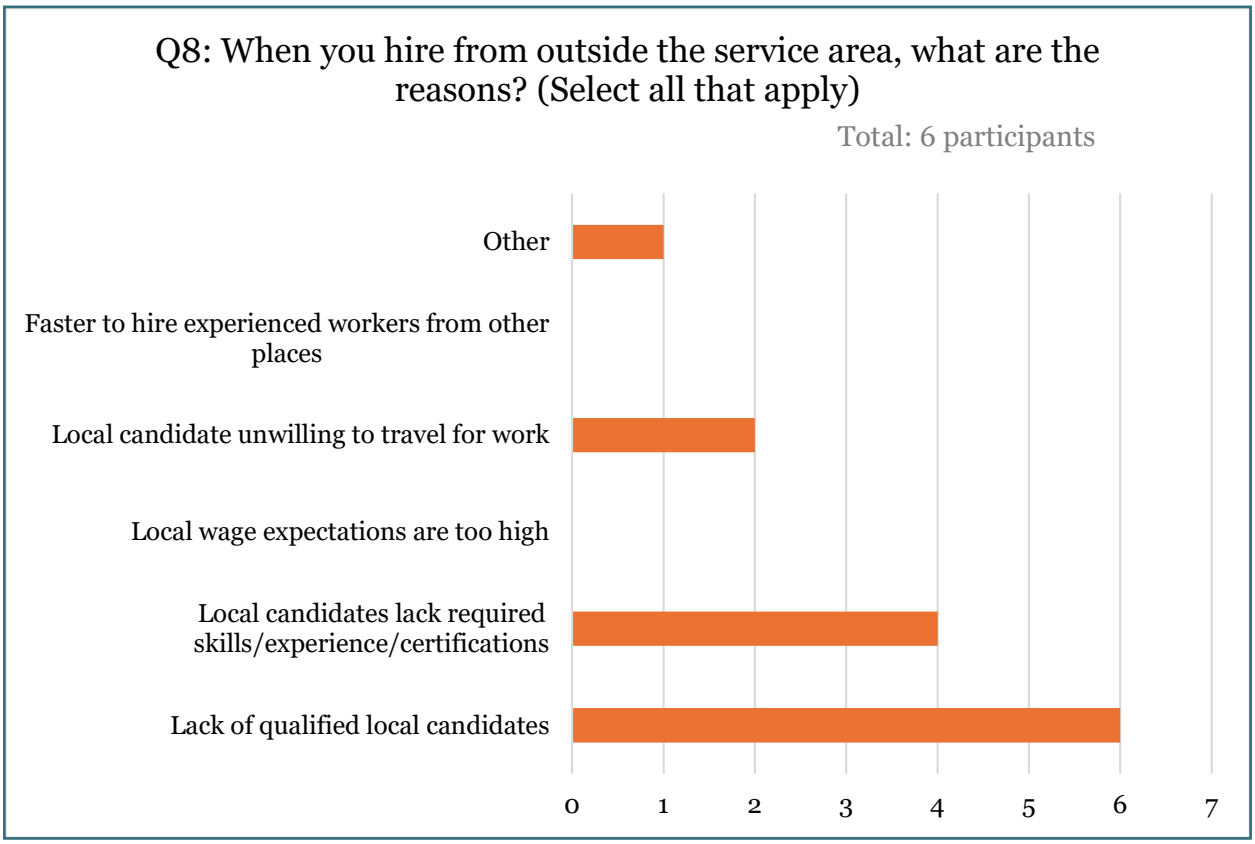
Figure 15: Program Graduate Types Wanted by ISPs



Recruitment, Retention, and Local Labor Constraints

Most ISPs reported that the majority of their workforce is hired locally, reflecting both preference and necessity. When hiring from outside their service area, providers cited the following reasons: lack of qualified local candidates, limited local experience or certifications, and difficulty competing with larger utilities or firms on wages.

Figure 16: Reasons for ISPs Hiring Non-Local Workers



Several providers noted challenges retaining workers after investing in training, as experienced employees are often recruited by larger companies offering higher pay. This dynamic limits the return on employer training investments and reinforces reliance on small, local hiring pools.

Training and Partnership Interest

Despite these challenges, most surveyed ISPs expressed interest in collaborating with local training providers or workforce programs to strengthen regional pipelines. Employers indicated particular interest in short-term, applied training models; internships or pre-apprenticeship opportunities; and training aligned with real-world job requirements. However, survey responses suggest that employer engagement is constrained by limited time and capacity, rather than lack of interest.

Summary of Employer Perspective

Overall, the ISP primary data indicates that broadband workforce challenges are driven by narrow labor pools, skill mismatches, and retention pressures, rather than a lack of demand. Employer needs are specific, localized, and tied closely to near-term deployment and maintenance work. These findings provide a demand-side foundation for assessing whether existing training programs and workforce systems are aligned with regional broadband needs.

Workforce Conclusions

Taken together, the workforce supply analysis and primary data from ISPs and regional stakeholders indicate that broadband workforce challenges in the NECCC and UCCC regions are structural, localized, and capacity-driven, rather than the result of short-term labor volatility.

Across both consortia regions, there is a clear mismatch between the types of workers broadband employers need and the training pathways currently available. Labor market data and program inventories show that while the region offers a range of construction, engineering, IT, and related programs, few are specifically designed to prepare workers for broadband installation, fiber optics, or network operations. Specialized fiber-optic training remains scarce, and most programs that could supply broadband workers are generalized, requiring employers to provide substantial on-the-job training.

Primary data confirms that ISPs are not seeking large numbers of degree-holders, but rather field-ready workers with applied technical skills. This disconnect suggests that existing education and training systems are not failing in scale, but in alignment with employer needs and timelines.

Employer Demand is Modest but Persistent

Quantitative estimates suggest that broadband expansion will require hundreds of workers regionally over the next decade, particularly to account for retirements and attrition. However, ISP survey data shows that near-term hiring needs are incremental and project-specific, typically involving small numbers of workers hired over time. This explains why training institutions have not seen consistent demand signals strong enough to justify new programs, even as employers report ongoing difficulty filling positions.

Rural geography, long travel distances, and small labor pools significantly constrain workforce availability across both regions. ISPs rely heavily on local hiring but face challenges recruiting and retaining workers in remote areas, particularly when larger utilities and contractors can offer higher wages elsewhere. Tribal and frontier communities face additional barriers related to remoteness, infrastructure gaps, and limited access to training. These constraints mean that importing labor is often impractical, reinforcing the importance of local workforce development.

Coordination, Not Willingness, is the Primary Limiting Factor

Across interviews and survey responses, employers, educators, workforce agencies, and governments consistently expressed interest in collaboration. However, effective coordination remains limited due to a lack of dedicated staff or intermediaries focused on broadband workforce development, misaligned planning and funding cycles, and unclear ownership of workforce development for a primarily private-sector industry. Training programs, workforce supports, and employer needs remain fragmented as a result, even where capacity and interest exist.

The broadband workforce challenges facing the NECCC and UCCC regions are not the result of insufficient demand or lack of interest. Rather, they reflect a misalignment between modest but persistent employer needs, generalized training pathways, and limited coordination capacity in a predominantly rural context. Addressing these gaps will require approaches that prioritize applied training, regional coordination, and local pipeline development, rather than large-scale or one-size-fits-all workforce programs. These conclusions inform the strategies and recommendations presented in the following sections of the report.

Challenges and Needs

Primary Data Collection

To complement secondary data and labor market analysis, this study incorporated primary data collection to capture on-the-ground perspectives from broadband employers, workforce and education systems, governments, Tribal entities, and community organizations across the NECCC and UCCC regions. The goal of this primary research was to identify perceived workforce gaps, capacity constraints, and readiness for collaboration related to broadband infrastructure deployment and maintenance.

Data Sources and Participants

Primary data collection consisted of two components:

- Surveys
  - » A regional stakeholder survey, distributed across multiple sectors involved in broadband infrastructure, workforce development, education, and community support.
  - » An additional survey targeted ISPs serving the consortia regions to assess employer needs.
- Interviews
  - » In-depth interviews with key stakeholders representing broadband providers, education and training institutions, workforce development organizations, local and Tribal governments, and community-based partners.

In total, the study collected responses from 47 organizations and conducted 13 interviews. Participants represented a wide geographic footprint across rural, frontier, and Tribal communities and included organizations serving multiple counties within each consortium region.

The stakeholder groups engaged through surveys and interviews included:

1. **Industry Employers:** internet service providers (ISPs), contractors, and subcontractors directly employed in building and maintaining broadband infrastructure and services.
2. **Training & Education Providers:** academic and vocational institutions with a vested interest in programs that advance the region's talent pipeline.
3. **Workforce Development & Placement Organizations:** business support and job placement organizations, such as workforce development boards (WDBs), American Job Centers (AJCs), Small Business Development Centers (SBDCs), and others.
4. **Local & Tribal Governments:** municipal, county, and Tribal government groups.
   - » Some separate questions in the survey were designed specifically for Tribal participants, making Tribal Governments effectively a sub-group within Local and Tribal Governments.
5. **Community & System Support Partners:** organizations that serve community and development needs, including community-based organizations (CBOs), economic development councils (EDCs), libraries, labor and union partners, and other regional intermediaries.

Limitations

Primary data collection for this study included survey responses from 47 organizations and 13 follow-up stakeholder interviews. Despite repeated outreach efforts, including direct calls to action, reminder emails, partner distribution, social media outreach, and an extended response period, the final response count does not support statistically representative findings for the region. As a result, the survey findings should be interpreted and understood as one component of the broader study evidence base rather than as a definitive measure of prevalence across all stakeholder groups in the North State.

Participation and qualitative depth were not evenly distributed across stakeholder groups. Within the coded interview dataset, Tribal community leadership and rural ISPs contributed a comparatively large share of coded segments. At the same time, the study documents that broadband providers in the region often operate with small teams, highly localized demand, and persistent workforce and retention pressures—conditions that may have limited broader participation. Code frequency reflects the interview sample and should not be interpreted as proportional prevalence across all stakeholder groups. Accordingly, findings are best understood as a regional assessment of recurring themes and shared conditions, rather than a comprehensive account of every stakeholder experience, employer condition, or local market dynamic across the North State.

Survey Design

The regional stakeholder survey was structured using a bucketed design, with a shared set of general questions followed by specific questions tailored to respondents based on their stakeholder group (e.g., ISPs, education providers, workforce agencies, governments, community organizations, etc.). This approach allowed for both cross-sector comparison and role-specific insight. Survey questions focused on workforce demand and hiring challenges, skill gaps and training needs, capacity to support internships, apprenticeships, or partnerships, barriers related to geography, funding, and coordination, and interest in regional collaboration. Survey results were analyzed by stakeholder type and then synthesized across groups to identify recurring patterns and points of divergence. Please refer to Appendix E to view the full stakeholder survey and its results.

An additional targeted ISP survey was administered to capture workforce demands and constraints from the perspective of broadband employers. The survey consisted of 10 questions focused on current workforce composition and service context, anticipated hiring needs by role, difficulty filling key positions, preferred qualifications, barriers affecting recruitment and retention in rural service areas, and employer interest in engaging with training providers or workforce partners. Responses were analyzed to identify patterns in role demand, skill mismatches, and capacity constraints common among regional providers. Please refer to Appendix F to view the full ISP-specific survey and its results.

Interview Approach

Interviews were conducted using semi-structured protocols tailored to each stakeholder category. While question sets varied by role, interviews consistently explored topics such as workforce shortages and hiring constraints, training availability and alignment with employer needs, coordination challenges across systems, regional and place-based barriers, and opportunities for collaboration or shared solutions.

Most interviews were conducted with attribution, while one interview was conducted anonymously and used only to support aggregate thematic analysis. Interview transcripts were coded using a structured codebook developed from the project proposal and interview questions, allowing for systematic comparison across sectors. Please refer to Appendix G for a list of interview questions.

Overview of Primary Data

Selected Responses from Stakeholder Survey

The stakeholder survey featured nearly 50 distinct questions distributed between five different stakeholder groups. Depending on selected responses, respondents were sorted into buckets with questions tailored to their stakeholder group; at most, a respondent would only be served 16 questions in the course of the survey.

Below is a small selection of survey responses that provided key insights for our findings. The complete survey results (excluding confidential responses) can be found in Appendix E.

Table 25: Industry Employers, Question No. 5
How difficult is it to find candidates with the following skills?
(Total: 6 participants)

Skill	1 Extremely Easy	2 Somewhat Easy	3 Neither Easy Nor Difficult	4 Somewhat Difficult	5 Extremely Difficult
Fiber-optic splicing and testing			2	2	2
Construction techniques			2	3	1
Network troubleshooting and diagnostic			2	1	3
Safety protocols and OSHA compliance	1	2	1	1	1
Equipment operations			3	2	1
Project management and multitasking		1	4	1	
GIS mapping and documentation		1	2	2	1
Basic electrical knowledge		1	2	2	1
Customer service and communication		2	2	2	

Providers reported that several technical skills are difficult to find among job candidates. Network troubleshooting, construction techniques, fiber-optic splicing, and equipment operations were most often rated as somewhat or extremely difficult to hire for. Skills such as project management, GIS mapping, basic electrical knowledge, and customer service were also challenging for some providers to a lesser degree. Only safety protocols and OSHA compliance received one "extremely easy" rating, but most respondents found this skill somewhat difficult to hire for. Providers faced the greatest hiring challenges for hands-on technical and field-based skills, indicating the need for more targeted training and workforce development.

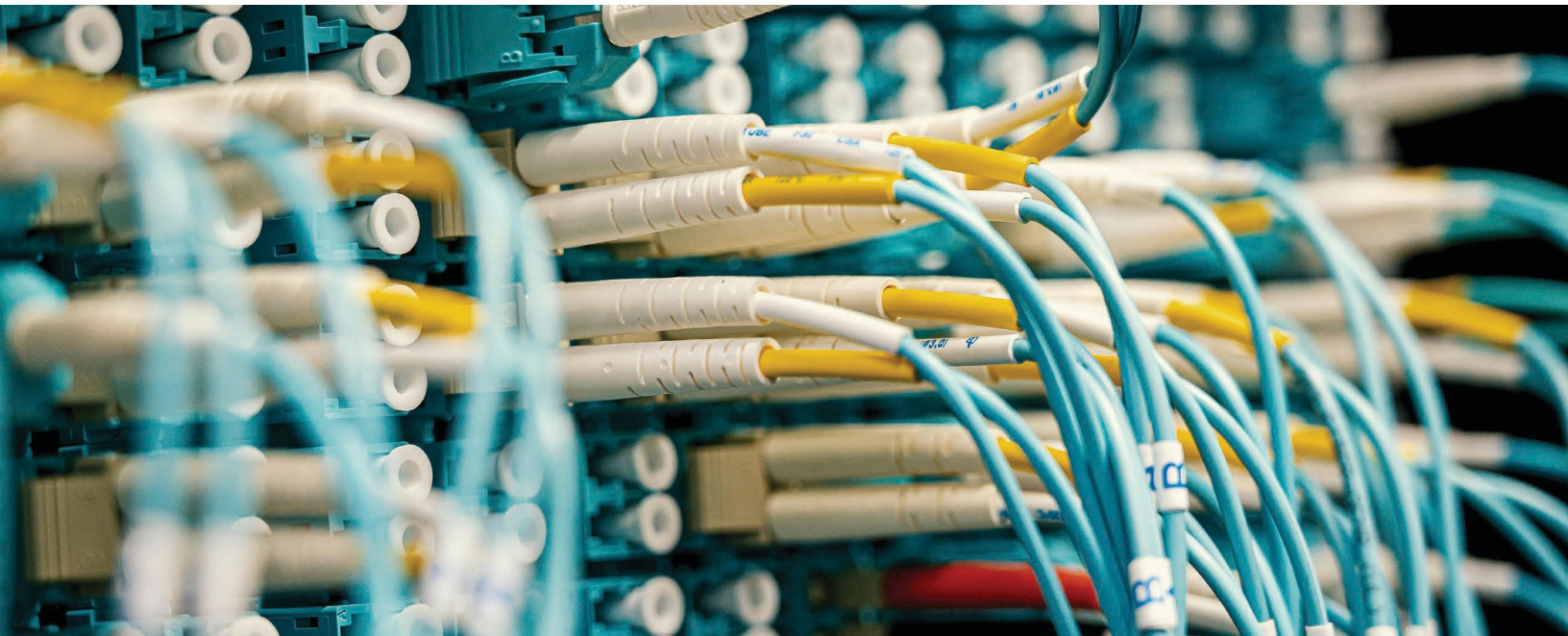
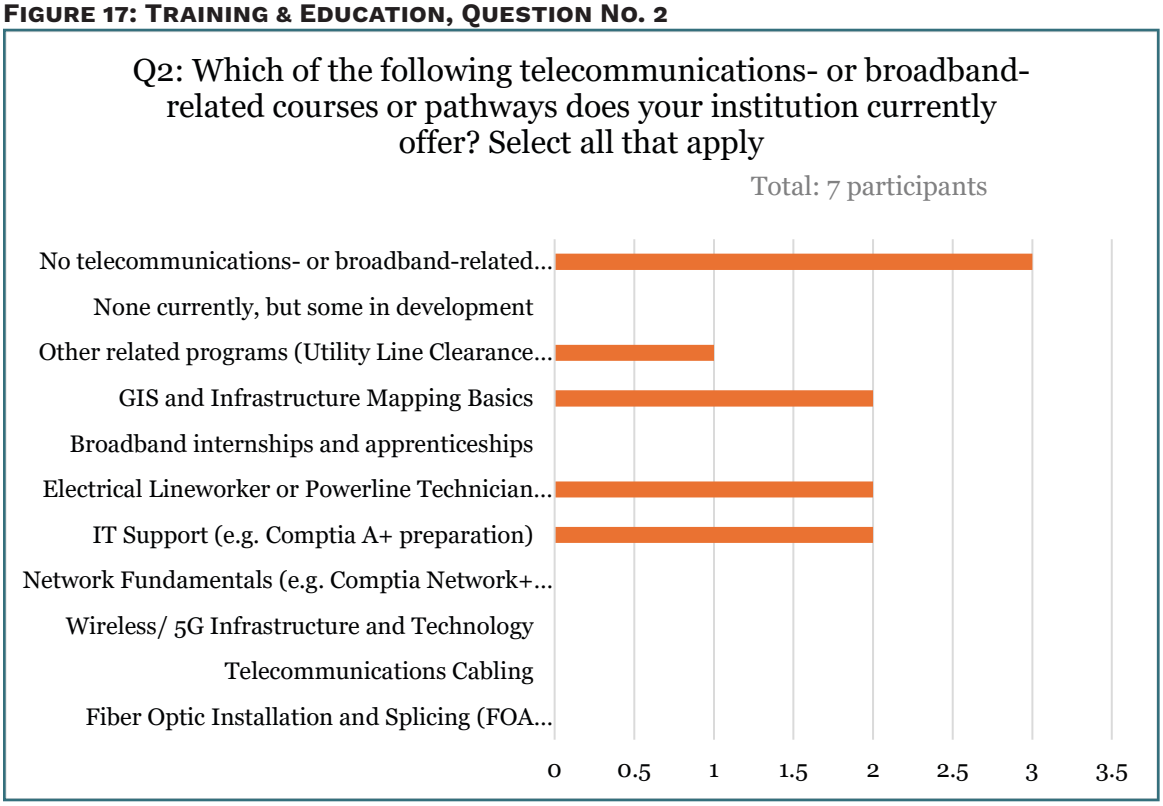
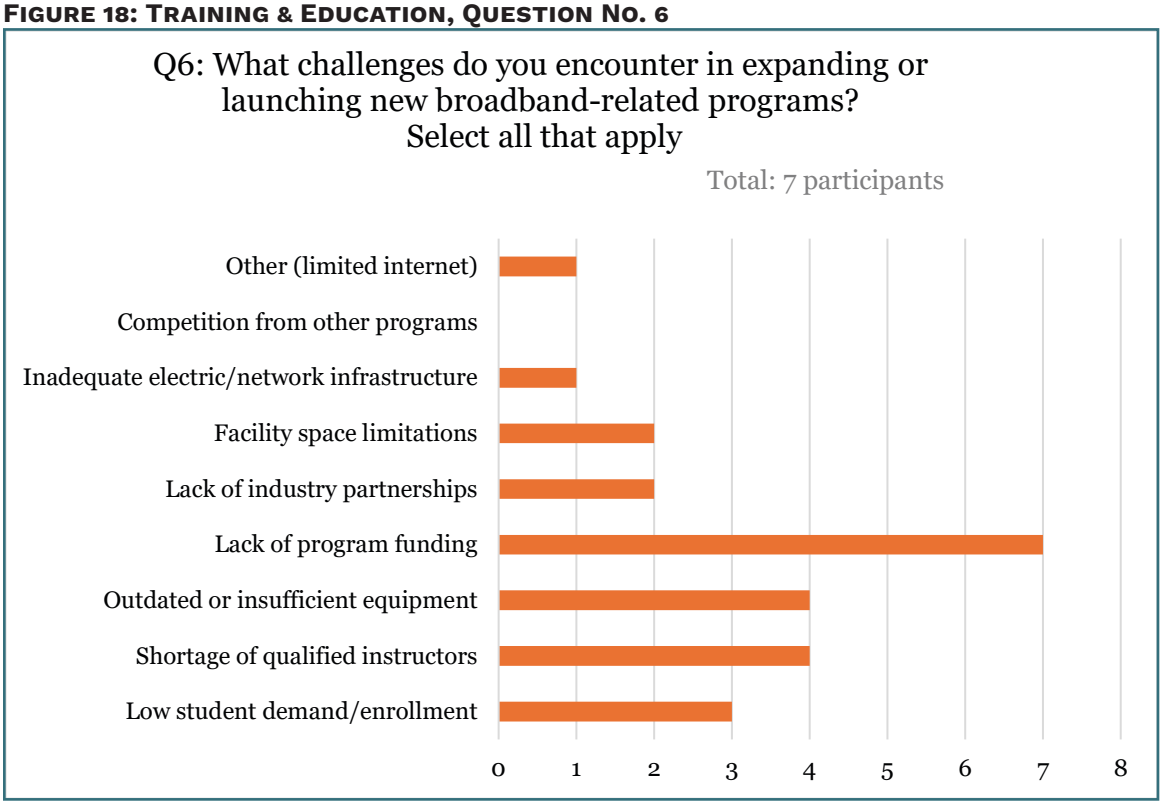


Figure 17: Training & Education, Question No. 2



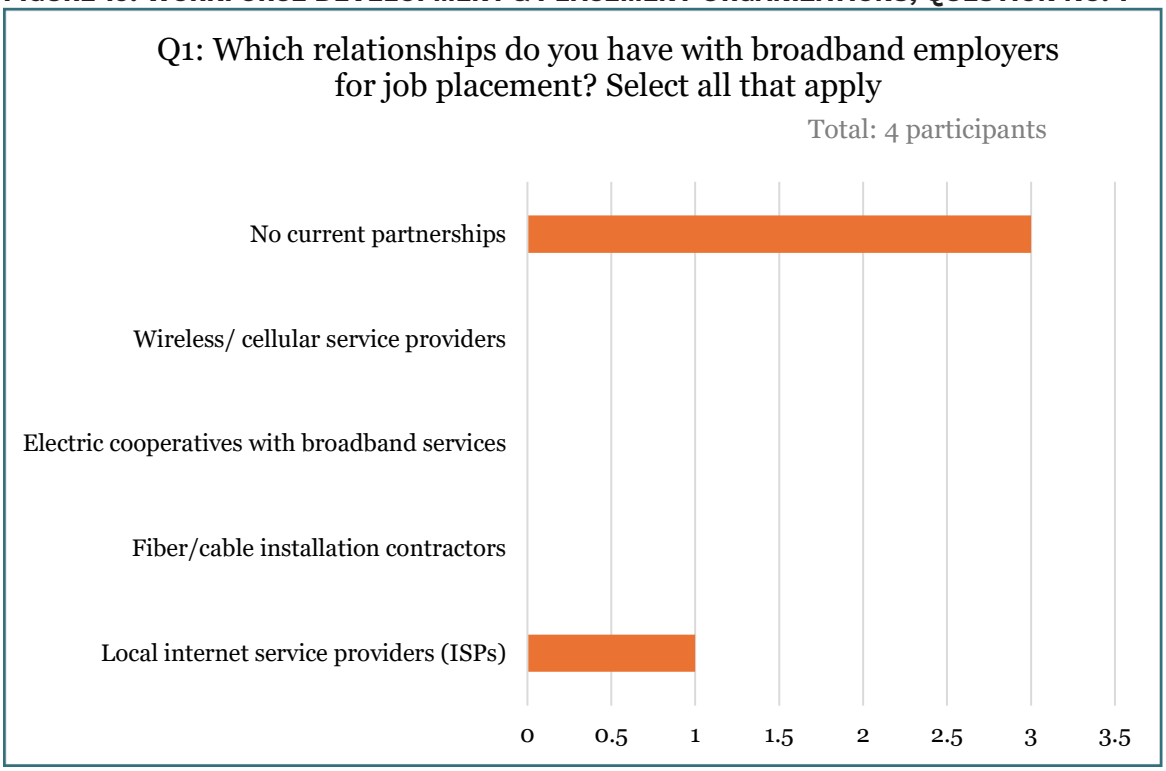
Most institutions indicated they offer only a few broadband-related programs. The most common courses are IT, GIS, and infrastructure mapping (each offered by three institutions). Three institutions also reported offering no telecommunications or broadband programs, highlighting a significant training gap. A few institutions offer lineworker training, internships, or other related programs, but none reported to be offering specialized courses such as fiber-optic installation, cabling, or wireless/5G technology.

Figure 18: Training & Education, Question No. 6



Institutions face several challenges to expanding or launching broadband-related programs. All seven respondents cited a lack of program funding as a common problem that they face. Other frequently reported barriers include a shortage of qualified instructors, outdated or insufficient equipment, and low student demand. Additional challenges, such as limited facility space, lack of industry partnerships, inadequate electrical/network infrastructure, and competition from other programs, were identified by smaller numbers of respondents. One institution also noted that limited internet access creates difficulties in delivering training. Overall, the responses show that funding limitations and staffing/equipment gaps are the primary obstacles to expanding broadband training and education in the region.

Figure 19: Workforce Development & Placement Organizations, Question No. 1



Most workforce development organizations indicated no current partnerships with broadband employers, with three out of four respondents selecting that option. Only one organization indicated a relationship with local ISPs. None of the respondents reported to have partnerships with fiber contractors, wireless providers, or electric cooperatives. The data suggests that job placement connections between workforce programs and broadband employers are minimal, indicating an opportunity for stronger collaboration.

Summary of Interviews

Using responses from the stakeholder survey, we identified parties who were interested in sharing additional broadband-related insights in a follow-up interview. We conducted 13 in-depth interviews in total. The primary objective was to assess regional broadband needs and identify opportunities for improving internet access in North State communities.

Interview transcripts were coded using a structured codebook developed from the project proposal and interview questions, allowing for systematic comparison across sectors. To ensure coding consistency and reliability, we utilized Claude (Anthropic) as an analytical support tool, with NSPDC staff retaining responsibility for the codebook, interpretation, and final analysis. Each transcript was processed to identify segments aligned with codebook categories while preserving the original language and context of participant statements. The codebook consisted of 8 thematic code

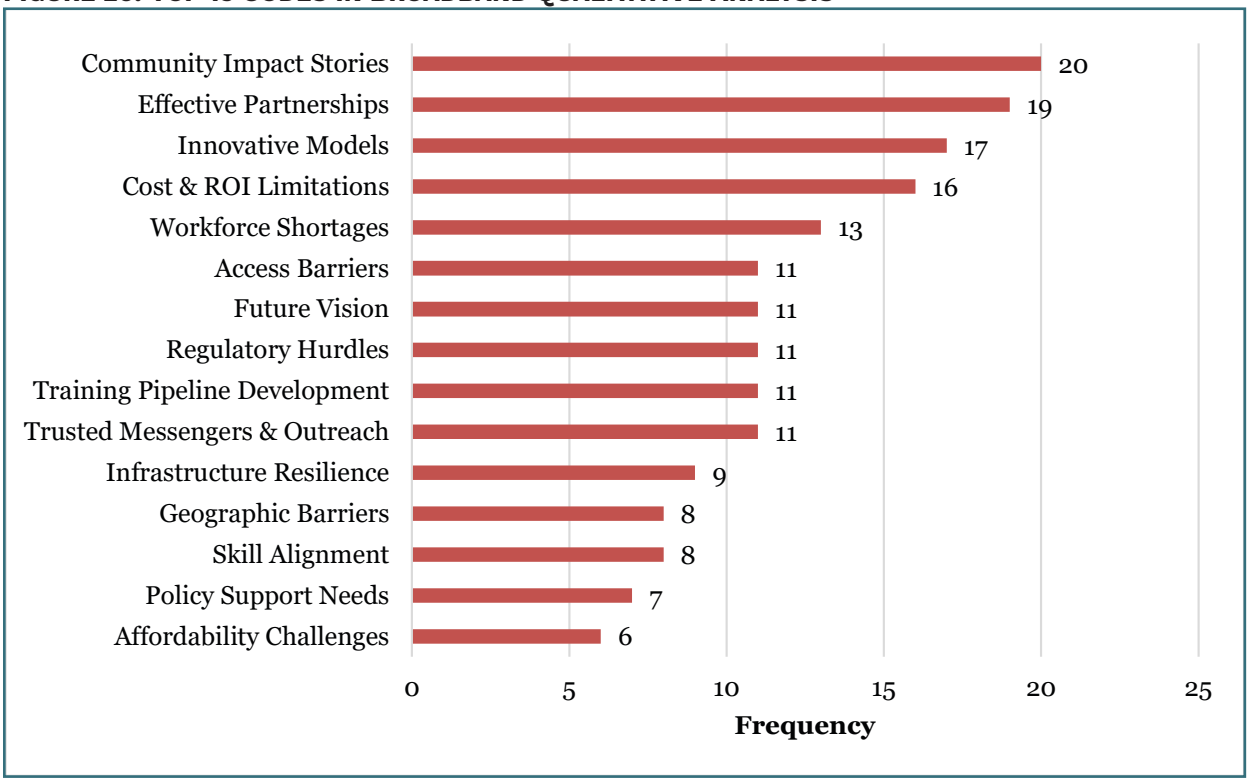
categories and 64 individual codes distributed across these categories. The code categories are shown in the table below. A full list of codes and their definitions can be found in Appendix H.

Table 26: Summary of Codes for Interview Qualitative Analysis

Thematic Category	Codes
Equity & Inclusion	7 codes
Workforce Development & Training	14 codes
Regional Collaboration & Coordination	8 codes
Infrastructure Challenges	5 codes
Economic & Community Impact	8 codes
Policy & Strategic Planning	7 codes
Digital Inclusion & Literacy	7 codes
Solutions & Opportunities	8 codes

After coding the interview transcripts, we assessed which codes appeared with the highest frequency across all interviews. The figure below shows the 15 codes that appeared most frequently in interview segments.

Figure 20: Top 15 Codes in Broadband Qualitative Analysis

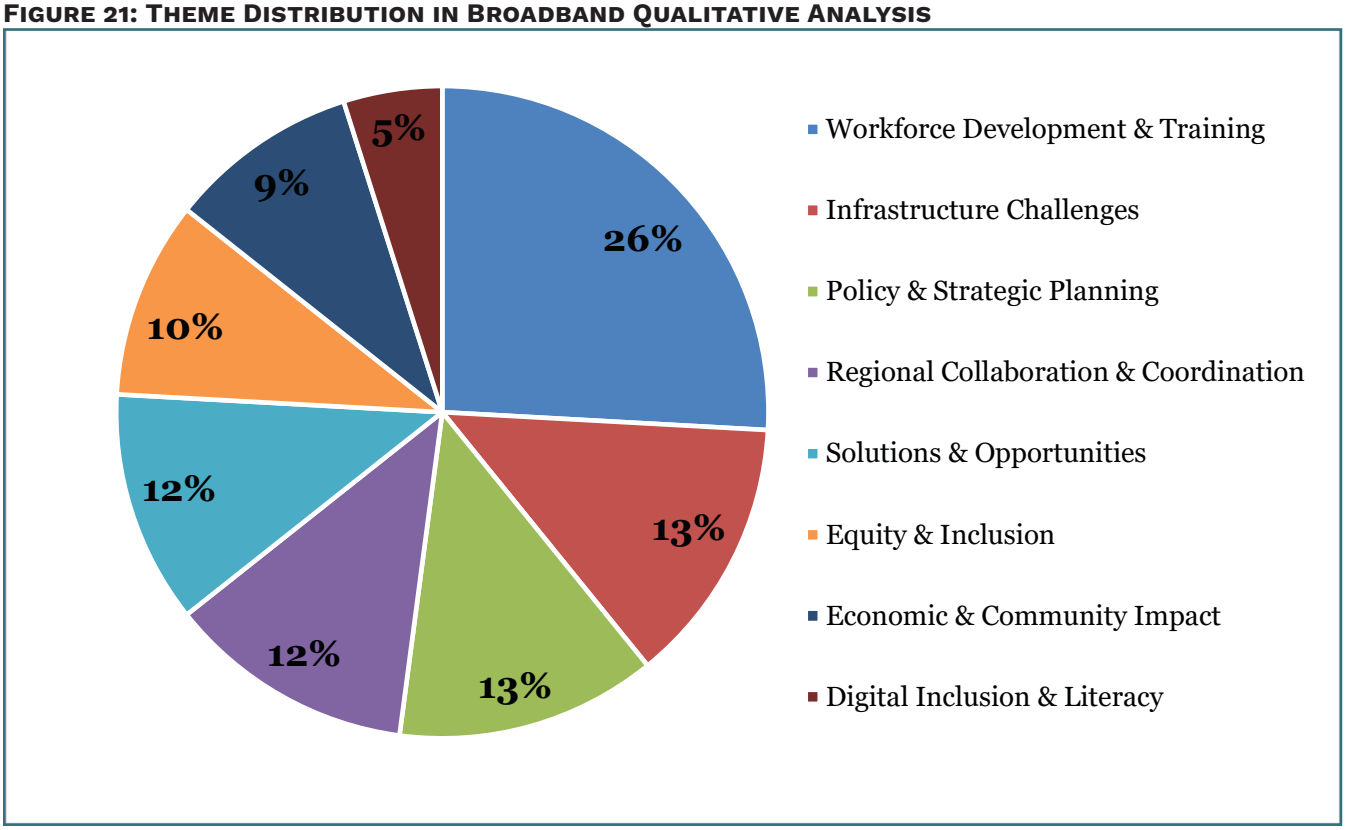


Community Impact Stories (20 segments) ranks first in the bar chart, indicating that stakeholders consistently relayed broadband challenges and opportunities from specific case examples rather than abstract frameworks. The subsequent prevalence of Effective Partnerships (19 segments) and Innovative Models (17 segments) demonstrates that non-traditional implementation approaches and collaborative governance structures take part in stakeholder conceptualizations of successful broadband deployment.

Cost & ROI Limitations appear in 16 segments, reflecting persistent concerns regarding financial viability in low-density service areas where traditional market mechanisms fail to support infrastructure investment. The distribution of workforce-related codes, including Workforce

Shortages (13 segments), Training Pipeline Development (11 segments), and related capacity concerns indicates that human capital constraints represent a significant barrier with infrastructure and funding challenges. The relatively even distribution across mid-tier codes (ranging from 6 to 11 segments) suggests that regional stakeholders should address multiple challenge domains including regulatory compliance, workforce development, technical infrastructure, and cross collaboration.

Figure 21: Theme Distribution in Broadband Qualitative Analysis



Workforce Development & Training accounts for 26 percent of all coded segments, which is more than double any other single theme. This reflects a fundamental challenge across stakeholder groups: broadband infrastructure deployment is ultimately constrained not by technology availability but by the skilled workforce needed to design, build, maintain, and support these networks. It also signals a critical gap between infrastructure funding availability and implementation capacity.

Three themes cluster in the 12–13 percent range: Infrastructure Challenges, Policy & Strategic Planning, and Regional Collaboration & Coordination. This near-parity suggests these domains should be considered as equally important and interconnected. Infrastructure challenges encompass both physical deployment hurdles and economic viability concerns. Policy issues affect regulatory frameworks, permitting processes, and strategic planning needs. Regional collaboration addresses the coordination challenges to expand broadband access.

Solutions & Opportunities, Equity & Inclusion, and Economic & Community Impact each capture 9–10 percent of coded segments. Solutions & Opportunities theme highlights stakeholders' long-term vision and their active engagement in identifying effective solutions rather than merely identifying problems. Equity & Inclusion reflects ongoing attention to workforce recruitment issues. Economic & Community Impact identifies how broadband would help boost the economy and make a positive impact for communities in the North State region.

Findings from Primary Data

Primary data collected through stakeholder surveys and interviews reveal a consistent set of workforce-related challenges and needs across the NECCC and UCCC regions. While experiences vary by geography and stakeholder type, several cross-cutting patterns emerge when primary data is viewed in the context of regional demographics, land use, and business structure.

Workforce Gaps are Persistent but Incremental

Employers and system partners consistently described broadband workforce gaps as ongoing and incremental. ISPs reported modest but recurring hiring needs tied to project schedules, maintenance requirements, and staff turnover. These needs are compounded by an aging workforce and limited local labor pools, particularly in rural, frontier, and Tribal communities.

Rather than anticipating large waves of new hires at once, employers emphasized difficulty sustaining sufficient staffing over time. This pattern aligns with the business context of the region, where small and mid-sized firms dominate and large-scale hiring surges are uncommon.

Skill Mismatch is a Larger Constraint than Worker Availability

Across interviews and surveys, stakeholders emphasized that workforce challenges stem less from a lack of interested workers and more from a misalignment between available skills and job requirements. Employers reported difficulty finding candidates with hands-on, field-ready experience in fiber installation, construction, network operations, and troubleshooting.

Education and workforce partners echoed this concern, noting that most existing programs prepare students for adjacent industries (construction, electrical, IT), but do not directly translate into broadband-specific readiness. As a result, employers rely heavily on on-the-job training, increasing both cost and risk, particularly for small providers.

Geography and Land Use Intensify Recruitment and Retention Challenges

Stakeholders consistently identified geography as a major constraint on workforce development. Long travel distances, dispersed populations, rugged terrain, and limited housing options make it difficult to recruit workers from outside the region and challenging to retain locally trained staff.

Local hiring is therefore both a preference and a necessity. However, when trained workers leave for higher-paying opportunities in larger markets, providers face repeated training cycles without long-term workforce stability. These dynamics are especially pronounced in Tribal and post-disaster communities, where infrastructure gaps and remoteness intersect.

Training Systems are Interested but Structurally Constrained

Education and training institutions expressed strong interest in supporting broadband workforce development, but primary data highlights several systemic barriers:

- Limited funding for program development and equipment
- Lengthy curriculum approval processes
- Instructor qualification and recruitment challenges
- Difficulty justifying new programs without sustained employer demand

Institutions emphasized that they are more responsive to clear, consistent demand signals, rather than anticipated future needs. This contributes to a lag between employer needs and training availability, even when interest exists on both sides.

Coordination Gaps Limit System Effectiveness

Across stakeholder groups, primary data points to coordination gaps as a central limiting factor. Employers, educators, workforce agencies, and governments all reported operating largely within their own systems, with limited mechanisms for shared planning, data exchange, or sustained collaboration.

Importantly, this fragmentation does not reflect lack of willingness. Survey and interview participants consistently expressed openness to partnerships, apprenticeships, and shared training efforts. Instead, the absence of dedicated coordination capacity and clearly defined ownership of broadband workforce development inhibits progress.

Broadband Workforce is Closely Linked to Community Outcomes

Primary data shows that broadband workforce development is viewed not only as an employment issue, but as a community resilience strategy. Stakeholders connected workforce capacity to:

- Emergency response and disaster recovery
- Youth retention and outmigration
- Tribal self-determination and sovereignty
- Access to education, health, and economic opportunity

This broader framing reinforces the importance of workforce strategies that are locally grounded and responsive to community context.

Conclusion of Primary Data Findings

Taken together, primary data indicates that broadband workforce challenges across the NECCC and UCCC regions are structural and place-based, shaped by geography, business scale, and system fragmentation. Employers face persistent skill gaps and retention pressures, training systems lack the flexibility to respond quickly, and coordination across sectors remains limited.

Interview Highlights

The following highlighted themes draw directly from stakeholder interviews conducted as part of this study. They are intended to illustrate how workforce, training, and coordination challenges intersect in practice across the NECCC and UCCC regions.

Rural Staffing Constraints: Retention Risk and Contractor Availability

Rural internet service providers consistently described a reliance on local hiring driven by geography, travel distance, and the impracticality of importing labor into remote service areas. Providers reported hiring entry-level workers locally and investing heavily in on-the-job training to build technical capacity.

Several ISPs emphasized that this approach creates vulnerability when trained workers leave for higher-paying opportunities elsewhere. Providers noted that recruiting and retaining workers in professional and technical roles is particularly difficult, as larger markets are often able to offer wages that smaller, rural providers cannot match.

With a limited local hiring pool, some ISPs rely on contractors and specialized subcontractors to complete projects, but have noted that contractor availability can itself be a constraint. As one provider stated:

> We're really challenged as far as finding enough contractors to complete the project. There's a shortage of qualified contractors to do the underground construction, and a shortage of contractors to splice the fiber.
>
> — *Frank Leschinsky, Volcano Communications Group*

Broadband construction in rural and frontier areas can be difficult to staff because projects are dispersed, travel times are long, and mobilizing crews can be costly and inefficient. Contractors and specialized subcontractors often operate on tight margins and must prioritize predictable workflows. When a project site is several hours away from a contractor's home base, the cost of travel time, lodging, per diem rates, transporting equipment, and lost productivity can outweigh the value of the job.

Training Interest Exists, but Program Development Lags

Education and training leaders described a clear willingness to support broadband workforce pathways, but they also described program creation as a constrained, multi-step process, especially in rural regions where staffing and equipment are limited. At the community college level, new workforce programs require more than student interest; they require instructors, equipment, and time to move curriculum through formal approval channels. As one college leader put it, building a new program is "a laborious process," particularly when it depends on finding qualified instructors and acquiring specialized equipment.

> We don't have the capacity to expand. … [A new program] would require instructors … and specialized equipment … and it's a laborious process.
>
> — *Bill McGinnis, Butte-Glenn Community College District*

The same interview emphasized that broadband can be difficult to translate into a single "program" because the workforce need spans multiple domains (construction, electrical work, and IT) making it harder to define a clean pathway without sustained employer demand signals and a clear occupational target.

> We don't really know yet what the specific broadband jobs look like. Is it construction? Is it electrical? Is it IT? Until we start seeing consistent demand, it's hard to build a program around it.
>
> — *Bill McGinnis, Butte-Glenn Community College District*

Adult education leaders described a related challenge from the learner side: demand for training is not always visible in rural communities because people often do not request opportunities they do not believe exist or cannot access. One interviewee characterized this as "latent interest," explaining that awareness and perceived availability shape whether people express demand.

> It might be latent interest. … I'm not gonna say I want popcorn if I don't think popcorn's available.
>
> — *Molly Stimpel, Shasta-Tehama-Trinity Adult Education Consortium*

Adult education leaders also described the practical limits many rural learners face when programs are structured around semester-length attendance. Working adults balancing employment and family responsibilities may not be able to participate in longer formats, even when they are interested.

> Timing is a big issue. Being able to attend semester-length classes can be very challenging for someone who's working and caring for family members.
> — *Molly Stimpel, Shasta-Tehama-Trinity Adult Education Consortium*

Across these interviews, the core issue was not lack of motivation to support broadband workforce development, but the reality that building and scaling new training requires inputs that are difficult to assemble quickly in rural regions: qualified instructors, equipment, curriculum timelines, and accessible formats.

Broadband Workforce as a Community Stability Strategy

Michael Y. Marcks, Vice Chairperson of the Habematolel Pomo of Upper Lake, described broadband workforce development as a long-term community capacity strategy—one shaped by small-community scale, remote geography, and the need to build local technical confidence over time. He explained that the Tribe's most practical entry point is early exposure for youth, noting that "being such a small tribe" affects how quickly a pipeline can form.

> Being such a small tribe, we're at that age group where we have kind of a gap … the majority of our young people are 12 and under … so that's where we want to start.
> — *Michael Y. Marcks, Vice Chairperson, Habematolel Pomo of Upper Lake*

In that context, the Vice Chairperson emphasized mentorship and representation as the mechanism that turns technical work from an abstract idea into something achievable for young people. He described how seeing someone relatable doing the work expands one's sense of what's possible:

> Seeing someone that they can relate to doing these jobs helps tremendously. … Doing those jobs makes it feel like it's attainable.
> — *Michael Y. Marcks, Vice Chairperson, Habematolel Pomo of Upper Lake*

He also described a practical challenge in maintaining those supportive relationships in remote settings, especially when teacher and staff turnover disrupts continuity and trust over time.

> The remoteness makes it hard to keep that connection … even with a teacher, and then that teacher transfers away … kids lose that connection …
> — *Michael Y. Marcks, Vice Chairperson, Habematolel Pomo of Upper Lake*

While much of his focus was on building early pathways and sustained support, the Vice Chairperson also tied workforce development directly to broadband expansion needs on the ground. He emphasized that deployment ultimately depends on practical "last-mile" capabilities—skills that can be taught and grown locally when pathways are accessible.

> I think the key is that last-mile … trenching, wiring, fiber-optic, and mapping. … We need the expertise to get it from there … and get it to the homes.
> — *Michael Y. Marcks, Vice Chairperson, Habematolel Pomo of Upper Lake*

Strategies, Tools, and Resources

Primary data collected for this assessment indicate that broadband workforce gaps in the region are structural. Employer demand is modest but persistent, often project-driven and variable by geography, with most providers anticipating hiring small numbers per role rather than scaling rapidly. Even at this scale, employers report difficulty finding qualified local workers for field-based roles, and importing labor is often impractical in rural areas, creating capacity constraints that can slow deployment and ongoing maintenance work even when projects and funding are available.

Employers prioritize field readiness and demonstrated applied competence over formal degrees. The most difficult roles to fill require hands-on skills such as fiber installation and splicing, network construction and troubleshooting, and equipment operation; on-the-job training remains a dominant entry pathway, and retention pressures persist as newly trained workers are recruited into higher-paying opportunities elsewhere. At the same time, training supply does not consistently align with broadband-specific needs: education and training providers express interest in expanding offerings, but cite constraints including funding, instructor availability, equipment costs, and curriculum approval timelines, with broadband-specific training availability uneven across the region.

Primary data also indicates that the limiting factor is often coordination, not unwillingness. Stakeholders across sectors support collaboration, partnerships, and apprenticeship models, but constraints persist: relationships between workforce organizations and broadband employers are limited in practice, broadband-specific outcomes are not consistently tracked, and education and employer timelines are frequently misaligned. Local and Tribal governments cite staff capacity constraints and unclear roles in workforce development for a largely private-sector industry, reinforcing the need for shared planning mechanisms and dedicated coordination capacity to translate stakeholder interest into functional pipelines.

Finally, rural, Tribal, and post-disaster communities face compounded constraints: small labor pools, geographic isolation, transportation barriers, and complex rebuilding conditions can reduce participation in training pathways and increase the difficulty and cost of both hiring and deployment. Workforce strategies must therefore be place-based and adaptable to avoid widening disparities across communities with fundamentally different conditions and capacities.

For these reasons, the solution opportunities that follow are organized by stakeholder groups. Not every solution requires action from every bucket. Instead, roles are assigned where they most directly address the barriers identified in primary data.

Summary of Strategies, Tools, and Resources

Based on the primary and secondary data collected for this report and their subsequent findings, we submit the following recommendations for strengthening broadband workforce and infrastructure development in the North State and mitigating known barriers. These recommendations are summarized below and categorized by stakeholder group. Subsequent sections address each recommendation in greater detail.

Table 27: Summary of Strategies by Stakeholder Group

Stakeholder Group	Strategy
Industry Employers	**Provide a recurring "demand signal"** by sharing projected roles, locations, and minimum requirements (even ranges), so training partners can justify cohorts and equipment despite incremental hiring patterns.
	Define and use a shared "field-ready" baseline (what a new hire must do safely on day one) and validate it with work samples/task lists so training aligns to real jobsite expectations.
	Commit to low-lift work-based learning (pooled internships, pre-apprenticeship slots, structured OJT) with a common supervisor checklist, allowing small employers to participate without building their own program infrastructure.
	Reduce fixed training costs by donating/sponsoring consumables (fiber, connectors, enclosures) or lending equipment for mobile labs/shared cohorts.
	Treat retention as an operating requirement by publishing wage progression steps and using mentorship/supervisor feedback loops to reduce the churn that drains rural employer capacity after training investments.
Training & Education Providers	**Deliver training in short, repeatable, lab-heavy blocks** (noncredit where possible) that prioritize hands-on readiness over seat-time, reflecting employer preference for applied competence over degrees.
	Integrate broadband skill modules into existing programs (construction, electrical, IT) rather than waiting for full new program approvals, reducing the lag caused by curriculum timelines and instructor constraints.
	Use shared lab capacity to reduce fixed costs and expand rural access by pooling equipment, rotating lab kits, or using mobile labs so hands-on training can reach smaller communities without every site building a permanent broadband lab.
Workforce Development & Placement Organizations	**Publish a training inventory and seat-capacity view** (what programs are available, when, where, how many seats) so employers and workforce partners can plan placements instead of relying on informal networks.
	Align cohorts to project timing by running smaller, more frequent intakes when needed and coordinating start dates with known deployment windows, limiting talent loss from trained workers who seek employment elsewhere.
	Build a shared intake-and-placement pipeline for broadband roles by screening for field realities (transport, schedule feasibility, readiness for outdoor work) and pairing placements with supportive services (tools/PPE, travel assistance) to improve completion and retention.
Local & Tribal Governments	**Reduce rural training overhead** by providing public facilities for training delivery (Tribal facilities, fairgrounds, schools, public works yards) and supporting permitting/logistics for temporary or mobile labs, so hands-on training can reach smaller communities without permanent buildouts.
	Use procurement and project agreements to enable local pipelines (where legally feasible) by requiring a simple workforce-readiness addendum that names the recruitment approach and whether OJT or apprenticeship will be used, without imposing one-size-fits-all mandates.
	Support place-based and Tribal-led pathway design as resilience capacity by aligning workforce planning with local governance and sovereignty contexts and connecting workforce strategy to disaster recovery and long-term community stability goals (not only near-term hiring).
Community & System Support Partners	**Operate the regional coordination entity and maintain a single source of truth** that keeps partners aligned (who is training what/when/where, who is hiring for what under which prerequisites, and who to contact), so participation does not depend on personal relationships and rural/Tribal partners can plug in consistently.
	Operate shared recruitment, screening, and navigation to supports by coordinating outreach and using a common intake screen for reliability barriers (transportation, childcare, schedule realism, readiness for outdoor work) and connecting participants quickly to supportive services that reduce drop-off.
	Manage pooled placements and the performance feedback loop by coordinating shared work-based learning administration (templates, paperwork, matching, supervisor rubrics) and tracking outcomes that reflect real constraints (supervisor-rated readiness and early retention), then feeding results back to training and workforce partners for rapid adjustment.

Industry Employers

Provide a Recurring Demand Signal

A demand signal is a clear, employer-authored statement of need that translates hiring into trainable specifications. In the absence of that clarity, education and training partners report difficulty designing broadband-specific pathways because they cannot confidently define local job requirements or demonstrate demand sufficient to justify program buildout. As Bill McGinnis of Butte-Glenn Community College District explained, "Until we start seeing consistent demand, it's hard to build a program around it." This demand-signal gap is not about unwillingness to collaborate but about limited time and capacity to engage consistently and the absence of shared planning mechanisms that make engagement efficient.

Table 28: Strategy: Provide a Recurring Demand Signal

Why it Matters	• **Training investment risk:** Broadband-specific training requires specialized equipment and instructor capacity, and program development can be slow; without credible employer demand, institutions remain cautious about launching or scaling offerings. • **Misalignment of readiness expectations:** Employers emphasize applied skills and reliability over degrees; a demand signal makes the field-ready bar explicit so training aligns to real tasks rather than generalized construction or IT proxies. • **Coordination friction:** Multiple systems (employers, colleges, workforce agencies, governments) may agree on the problem, but without a shared plan, efforts remain fragmented and outcomes go untracked.
How It's Used	• **Education and training providers** use it to shape curriculum around real job tasks, justify lab investments, and size cohorts appropriately for small rural hiring volumes. • **Workforce organizations** use it to recruit candidates who match field constraints (reliability, transportation feasibility, safety readiness) and to target supportive services that reduce drop-off between training and job placement. • **Local and Tribal governments and regional partners** use it to align workforce efforts with infrastructure timelines and local conditions, especially where hiring is tied to specific projects and where local capacity constraints slow deployment even when funding is available.
What a "Good" Demand Signal Includes	• **Priority roles and role definitions:** Identify the specific roles most needed (e.g., fiber installers/splicers, construction/line workers, network/field technicians, project managers/supervisors) and define the core job tasks for each. • **Day-one field readiness:** Specify what a new hire must be able to do safely on day one. This can be presented as task lists, work samples, and readiness expectations (not degree requirements). • **Hiring ranges and geography:** Provide a realistic range for expected hiring by role and where work will occur, reflecting the project-driven nature of demand. • **Timing window and project context:** Indicate whether needs are tied to deployment peaks, ongoing maintenance, restoration/repair work, or a specific set of builds.
How to Do It	1. **Assign a workforce point-person** who can provide updates and respond to partner questions efficiently. 2. **Complete a one-page Employer Demand Signal form** covering roles, hiring ranges, locations, minimum competencies, and readiness bar. This can be aggregated across providers to protect sensitive details while still creating a usable regional picture. 3. **Validate readiness expectations with evidence** by sharing the actual tasks and tools used in the field (e.g., basic fiber handling, construction techniques, troubleshooting). 4. **Offer at least one "proof of pull" commitment** (interviews, conditional offers, job shadows, or structured OJT opportunities) so training participation is rational for jobseekers and justifiable for institutions. 5. **Support training realism where possible** by donating or sponsoring consumables and equipment that keep labs aligned with real field conditions (e.g., fiber, connectors, enclosures).

Example	Industry employers can standardize inputs using a simple format: • Employer type (ISP/contractor/subcontractor) and service area • Priority roles (select from a shared list) • Expected hiring range per role (range is acceptable) and location(s) • Minimum "day-one" tasks (checklist) and must-have safety requirements • Preferred backgrounds (e.g., construction experience) and disqualifiers • Work-based learning availability (yes/no; type) • Interview/conditional-offer commitment for completers (yes/no; parameters) • Point of contact for coordination and supervisor feedback

Define and Use a Shared Field-Ready Baseline

A field-ready baseline is a shared definition of what a new hire must be able to do safely on day one, plus the minimum expectations for reliability and jobsite conduct. It is not a degree requirement and not simply a list of certifications. It is a short, observable set of tasks and safety behaviors that employers agree indicate a candidate is prepared to enter supervised field work and continue learning effectively on the job.

Table 29: Strategy: Define and Use a Shared Field-Ready Baseline

How It's Used	• **Employers** use it to screen and hire consistently for entry-level field roles and reduce "unknowns" in early performance. • **Training providers** use it to design short, lab-heavy modules that teach the specific job tasks employers struggle to hire for. • **Workforce partners** use it to recruit and screen candidates who can meet the real conditions of field work, and to target supportive services that reduce early dropout and turnover. • **Local and Tribal partners** can use it to align place-based training delivery to local employment needs, particularly where rural constraints intensify workforce shortages.
How to Do It	1. **Select priority roles based on real hiring needs.** Primary data indicates common hiring needs include project managers/supervisors, fiber installers/splicers, construction/line workers, and network/field technicians. 2. **Define day-one safe participation for each priority role.** For each role, employers specify what a new hire must be able to do safely and reliably on day one. The goal is clarity on applied readiness (not additional credential barriers) because employers report degrees and formal academic credentials are not primary screening criteria. 3. **Create a one-page job task analysis and readiness checklist.** The most effective format is short and operational: tasks performed, tools used, safety risks, and the expected proficiency standard. 4. **Validate the baseline with work samples.** A baseline becomes usable for training when it includes at least one replicable work sample per role family (e.g., a short demonstration or practical check aligned to what employers say is hard to hire for: fiber work, troubleshooting, field construction techniques, etc.). 5. **Make the baseline credible by agreeing how employers will use it.** The baseline functions best when employers explicitly state how it will affect hiring (e.g., using it as a preferred qualification and committing to interviews or conditional consideration for completers of training mapped to the baseline). 6. **Build a feedback loop so the baseline stays accurate.** Employers can provide a simple supervisor-rated readiness check after hire (e.g., "ready / close / not ready" against the baseline) so training partners can adjust quickly.
Tools and Deliverables	• Field-ready baseline (1–2 pages) for each priority role family • One-page Job Task Analysis per role (tasks, tools, safety risks, proficiency standard) • Work sample / practical check per role family (short, repeatable) • Supervisor feedback rubric to validate whether "field-ready" matches jobsite reality • Training crosswalk that maps each baseline item to a teachable module and (where useful) to industry credentials.

Commit to Low-Lift Work-Based Learning

Low-lift work-based learning is a pragmatic response to the primary data findings. It creates structured exposure to real jobsite expectations while keeping the employer commitment manageable. The goal is not to require every ISP or contractor to become a training provider, but to establish repeatable placement options (internships, pre-apprenticeship slots, or structured OJT) that can be coordinated across multiple employers and supported by workforce and education partners. Primary data indicates stakeholders across sectors support apprenticeship and partnership models; what is missing is a consistent mechanism to implement them and track outcomes.

Low-lift work-based learning refers to placement models that require limited administrative overhead from employers while still producing meaningful skill development. These models typically include:

- Pooled internships or shared placements in which multiple employers each host a small number of participants, coordinated through a central partner so that no single employer carries the full program burden.
- Pre-apprenticeship slots that provide structured, supervised entry experience aligned to employer needs and (where applicable) connected to registered apprenticeship pathways.
- Structured OJT where a new hire is trained while working, using a defined checklist and supervisor sign-off so that learning outcomes are documented rather than informal.

These models are designed for regions where employers hire incrementally and cannot sustain large, continuous cohorts on their own.

Table 30: Strategy: Commit to Low-Lift Work-Based Learning

How to Do It	1. **Offer a defined type of placement with clear boundaries.** Employers identify which low-lift option they can reliably support (e.g., one intern placement, one pre-apprenticeship slot, or structured OJT for one new hire) and what the jobsite conditions will be (travel demands, schedule, physical requirements, safety expectations). 2. **Use a common supervisor checklist linked to the field-ready baseline.** Employers commit to using a shared checklist to document what the participant did and what skills were demonstrated. 3. **Centralize administration through a workforce partner or intermediary.** Employers reduce burden by delegating recruitment, eligibility, paperwork, supportive services coordination, and tracking to a workforce organization or designated intermediary. 4. **Commit to one "proof of pull" action that makes participation meaningful.** This can be as simple as committing to an interview, priority consideration, or a defined conversion pathway for participants who demonstrate readiness. 5. **Provide quick feedback to training partners on readiness gaps.** Employers' supervisor observations are one of the most valuable alignment tools available because they translate field realities into adjustments training partners can make.
Tools and Deliverables	• A standard placement agreement (roles, duration/structure, safety requirements, supervision expectations) • A common supervisor checklist aligned to the field-ready baseline (task demonstration plus reliability/jobsite conduct items) • A participant screening rubric focused on jobsite realism (transport, schedule, basic readiness) • A feedback mechanism (simple supervisor rating and notes) that training providers can use to adjust modules • A central coordinator (workforce org/intermediary) that handles recruitment, matching, paperwork, and outcome tracking

Reduce Fixed Training Costs

Reducing fixed costs matters because the region's demand profile does not call for mass hiring. Employers plan to hire in small numbers per role, and needs vary by geography and project timing, so training systems must be able to run smaller, more frequent, locally accessible cohorts without requiring each site to build a full permanent lab. Lowering the cost barrier makes it feasible to deliver the hands-on training that employers say is essential for field readiness, especially in rural, Tribal, and post-disaster communities where travel to centralized labs may be unrealistic.

In practice, this solution has two components:

- **Consumables support:** Employers donate or sponsor the recurring materials that make labs possible, providing items that are inexpensive per unit but costly over time for institutions, especially when budgets are tight.
- **Shared equipment access:** Employers lend equipment or broker shared access to specialized gear (or scheduled lab time) so that training partners can deliver credible labs without each institution purchasing full tool sets.

Table 31: Strategy: Reduce Fixed Training Costs

How It's Used	• **It makes training "job-realistic."** Learners practice with the same kinds of materials and components used in the field, improving readiness for installation and troubleshooting roles employers report as difficult to fill. • **It expands geographic access.** Shared equipment and consumables make mobile labs and distributed cohorts feasible, addressing rural and Tribal access barriers where travel distance reduces participation. • **It reduces program launch friction.** Institutions can pilot modules more quickly when the most expensive or hard-to-source inputs are provided through industry partnership, mitigating the capacity constraints described in primary data.
How to Do It	1. **Agree on a minimum viable lab kit for priority roles.** Employers and training partners identify the smallest set of consumables and equipment access needed to deliver a credible, hands-on module tied to the field-ready baseline (e.g., basic fiber handling/termination practice, enclosure work, basic testing concepts). 2. **Provide consumables in a predictable way.** Employers can donate surplus/expired-for-field-but-good-for-training materials, sponsor a recurring "lab supply" line item, or coordinate pooled purchasing. The key is predictability so providers can schedule cohorts knowing labs can run. 3. **Support shared equipment access rather than permanent buildout at every site.** In rural regions, the most efficient model is often rotating access (loaned equipment for scheduled training blocks, shared lab time, or a mobile lab model) so training can reach multiple communities without duplicating capital costs at every location. 4. **Document what was used and what skills it enabled.** Training partners track how consumables/equipment were used (which modules, how many learners, what competencies were practiced). Employers can then validate whether the training aligns to jobsite expectations and refine the "minimum viable" kit. 5. **Connect contributions to a feedback loop.** Employers provide brief supervisor feedback on whether participants who trained with the supported lab materials demonstrate better readiness.
Tools and Resources	• A consumables and equipment list (the "minimum viable lab kit" by role/module) • A simple donation/sponsorship mechanism (in-kind log with sponsorship option) • An equipment lending and liability agreement (loan period, maintenance, responsibilities) • A mobile lab deployment checklist (transport, setup, safety, inventory) • A short usage and outcomes log (cohorts served, skills practiced, employer validation)

Treat Retention as an Operating Requirement

Treating retention as an operating requirement directly supports the region's workforce development goals because it shifts the emphasis from training completions to sustained workforce capacity. This aligns with primary data indicating on-the-job training remains the dominant pathway into broadband work and that coordination gaps limit the ability to build durable pipelines. Improving retention makes the existing pathway more effective and reduces the pressure to constantly recruit and restart training cycles.

In this context, "retention" means that employers treat early-career stability as a production and service capacity issue and implement a small set of practices that reduce avoidable turnover. Evidence from workforce practice and HR research suggests retention improves when employees have clear expectations, supportive supervision/mentorship, and visible opportunities for growth and advancement (Lourenço & Rodrigues, 2025; Mosquera & Soares, 2025).

Table 32: Strategy: Treat Retention as an Operating Requirement

How to Do It	1. **Publish wage progression steps tied to skill milestones.** Employers can provide a transparent wage progression framework that shows how compensation increases as workers demonstrate competencies (for example, a progression from entry-level helper/trainee to specialist). The intent is not to standardize wages across firms, but to make progression explicit so workers can see a future locally rather than assuming they must leave to advance. 2. **Use mentorship and structured onboarding for the first months of field work.** Early-career turnover can happen when jobsite expectations are unclear or when new workers lack consistent guidance. A light mentorship structure (for instance, pairing new hires with a trained mentor/supervisor for check-ins and task sign-offs) reduces confusion, improves safety culture, and increases the likelihood that workers become productive rather than disengaging and leaving. This is particularly important in field-based work where "reliability and jobsite readiness" are central hiring priorities. 3. **Create supervisor feedback loops that improve both training and job fit.** Employers can implement a simple feedback loop in which supervisors document whether new hires are meeting readiness expectations and where gaps remain. This serves two functions: it improves internal coaching and performance management, and it provides a concrete signal back to training and workforce partners about whether preparation is translating into jobsite readiness. 4. **Make "work conditions realism" part of recruitment and onboarding.** In rural geographies, mismatches around travel, hours, physical demands, and jobsite conditions can cause early exit (Mosquera & Soares, 2025). Employers can reduce churn by communicating job realities up front and using a short screening conversation to confirm transportation feasibility and schedule fit, especially when hiring locally is essential and replacing workers is costly. 5. **Connect retention practices to regional workforce supports where available.** While this solution opportunity focuses on employer actions, retention improves when employers coordinate with workforce and community partners that can address barriers such as transportation, tools, or short-term financial instability.
Tools and Resources	• A wage progression and skill milestone sheet (one page, role-based) • A first-90-days onboarding and mentorship plan (check-ins and task sign-offs) • A supervisor readiness rubric aligned to the "field-ready" baseline • A short job conditions realism checklist used during hiring and onboarding • A feedback summary that can be shared with training partners to improve alignment over time

Training & Education Providers

Deliver Training in Short, Repeatable, Lab-Heavy Blocks

Short, repeatable, lab-heavy training blocks address the specific mismatch documented in primary data: the regional challenge is not a lack of interest or total training volume, but a lack of alignment between what is taught and what employers need (and when they need it). Modular delivery also fits rural labor market realities: when employers hire in small numbers and projects vary by geography, training that can run in smaller cohorts and be repeated more often is better matched than long, infrequent, degree-sequenced programs.

Primary data further indicates employers are interested in short-term, applied training models and training aligned with real job requirements, but have limited internal capacity to build such systems themselves. Consequently, the training product needs to be easy for employers to validate and use.

Table 33: Strategy: Deliver Training in Short, Repeatable, Lab-Heavy Blocks

How to Do It	1. **Build blocks around job tasks tied to day-one readiness.** Use the applied skill areas employers report being difficult to hire for (fiber work, troubleshooting, and construction/equipment operation), then define what the lab practice teaches and what "ready" means for supervised field work. 2. **Prioritize lab time over lecture time.** Keep instruction tight and use repeated lab practice to build competence. The goal is observable readiness, not seat-time completion. 3. **Use smaller cohorts and repeat more often.** Smaller, more frequent offerings are better matched to incremental, project-driven hiring (one-to-five hires per role) compared to large, infrequent cohorts. 4. **Validate alignment through a simple employer feedback loop.** Primary data suggests that the limiting factor is often coordination and alignment rather than interest; a lightweight employer review of tasks and a short post-hire readiness check helps keep modules grounded in jobsite expectations.
Tools and Resources	• A module outline for each block (skills taught, lab sequence, completion standard) • A lab materials list (equipment and consumables needed to run the block reliably) • A work sample and scoring rubric (practical demonstration aligned to job tasks) • An employer feedback form (short, structured input on readiness and gaps) • A published schedule (what programs are available, when, where, how many seats) that connects directly to your "training inventory and seat-capacity view" solution opportunity

Integrate Broadband Skill Modules into Existing Programs

Broadband work sits at the intersection of construction, electrical, and IT sectors, and many potential entrants are already moving through those feeder programs. Embedding targeted broadband competencies into existing coursework can create a steady flow of candidates with relevant, job-adjacent skills without waiting for a full new program to be built.

This approach also fits the practical reality that new courses and programs must move through local curriculum processes and (when required) Chancellor's Office submission/chaptering under statewide guidance. This is a necessary quality-control system, but not designed for rapid iteration around emerging skill needs (California Community Colleges Chancellor's Office [CCCCO], 2022).

Table 34: Strategy: Integrate Broadband Skill Modules into Existing Programs

How to Do It	1. **Identify the "broadband add-ons" that convert feeder pathways into broadband readiness.** Pick a small set of competencies that are missing from typical construction/electrical/IT training (e.g., outside plant context, fiber handling basics, jobsite documentation norms, troubleshooting workflow, safety/jobsite practices). 2. **Decide what gets embedded vs. what becomes a short standalone module.** • Embedded: a lab unit or assignment inside an existing course. • Standalone: a short add-on module (credit or noncredit) that multiple programs can send students and trainees into. 3. **Use lab-first design even when embedding.** Don't rely on lecture insertions, but rather attach each skill module to a hands-on demonstration that a student can complete and an employer can recognize. 4. **Reduce instructor constraints by using a shared delivery model.** Create an industry instructor pool (adjunct faculty, employer subject matter experts [SMEs], retired technicians) who can rotate through multiple campuses/cohorts for the lab-intensive components, while the base course remains taught by existing faculty. 5. **Pilot with one pathway, then replicate.** Start with one feeder program (e.g., construction) and one or two embedded modules, document what worked, then reuse the same modules in electrical/IT where they fit. 6. **Align to curriculum governance from day one.** Use a simple internal checklist so embedded content and any new modules are documented in course materials/CORs and routed through the appropriate curriculum steps, consistent with CCCCO curriculum guidance.
Tools and Resources	• Module map (which feeder programs/courses receive which broadband modules, and what competency each adds) • Work sample and rubric for each module (what "meets standard" looks like in practice) • Instructor coverage plan (who teaches the lab component; minimum qualifications/adjunct pipeline) • Lab plan and equipment list (what is required, where labs occur, and how access is scheduled) • Curriculum routing checklist (what requires local approval vs. what requires state submission/chaptering, using CCCCO curriculum guidance as the reference point)

Use Shared Lab Capacity to Reduce Fixed Costs and Expand Rural Access

Hands-on broadband readiness depends on lab access, but primary data indicates that only a small number of institutions currently offer broadband-specific coursework and that expanding capacity is slowed by structural barriers, especially the cost of specialized equipment, along with funding and staffing constraints. In rural and Tribal areas, the challenge is compounded by geographic isolation and transportation barriers, which makes it harder for learners to travel to a single permanent lab site and contributes to uneven access across communities.

Shared lab capacity addresses both constraints at once: it reduces the need for every campus or program to independently build and sustain a full broadband lab, while making hands-on training deliverable closer to where people live.

Instead of treating lab capability as a fixed, single-location asset, partners should treat it as a regional, shared utility that can move. Equipment is pooled and scheduled across multiple host sites (community college campuses, adult education hubs, Tribal facilities, or other training-ready locations), enabling providers to run lab-heavy modules in smaller communities without duplicating high-cost tools and test gear. This approach is especially aligned with the region's rural constraints described in primary data because it supports smaller, place-based cohorts and reduces travel burdens for participants who otherwise may not be able to attend lab sessions consistently.

Table 35: Strategy: Use Shared Lab Capacity to Reduce Fixed Costs and Expand Rural Access

How to Do It	1. **Partners define a minimum viable lab kit** for the specific hands-on modules being offered (e.g., what is required to run a lab block safely and credibly), and identify which items must be shared because they drive cost or are difficult to acquire. This keeps the model focused on removing the equipment barrier that training providers flagged in primary data. 2. **The region designates a custodian for the shared inventory** (likely a lead training provider or intermediary. This person becomes responsible for maintenance, calibration schedules (where relevant), consumables replenishment, and lending logistics. Because coordination gaps were repeatedly identified in primary data, assigning clear ownership is essential; otherwise, "shared equipment" becomes informal and unreliable. 3. **Partners operate the shared lab through a predictable rotation plan:** host sites commit to basic readiness (secure storage during delivery windows, space, power, safety procedures), instructors schedule lab-intensive blocks to coincide with the equipment rotation, and cohorts are planned around the mobile/shared lab calendar. This is the practical mechanism that converts "interest in broadband training" into actual capacity in places where permanent labs are difficult to sustain.
Tools and Resources	• A shared equipment inventory and condition log (what exists, where it is, what's functional) • A reservation/rotation schedule (who has it, when, and for which module) • A lending and chain-of-custody form (responsibilities, loss/damage procedures, required checks on return) • A maintenance and calibration checklist (so training quality doesn't vary by site) • A consumables replenishment plan (what gets used each cohort; how it gets restocked) • A host-site readiness checklist (space, power, storage, safety expectations) • A simple post-delivery feedback form (what worked, what broke, what needs to change before the next rotation)



Workforce Development & Placement Organizations

Publish a Training Inventory

In a project-driven labor market, timing and capacity matter as much as whether a program exists. If employers and workforce staff can't quickly see what training is actually running, where, and how many seats are realistically available, referrals default to informal networks, participants miss enrollment windows, and employers can't plan interviews or placements with any confidence.

Public workforce systems are already built around informed consumer choice and publicly disseminated training-provider information. The Workforce Innovation and Opportunity Act (WIOA) Eligible Training Provider List (ETPL) framework exists specifically to make training options visible and comparable, and local boards are explicitly allowed to supplement state-level information to make this resource more useful locally (Employment and Training Administration [ETA] 2026a, 2020).

Table 36: Strategy: Publish a Training Inventory

How to Do It	1. **Start with what partners actually need to act.** Keep the inventory operational (not encyclopedic): program/module name, provider, location(s), delivery format, lab dates (if relevant), start/end dates, enrollment deadline, prerequisites, total seats, remaining seats, and a single point of contact. 2. **Use the ETPL as the backbone of the inventory, then add a broadband lens.** Pull WIOA-eligible programs from the ETPL and layer in broadband-relevant noncredit, short courses, and employer-led training that may not appear there but still feeds real hiring. California's ETPL is an existing statewide resource you can point to and build from (California Employee Development Department [EDD], 2026). 3. **Make seat capacity a live status, not a static number.** Use a simple status field that can be updated quickly (open/limited/waitlist/closed status, remaining seats, next intake date). 4. **Assign one steward and one publication location.** The fastest way to lose credibility is by having multiple inventory versions. Establish a single authoritative owner with one link and a visible last updated date. Also, implement a predictable update cadence (monthly or per term, plus quick updates when dates or prerequisites change). 5. **Create a low-friction update workflow for providers.** A short form or email template that providers submit on schedule. The steward publishes updates and resolves conflicts. 6. **Add a referral-ready line item for workforce staff.** Show what documentation is needed, typical lead time, and who to contact for a warm handoff so referrals don't stall. 7. **Use the inventory as a planning tool, not just a directory.** Once it's live, review it with partners to spot repeated waitlists, geographic gaps, prerequisites that unintentionally screen out rural/Tribal participants, and timing collisions across providers.
Tools and Resources	• Standard inventory template with definitions (so every provider reports the same fields the same way) • Seat-status rules (when "Limited" becomes "Waitlist," how remaining seats are counted) • Single publication channel (one stable link) with version control and "last updated" stamp • Provider contact directory (training lead, enrollment lead, supportive services lead) • Referral handoff checklist (documents needed, timing, contact, escalation path) • ETPL linkage (a simple pointer to the statewide ETPL search and/or your region's filtered view for broadband-relevant offerings)

Align Cohorts to Project Timing

Primary data indicates that workforce demand is steady but project-driven, tied to specific deployment and maintenance work, geographies, and funding timelines. Most providers anticipate hiring in small numbers over time, not through large synchronized hiring waves. When cohort start dates do not line up with when employers can hire, trainees can sit idle, raising the likelihood of trainees departing a rural labor market already constrained by retention pressures.

Table 37: Strategy: Align Cohorts to Project Timing

How to Do It	1. **Collect a deployment window signal** from employers (e.g., county, quarter, and roles likely needed). The signal can be coarse to avoid sensitive project details while still supporting alignment. 2. **Convert the signal into a placement lead-time plan:** target cohort end dates that land shortly before expected hiring, accounting for onboarding and any required safety steps. 3. **Shift from big intakes to triggered intakes:** run smaller cohorts more frequently when waitlists and employer signals justify it, rather than waiting to fill large classes. 4. **Use a rolling 90–180 day calendar** that links: expected hiring windows, cohort dates, supportive services lead time (tools/PPE, transportation planning), and placement activity. 5. **Build a pre-enrollment bench (a readiness list):** participants complete screening and paperwork early, so cohorts can launch quickly when timing aligns. 6. **Coordinate employer commitments at a realistic level:** even "intent to interview" or "priority consideration for completers" helps reduce post-training drift without requiring binding hiring promises. 7. **Add a rapid adjustment step:** if an employer window shifts, adjust intake timing or offer short "refresher labs" so completers maintain readiness rather than exiting.
Tools and Resources	• Employer deployment-window intake form (simple, repeatable) • Cohort timing worksheet (start/end dates, training duration, placement lead time, target hire window) • Pre-enrollment/readiness tracker (who is ready to start next) • Shared calendar linking cohorts to projected hiring windows • Short employer-facing script (what information is requested; why it matters; how it will be used)

Build a Shared Intake-and-Placement Pipeline

Primary data indicates that workforce organizations often have few active relationships with broadband employers and do not consistently track broadband-specific employment outcomes, which limits the system's ability to turn training into durable placement and retention. Primary data also shows that rural and Tribal communities face participation barriers (including limited local training options and transportation constraints) that can derail completion and early job success if not addressed directly.

This matters because employers report persistent difficulty finding candidates with field-ready skills and emphasize local hiring necessity alongside retention pressure.

Table 38: Strategy: Build a Shared Intake-and-Placement Pipeline

How to Do It	1. **Define the target roles and placement-ready criteria** with employers, outlining what a candidate must be able to do safely and non-negotiables like schedule and travel realities. 2. **Standardize intake screening for field conditions** across workforce partners: transportation feasibility, schedule reliability, willingness/ability to work outdoors and across dispersed areas, and baseline workplace readiness. 3. **Separate trainable gaps from placement blockers early:** determine what can be addressed through training/support versus what prevents placement into field work right now. 4. **Pair each participant with a support plan at intake,** not after problems arise, especially for tools/PPE, travel costs, testing fees, childcare, and connectivity constraints documented in rural/Tribal contexts. 5. **Create an employer engagement rhythm** that is light but consistent: a named point of contact, a simple job order/role template, and a predictable cadence for referral packets and interview scheduling. 6. **Use "warm handoffs" into placements:** workforce staff provide a short readiness summary (skills completed, supports in place, constraints) so supervisors aren't guessing on day one. 7. **Track outcomes that matter for system learning.** At minimum: referral-to-enrollment, completion, placement, and early retention (e.g., 30/90 days). Primary data specifically flags the absence of broadband-specific outcome tracking as a barrier. 8. **Close the loop with supervisors:** capture short feedback on gaps observed and feed it back to training partners so the pipeline tightens over time.
Tools and Resources	• Broadband intake screen (field realities and barriers assessment) • Placement-ready checklist (co-developed with employers) • Supportive services menu with rapid approval steps (so supports deploy on time) • Employer role template (requirements, schedule, travel area, pay range where feasible) • Referral packet template (readiness summary with supports plan) • Outcome tracker focused on broadband placements and early retention
Funding Specific to This Mechanism	• **Supportive services:** WIOA regulations require Local Workforce Development Boards to develop a supportive services policy in coordination with partners, and define supportive services within Subpart G (ETA, 2026b). • **On-the-Job Training (OJT):** OJT contracts reimburse employers for extraordinary training/supervision costs (typically up to 50 percent of wages, and up to 75 percent in limited circumstances) supporting structured "earn-and-learn" transitions into field roles.

Local & Tribal Governments

Reduce Rural Training Overhead

In rural and Tribal communities, travel distance and limited local options can be the main barrier to participation. Public facilities and government-enabled logistics can make hands-on training feasible in smaller communities without requiring a permanent broadband lab at every location.

Table 39: Strategy: Reduce Rural Training Overhead

How to Do It	1. **Designate eligible public host sites** (Tribal facilities, fairgrounds, schools, libraries, public works yards) suitable for short lab intensives. 2. **Standardize a site-readiness checklist** (secure storage during delivery windows, power, tables, safety procedures, parking/yard space if needed, local point of contact). 3. **Pre-clear the most common logistics** that slow temporary labs: facility use agreements, after-hours access, insurance requirements, and any permits needed for mobile setups. 4. **Coordinate scheduling to reduce travel burden** (weekend intensives, fewer trips, consistent lab windows). 5. **Coordinate with workforce partners** so supportive services (travel assistance, tools/PPE) are ready when a local site is scheduled.
Tools and Resources	• Facility use/MOU template • Site readiness checklist • Mobile/temporary lab logistics checklist (delivery, setup/tear-down, custody, consumables) • Local scheduling matrix (site availability and cohort dates with support availability)

Use Procurement and Project Agreements to Enable Local Pipelines

Government capacity to directly run workforce programs may be limited, but contracting and project administration are levers governments control. A simple, implementable workforce-ready requirement in project documents can turn general intentions into an operational plan without imposing rigid mandates.

Table 40: Strategy: Use Procurement and Project Agreements to Enable Local Pipelines

How to Do It	1. **Add a one-page workforce-readiness addendum** to relevant RFPs, grants, and project agreements (scaled to project size). 2. **Require disclosure rather than quotas:** contractors identify (a) recruitment approach, (b) anticipated hiring windows, (c) whether OJT/apprenticeship will be used, and (d) a workforce point of contact. 3. **Tie the addendum to the build-to-hire planning signal** so timing commitments reflect the actual project critical path. 4. **Use meet-and-confer language** to allow adjustments when project schedules change. 5. **Ensure implementation is feasible under local rules** and (for Tribal governments) consistent with sovereignty and governance processes.
Tools and Resources	• Workforce-readiness addendum template • Contractor reporting fields (timing, roles, recruitment method, partner contact) • Local referral protocol (how contractors connect to workforce partners) • Change notice trigger (when timing changes, who is notified)

Support Place-Based and Tribal-Led Pathway Design as Resilience Capacity

In many communities, broadband workforce capacity is part of long-term community stability and recovery, not only near-term hiring. Post-disaster conditions add complexity, and place-based, Tribal-led design is how training delivery, governance, and participation supports remain realistic in small-cohort and remote settings.

Table 41: Strategy: Support Place-Based and Tribal-Led Pathway Design as Resilience Capacity

How to Do It	1. **Co-design pathways with Tribal governments and local partners** so delivery fits local constraints (micro-cohorts, fewer trips, locally hosted labs, culturally appropriate recruitment). 2. **Treat workforce planning as part of resilience capacity** by identifying who can support maintenance and emergency connectivity needs, not only construction peaks. 3. **Align workforce actions with recovery planning** so rebuilding windows become workforce opportunities rather than missed chances. 4. **Use government-to-government structures** to clarify roles, decision-making, and data-sharing boundaries.
Tools and Resources	• Government-to-government workforce MOU (roles, decision rights, data boundaries)[2] • Community constraints checklist (transport, seasonal access, scheduling realities) • Resilience staffing map (who is trained/available for maintenance/emergency support) • Lessons-captured protocol after projects/recovery phases



Community & System Support Partners

Operate the Regional Coordination Entity and Maintain Single Source of Truth

A regional workforce system can look active and still fail operationally if nobody is responsible for keeping the moving parts aligned. In cross-sector implementation models, a dedicated regional coordination entity exists for exactly this purpose: to coordinate day-to-day execution across independent partners so participation doesn't depend on personal relationships or institutional memory (Kania & Kramer, 2011).

For rural and Tribal contexts, the stakes are practical. If training schedules, prerequisites, points of contact, and hiring windows are not visible and kept current, partners miss opportunities, learners bounce between programs, and smaller communities are least able to navigate the maze informally.

Table 42: Strategy: Operate the Regional Coordination Entity and Maintain Single Source of Truth

How to Do It	1. **Designate a host and scope the role clearly.** Name the organization that will operate the regional coordination entity (often housed in an existing regional organization) and define the minimum responsibilities: convening, maintaining the source of truth, tracking commitments, and troubleshooting breakdowns. 2. **Define the source of truth as an operational tool, not a report.** Start with only the fields that let partners act. • Training: what, when, where, seats, prerequisites, enrollment deadline, point of contact • Hiring: roles, locations, prerequisites, timing windows, point of contact • Referrals/supports: where to send people, what documentation is needed, lead times 3. **Set a predictable update cadence and ownership rules.** Decide who updates what (e.g., training providers update offerings; employers update hiring prerequisites; workforce partners update supports) and how often (e.g., monthly, plus immediate updates when dates or prerequisites shift). 4. **Make it usable in low-capacity settings.** Publish in one stable location, add a visible "last updated" stamp, and avoid tools that require heavy logins or complicated workflows. 5. **Create an issue escalation lane.** When a placement stalls, prerequisites change, or a cohort is at risk, the regional coordination entity convenes the right parties quickly and records the resolution so the system improves over time. 6. **Put data governance in writing.** Establish what information is public vs. partner-only, and how participant data is shared. If partners operate within a One-Stop/WIOA environment, MOUs are a familiar structure for documenting coordination and shared costs (ETA, 2026c).
Tools and Resources	• Data dictionary and templates (standard fields for training, hiring, prerequisites, contacts) • Single publication channel (one link/location) with version control and "last updated" stamp • Partner directory (named contacts for training, hiring, referrals, supportive services) • Action tracker (commitments, due dates, blockers, owner) • Issue log with resolution notes (what broke, what changed, what to adjust) • Data-sharing guardrails (public vs. partner-only; privacy-compliant handling of participant info)

Operate Shared Recruitment, Screening, and Navigation to Supports (Common Intake and Rapid Supportive Services)

In rural and Tribal communities, drop-off is often driven by predictable logistics (transportation, childcare, and schedule feasibility) rather than a lack of interest. Transportation barriers, in particular, can directly affect continued enrollment and employment, and targeted supports can improve outcomes (Cojocaru & Hoermann, 2025). Supporting participants through these barriers is also a recognized workforce-system function: WIOA's supportive services framework explicitly includes transportation, childcare/dependent care, and work-related tools/attire (among other needs) when they are necessary for participation (ETA, 2026b).

Table 43: Strategy: Operate Shared Recruitment, Screening, and Navigation to Supports (Common Intake and Rapid Supportive Services)

How to Do It	1. **Coordinate outreach through trusted channels and field reality messaging.** Use community-based networks to recruit with honest expectations (outdoor work, travel radius, schedule, safety culture) so fewer participants enter with mismatched assumptions. 2. **Use one common intake screen across partners.** Standardize a short intake that captures the reliability barriers that commonly derail participation (transportation plan, childcare/dependent care, schedule constraints, ability to work outdoors/variable hours, documentation needed for hiring). 3. **Triage barriers into "fix now" vs. "needs a different pathway."** Establish simple decision rules: what can be addressed quickly with supportive services (gas cards, PPE/tools, testing fees) versus what requires a different placement or a longer stabilization period. 4. **Stand up a rapid supportive-services pathway.** Build a support menu with clear thresholds for fast approval and a short turnaround time, because supports are most effective when delivered before missed classes/interviews accumulate. WIOA contemplates supportive services precisely for enabling participation in career/training activities (ETA, 2026b). 5. **Prefer direct payment where feasible (avoid reimbursement delays).** Evidence from SNAP E&T pilots shows many participants cannot front costs, and programs often pay vendors directly (or use gas cards/bus passes) to remove barriers quickly (Rowe, 2021). 6. **Create warm handoffs to workforce and training partners.** Intake should immediately trigger the next step: referral to a specific training start date or employer pipeline, plus the supports needed to show up consistently. 7. **Add light-touch navigation and follow-up.** Short check-ins at predictable points (pre-start, week 1, first lab, first interview, first week on the job) catch the common failure points early (transport breakdowns, childcare gaps, tool/PPE needs, schedule mismatch). 8. **Document what actually caused drop-off and feed it back.** Track a small set of reasons (transportation, childcare, schedule conflict, equipment cost, readiness mismatch) and share patterns with training and workforce partners so the system reduces repeat failures over time. Research reviews note supportive services are intended to address barriers like childcare and transportation that affect completion (Hess et al., 2016).
Tools and Resources	• Common intake screen with readiness checklist (used by all recruitment/entry points) • Supports menu (what's available, eligibility, approval rules, typical turnaround time) aligned to allowable supportive services (transportation, childcare, tools/attire, fees/tests, etc.) • Referral directory (training contacts, hiring contacts, AJC points of contact, supportive service providers) • Transportation planning aid (route options, mileage bands, ride-share/shuttle resources where available) • Case note with consent/data-sharing templates for participant handoffs • Follow-up scripts for the first two weeks of training and the first month of employment

Manage Pooled Placements and the Performance Feedback Loop (Shared WBL Administration and Readiness/Retention Outcomes)

Small rural employers can often host a trainee or new worker, but they usually cannot absorb the paperwork, matching, documentation, and follow-up that formal work-based learning (WBL) requires, especially when hiring is incremental and supervisors are already stretched. A pooled model makes participation "light enough" for small employers by centralizing the administrative load and standardizing what supervisors are asked to observe and sign off.

Just as importantly, WBL only strengthens a pipeline if the system learns quickly from what happens on the jobsite. Rigorous evidence reviews show that work experience and WBL interventions can improve employment and earnings outcomes, but impacts vary by design, making fast feedback and course correction a core feature, not an add-on (Shenk et al., 2023).

Table 44: Strategy: Manage Pooled Placements and the Performance Feedback Loop (Shared WBL Administration and Readiness/Retention Outcomes)

How to Do It	1. **Stand up a pooled placement operating model.** Define who does what across partners (matching, paperwork, employer support, participant check-ins, issue escalation) and assign one placement coordinator to run the day-to-day. 2. **Standardize the placement packet so employers aren't reinventing the process.** Use one set of templates (position description, schedule/travel expectations, safety requirements, supervisor sign-off forms, and a simple training plan) that works across multiple employers. 3. **Create a common matching method.** Maintain a shared roster of placement-ready participants and a simple matching rubric that weights field realities (transportation feasibility, schedule reliability, outdoor work readiness) and role fit. 4. **Use one supervisor rubric for readiness.** Keep it short and practical: the specific tasks/behaviors a supervisor can observe early (week 1–2) and again at 30/90 days. This becomes the shared definition of "ready enough to be productive safely," and it produces actionable feedback for training adjustments. 5. **Build in early retention checkpoints.** Have the placement coordinator check in with both supervisor and participant at predictable points (for example: end of week 1, day 30, day 90) to catch preventable failures (schedule mismatch, transportation breakdown, missing tools/PPE, unclear expectations) before they become turnover. 6. **Run a rapid feedback loop to training and workforce partners.** On a fixed cadence (monthly or per cohort), summarize what supervisors are seeing (top skill gaps, top reliability barriers, top reasons placements stall) and feed that into training content, intake screening, and supportive services planning. 7. **Track the outcomes that reflect the constraint.** Keep the dashboard small: (1) placed, (2) supervisor-rated readiness at early checkpoint, (3) 30/90-day retention, and (4) common failure reasons. Use the results to adjust, not to punish; your goal is faster alignment.
Tools and Resources	• Shared templates: placement agreement, training plan, supervisor sign-off, participant expectations sheet • Common supervisor rubric: readiness checklist with short rating scale at week 1–2 and 30/90 days • Matching roster and rubric: placement-ready list, role requirements, decision rules • Issue escalation protocol: who gets called when a placement stalls, and what "fixes" are available • Outcome tracker: minimal dashboard with reason codes for churn/stalls • Data-sharing/consent forms: so partners can share placement status and outcomes appropriately

Funding Opportunities Supporting Multiple Stakeholder Groups

Table 45: WIOA Title I Funding: Training and Supportive Services and Paid WBL

What It's Best For	Paying for training (often via eligible providers), supportive services (transportation, childcare/dependent care, tools/attire, etc.), and WBL such as OJT and other structured work experiences.
Key Notes	• Federal rules define/support OJT under contracts with employers or Registered Apprenticeship sponsors. • Supportive services are an explicit WIOA mechanism and require local policy coordination. • California's ETPL is a core tool for WIOA-funded training visibility/selection.
Online Resources	Workforce Innovation and Opportunity Act WIOA Title I Formula Allocations – PY 24–25

Table 46: California Workforce Development Board High Road Training Partnerships (HRTP) and Related CWDB Competitive Grants

What It's Best For	Funding industry partnerships that translate employer demand into training, improve access, and build job-quality pathways, often with strong fit for convening, training design, and placement supports.
Key Notes	• CWDB explicitly frames HRTP as an industry partnership model to meet workforce needs and expand access to good jobs. • CWDB's grant cycles shift; their grant info page is the stable reference point for current opportunities.
Online Resources	HRTP Grantee Guidance

Table 47: California Community Colleges Strong Workforce Program (SWP)

What It's Best For	Community-college-led Career Technical Education (CTE) program improvement, employer alignment, curriculum modernization, equipment/labs (as allowable), and regional workforce planning through the CCC ecosystem.
Online Resources	CCC - Strong Workforce Program

Table 48: California Adult Education Program (CAEP)

What It's Best For	Noncredit and adult-learner programming, especially where entry-level pathways need flexible formats and supports; can be a strong fit for short, repeatable blocks that help adults enter training/employment.
Key Notes	• CAEP is a durable statewide structure that can support on-ramps and bridge content when your strategies emphasize "field readiness" over degrees.
Online Resources	CCC - California Adult Education Program

Table 49: Perkins V CTE Funding

What It's Best For	Strengthening secondary and postsecondary CTE programs (equipment, program improvement, alignment, support for CTE learners) through established education channels.
Key Notes	• Perkins V is a mainstream source for CTE modernization that can complement SWP/CAEP rather than forcing you to cite broadband-specific grants for basic training capacity.
Online Resources	Perkins V Application for Funding

Table 50: California Employment Training Panel (ETP)

What It's Best For	Employer-driven training reimbursement (upskilling incumbent workers and supporting structured training investments driven by business need).
Key Notes	• This is the cleanest "employer bucket" funding lever when you don't want to imply every solution needs public program dollars. ETP is specifically designed around employer training costs.
Online Resources	ETP Program Overview

Table 51: Registered Apprenticeship Supports and Intermediaries (Plus CCC Apprenticeship Infrastructure)

What It's Best For	Building/expanding apprenticeship pathways and the "connector" capacity that helps employers and training/workforce partners implement apprenticeships at lower friction.
Key Notes	• Apprenticeship.gov describes Registered Apprenticeship Industry Intermediaries as partners that connect employers/labor with workforce and education and provide technical assistance. • CCCCO highlights apprenticeship initiatives within the community colleges system.
Online Resources	Apprenticeship Open Funding Opportunities

Table 52: CPUC CASF: Consortia, Tribal Technical Assistance, and Adoption Accounts

What It's Best For	Regional coordination/planning capacity (Consortia Account), Tribal planning/technical assistance (Tribal Technical Assistance Program), and digital literacy/public education projects (Adoption Account). Useful for community/system support partners and local/Tribal governments.
Key Notes	• CASF accounts let you fund the system scaffolding (coordination entity, planning, community-facing adoption work) without trying to wedge infrastructure dollars into workforce tasks.
Online Resources	CPUC Broadband Funding Programs

Table 53: Broadband Implementation Capital: BEAD and CASF Infrastructure (Workforce-Linked Deployment)

What It's Best For	Building broadband infrastructure (CASF Infrastructure) and state-administered BEAD subgrants, with explicit attention to labor/workforce readiness expectations in the BEAD planning/application ecosystem.
Online Resources	NTIA Broadband Equity Access and Deployment Program

References

Bartolome, J. (2025). *Cost analysis to achieve total broadband coverage in Northern California consortia counties* (MSBA 208 capstone project). California State University, Sacramento.

California Community Colleges Chancellor's Office. (2022). *Program and Course Approval Handbook* (8th edition). Educational Services Support; California Community Colleges Curriculum Committee. https://www.cccco.edu/-/media/CCCCO-Website/docs/curriculum/program-course-approval-handbook-8th-edition.pdf?utm

California Department of Finance. (2025). *E-4 Population Estimates for Cities, Counties, and the State, 2021–2025, with 2020 Census benchmark*. Sacramento, CA. https://dof.ca.gov/Forecasting/Demographics/Estimates/e-4-population-estimates-for-cities-counties-and-the-state-2021-2025-with-2020-census-benchmark/

California Department of Technology. (2023). *CA's broadband middle-mile network gets a boost*. California Government Operations Agency. https://www.cdt.ca.gov/newsroom/2023/07/californias-broadband-middle-mile-network-gets-a-boost/

California Department of Technology. (2024). *Middle-Mile Broadband Initiative report – November 2024*. California Government Operations Agency. https://www.cdt.ca.gov/wp-content/uploads/2025/01/Middle-Mile-Broadband-Initiative-Report---November-2024.pdf

California Department of Technology. (2025). *Broadband for All*. California Government Operations Agency. https://broadbandforall.cdt.ca.gov/

California Employment Development Department. (2026). *Eligible Training Provider List*. Labor and Workforce Development Agency. Retrieved March 3, 2026. https://edd.ca.gov/en/jobs_and_training/eligible_training_provider_list?utm

California Public Utilities Commission. (2024). *California Interactive Broadband Map* [Interactive map]. https://www.broadbandmap.ca.gov/

California Public Utilities Commission. (2025a). *CPUC continues to help close the digital divide through broadband grants across California*. https://www.cpuc.ca.gov/news-and-updates/all-news/cpuc-continues-to-help-close-digital-divide-through-broadband-grants-across-california

California Public Utilities Commission. (2025b). *Federal Funding Account recommendations and awards* (Resolutions T-17863 through T-17873). https://www.cpuc.ca.gov/industries-and-topics/internet-and-phone/broadband-implementation-for-california/last-mile-federal-funding-account/federal-funding-account-awards

California Public Utilities Commission. (2025c). *California Advanced Services Fund 2024 annual report*. https://www.cpuc.ca.gov/-/media/cpuc-website/industries-and-topics/reports/casf-2024-annual-report---final.pdf

California Public Utilities Commission. (2025d). *CPUC Annual Collected Broadband Data* (Data Tables as of December 31, 2023). https://www.cpuc.ca.gov/industries-and-topics/internet-and-phone/broadband-mapping-program/cpuc-annual-collected-broadband-data

City of Redding. (2024, April 9). *Capital Improvement Plan 2023–2028* (Inter-Sub Fiber Project REU-2019-03). Public Works Department. https://records.ci.redding.ca.us/Public/DocView.aspx?id=244820&dbid=0&repo=General

Cojocaru, L. & Hoermann, S. (2025). Getting there matters: how transportation barriers can derail college dreams. *MDRC*. https://www.mdrc.org/work/publications/getting-there-matters

Collective Impact Forum & FSG. (2021). *Backbone starter guide: a summary of major resources about the backbone from FSG and the collective impact forum*. https://collectiveimpactforum.org/wp-content/uploads/2021/12/Backbone-Starter-Guide.pdf

Comcast California. (2025, January 15). *Comcast to expand fiber broadband across Butte and Colusa Counties*. Comcast. https://california.comcast.com/2025/01/15/comcast-to-expand-fiber-broadband-services-across-butte-colusa-counties/

Continuum Capital. (2024). *Broadband market workforce needs: Research summary*. Fiber Broadband Association; Power and Communication Contractors Association. https://fiberbroadband.org/wp-content/uploads/2024/08/PCCA_FBA_6-26-2024_vFinal_1.pdf

County of Lake Administrative Office. (2025, February 14). *Broadband consultant services* (RFP No. 25-1012). https://www.lakecountyca.gov/bids.aspx?bidID=94

Employment and Training Administration. (2020). *Eligible training provider (ETP) list requirements and responsibilities* (Attachment II to Training and Employment Guidance Letter No. 08-19). U.S. Department of Labor. https://www.dol.gov/sites/dolgov/files/ETA/advisories/TEGL/2020/TEGL_8-19_Attachment_II_acc.pdf?utm

Employment and Training Administration. (2026a). *20 CFR § 680, Subpart D: Eligible training providers* (in Electronic Code of Federal Regulations). U.S. Department of Labor. https://www.ecfr.gov/current/title-20/chapter-V/part-680/subpart-D

Employment and Training Administration. (2026b). *20 CFR § 680, Subpart G: Supportive Services* (in Electronic Code of Federal Regulations). U.S. Department of Labor. https://www.ecfr.gov/current/title-20/chapter-V/part-680/subpart-G

Employment and Training Administration. (2026c). *20 CFR § 678, Subpart C: Memorandum of Understanding for the One-Stop Delivery System* (in Electronic Code of Federal Regulations). U.S. Department of Labor. https://www.ecfr.gov/current/title-20/chapter-V/part-678/subpart-C

Federal Communications Commission. (2024). *Broadband summary by geography type* (D23_14may2024) [Data set]. Broadband Data Collection. https://broadbandmap.fcc.gov/data-download/nationwide-data?version=dec2023

Federal Communications Commission. (2025). *Broadband Data Collection*. https://www.fcc.gov/BroadbandData

Fiber Broadband Association, & Cartesian. (2023). *Broadband workforce development guidebook*. https://www.fiberbroadband.org/wp-content/uploads/2023/05/Broadband-Workforce-Development-Guidebook-FBA-and-Cartesian-April-2023.pdf

Golden State Connect Authority. (2024, December 20). *Golden State Connect Authority Awarded $97.1 Million in Grant Funding for Rural Broadband Networks in Glenn and Tehama Counties*. https://goldenstateconnect.org/wp-content/uploads/2024/12/Golden-State-Connect-Authority-Awarded-Grant-Funding-for-Rural-Broadband-Network-in-Glenn-and-Tehama-Counties.pdf

Hess, C., Mayayeva, Y., Reichlin, L., & Thakur, M. (2016). *Supportive services in job training & education: a research review*. Institute for Women's Policy Research. https://iwpr.org/wp-content/uploads/2020/08/Supportive-Services-in-Job-Training-Education-C434.pdf

Kania, J., & Kramer, M. (2011). Collective Impact. *Stanford Social Innovation Review*. https://ssir.org/articles/entry/collective_impact

KRCR News. (2025, July 28). *High-speed internet expansion underway in Butte County*. https://krcrtv.com/news/local/high-speed-internet-expansion-underway-in-butte-county

Lightcast Analyst. (2025, October 28). *Occupation Overview* (target occupations and counties). Retrieved from Lightcast. http://www.lightcast.io/

Lourenço, B., & Rodrigues, R. (2025). Organisational onboarding and talent retention: The mediating role of workplace attachment and supervisor support. *Social Sciences & Humanities Open*, 12. https://doi.org/10.1016/j.ssaho.2025.101909.

Mosquera, P., Soares, M.E. (2025). Onboarding: a key to employee retention and workplace well-being. *Rev Manag Sci*, 19, 3687–3711 (2025). https://doi.org/10.1007/s11846-025-00864-3.

National Telecommunications and Information Administration. (2022). *Internet for All Workforce Planning Guide: Guidance for BEAD Program eligible entities*. https://broadbandusa.ntia.gov/sites/default/files/2022-10/DOC_NTIA_Workforce%20Planning%20Guide_FINAL_100722.pdf?utm_%20NTIA%20Internet%20for%20All

North State Planning and Development Collective. (2024). *North State Regional Strategies: Regional Plan Part 2*. https://www.csuchico.edu/_assets/documents/office/nspd/north-state-ca-jobs-first-rpp2.pdf

The Pew Charitable Trusts. (2025, October 30). *Demand for broadband workforce expected to rise to meet BEAD requirements*. https://www.pew.org/en/research-and-analysis/issue-briefs/2025/10/demand-for-broadband-workforce-expected-to-rise-to-meet-bead-requirements?utm_

Plumas-Sierra Telecommunications. (2021, January 14). *Plumas-Sierra Telecommunications awarded additional California Advanced Services Fund grant* [Press release]. https://www.plumassierratelecommunications.com/pst-awarded-additional-grant-funds/

Rowe, G. (2021). *Provision of support services to reduce barriers in the 10 SNAP E&T pilots* (ERIC ED616573). ERIC. https://files.eric.ed.gov/fulltext/ED616573.pdf

Shenk, M., Welch, E., & Dolfin, S. (2023). *Evidence Snapshot: Work experience and work-based learning* (OPRE Report #2023-056). Office of Planning, Research, and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services. https://acf.gov/opre/report/evidence-snapshot-work-experience-and-work-based-learning

U.S. Census Bureau. (2011). *LND01 — land area in square miles by county* [Data set]. USA Counties: 2011. https://www.census.gov/library/publications/2011/compendia/usa-counties-2011.html

U.S. Census Bureau. (2017). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002). https://data.census.gov/table/ACSDT5Y2017.B28002?q=b28002&g=040XX00US06$0500000&y=2017

U.S. Census Bureau. (2018). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002). https://data.census.gov/table/ACSDT5Y2018.B28002?q=b28002&g=040XX00US06$0500000&y=2018

U.S. Census Bureau. (2019). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002). https://data.census.gov/table/ACSDT5Y2019.B28002?q=b28002&g=040XX00US06$0500000&y=2019

U.S. Census Bureau. (2020). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002). https://data.census.gov/table/ACSDT5Y2020.B28002?q=b28002&g=040XX00US06$0500000&y=2020

U.S. Census Bureau. (2021). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002). https://data.census.gov/table/ACSDT5Y2021.B28002?q=b28002&g=040XX00US06$0500000&y=2021

U.S. Census Bureau. (2022). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002). https://data.census.gov/table/ACSDT5Y2022.B28002?q=b28002&g=040XX00US06$0500000&y=2022

U.S. Census Bureau. (2023). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002). https://data.census.gov/table/ACSDT5Y2023.B28002?q=b28002&g=040XX00US06$0500000&y=2023

U.S. Census Bureau. (2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002). https://data.census.gov/table/ACSDT5Y2024.B28002?q=b28002&g=040XX00US06$0500000&y=2024

U.S. Department of Agriculture. (2023, June 12). *USDA Rural Development ReConnect Round 4 Awards* (Modoc and Siskiyou Counties). https://www.rd.usda.gov/media/file/download/usda-rd-reconnect-r4-tranche-2-06122023.pdf

U.S. Government Accountability Office (GAO). (2022, December 15). *Telecommunications workforce: Additional workers will be needed to deploy broadband, but concerns exist about availability* (GAO-23-105626). https://www.gao.gov/assets/gao-23-105626.pdf

Appendices

Appendix A: Historical Statistics on Broadband Speed and Coverage

Percentage of Households with Broadband of Any Type

Table 54: NECCC Percentage of Households with Broadband of Any Type

	Butte	Lassen	Modoc	Plumas	Shasta	Siskiyou	Tehama	NECCC Total	California Total
2017	80.9%	72.9%	68.2%	70.4%	75.3%	74.6%	70.3%	76.5%	82.6%
2018	83.2%	76.1%	69.4%	75.9%	78.8%	77.8%	71.7%	79.3%	84.7%
2019	85.4%	78.8%	69.7%	77.9%	80.3%	80.2%	75.7%	81.4%	86.7%
2020	87.7%	82.1%	75.3%	81.3%	84.9%	81.8%	80.1%	84.8%	88.9%
2021	89.0%	83.9%	76.4%	82.7%	87.1%	82.8%	82.3%	86.5%	90.4%
2022	89.8%	85.9%	79.3%	84.4%	88.5%	84.1%	83.2%	87.6%	91.5%
2023	90.7%	87.2%	82.7%	83.5%	89.5%	86.3%	86.1%	88.9%	92.5%
2024	91.8%	88.7%	87.4%	85.5%	91.3%	88.5%	88.0%	90.5%	93.5%

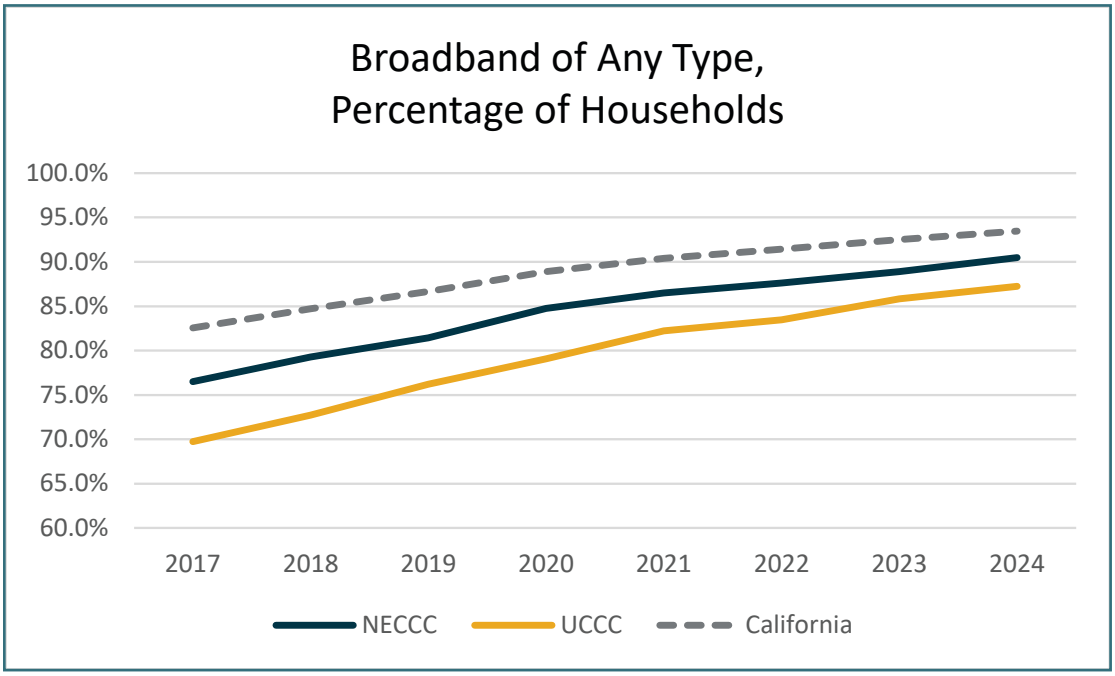
Note. Source: U.S. Census Bureau. (2017–2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

Table 55: UCCC Percentage of Households with Broadband of Any Type

	Colusa	Glenn	Lake	UCCC Total	California Total
2017	74.5%	64.0%	70.6%	69.7%	82.6%
2018	77.3%	69.8%	72.6%	72.7%	84.7%
2019	81.0%	71.6%	76.6%	76.2%	86.7%
2020	80.4%	73.7%	80.8%	79.1%	88.9%
2021	79.0%	82.7%	82.9%	82.2%	90.4%
2022	80.3%	85.9%	83.5%	83.5%	91.5%
2023	82.9%	90.5%	85.0%	85.8%	92.5%
2024	84.6%	89.5%	87.1%	87.2%	93.5%

Note. Source: U.S. Census Bureau. (2017–2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

Figure 22: Percentage of Households with Broadband of Any Type



Note. Source: U.S. Census Bureau. (2017–2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

Percentage of Households with Wired Broadband Connection

TABLE 56: NECCC PERCENTAGE OF HOUSEHOLDS WITH WIRED BROADBAND CONNECTION

	Butte	Lassen	Modoc	Plumas	Shasta	Siskiyou	Tehama	NECCC Total	California Total
2017	67.9%	58.5%	49.3%	45.1%	61.2%	52.7%	49.5%	60.9%	72.1%
2018	68.6%	60.1%	52.8%	41.0%	62.3%	54.5%	47.5%	61.5%	73.0%
2019	69.4%	58.5%	54.6%	35.6%	62.5%	56.6%	48.7%	61.8%	73.9%
2020	70.1%	55.5%	62.7%	32.9%	64.5%	57.4%	48.5%	62.6%	75.2%
2021	71.2%	53.3%	56.7%	35.2%	65.8%	58.4%	47.5%	63.4%	76.6%
2022	70.6%	54.4%	60.0%	35.7%	67.7%	58.9%	46.0%	63.7%	77.4%
2023	70.8%	52.4%	59.8%	39.5%	68.0%	60.3%	48.7%	64.4%	78.3%
2024	71.3%	50.0%	60.8%	40.8%	68.8%	62.6%	49.1%	65.0%	78.9%

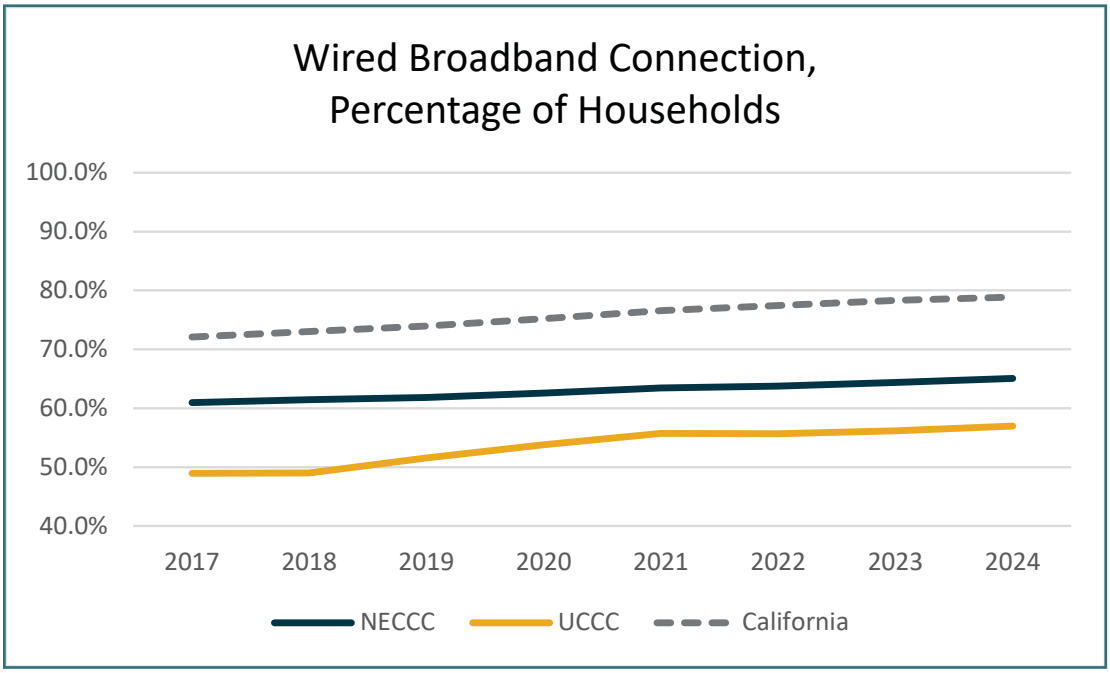
Note. Collective staff use the shorthand "Wired Broadband" to refer to the Census Bureau's category "Broadband such as cable, fiber optic or DSL" in table B28002. Source: U.S. Census Bureau. (2017–2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

TABLE 57: UCCC PERCENTAGE OF HOUSEHOLDS WITH WIRED BROADBAND CONNECTION

	Colusa	Glenn	Lake	UCCC Total	California Total
2017	46.2%	44.9%	51.2%	48.9%	72.1%
2018	44.0%	46.8%	51.2%	49.0%	73.0%
2019	44.7%	48.2%	54.8%	51.5%	73.9%
2020	47.1%	44.7%	59.4%	53.8%	75.2%
2021	45.9%	47.6%	61.5%	55.8%	76.6%
2022	47.8%	49.0%	60.3%	55.6%	77.4%
2023	49.5%	51.4%	59.8%	56.2%	78.3%
2024	52.1%	50.7%	60.7%	57.0%	78.9%

Note. Collective staff use the shorthand "Wired Broadband" to refer to the Census Bureau's category "Broadband such as cable, fiber optic or DSL" in table B28002. Source: U.S. Census Bureau. (2017–2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

FIGURE 23: PERCENTAGE OF HOUSEHOLDS WITH WIRED BROADBAND CONNECTION



Note. Source: U.S. Census Bureau. (2017–2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

Percentage of Households with Wired Broadband Alone

TABLE 58: NECCC PERCENTAGE OF HOUSEHOLDS WITH WIRED BROADBAND ALONE

	Butte	Lassen	Modoc	Plumas	Shasta	Siskiyou	Tehama	NECCC Total	California Total
2017	26.1%	42.2%	34.7%	26.5%	28.9%	21.6%	18.1%	26.6%	25.3%
2018	20.2%	40.3%	36.6%	20.7%	23.2%	20.3%	15.1%	21.8%	19.3%
2019	13.9%	34.8%	35.5%	14.1%	17.0%	17.7%	12.1%	16.3%	13.3%
2020	8.6%	26.0%	33.8%	7.5%	10.4%	13.7%	9.7%	10.9%	6.9%
2021	7.3%	20.2%	27.0%	6.7%	9.3%	11.9%	8.2%	9.2%	5.8%
2022	6.2%	14.7%	20.3%	5.4%	9.0%	10.0%	7.1%	8.1%	5.0%
2023	5.3%	9.4%	11.5%	4.1%	8.4%	8.3%	5.6%	6.8%	4.4%
2024	4.9%	4.4%	7.7%	3.6%	7.6%	6.7%	5.2%	5.9%	3.8%

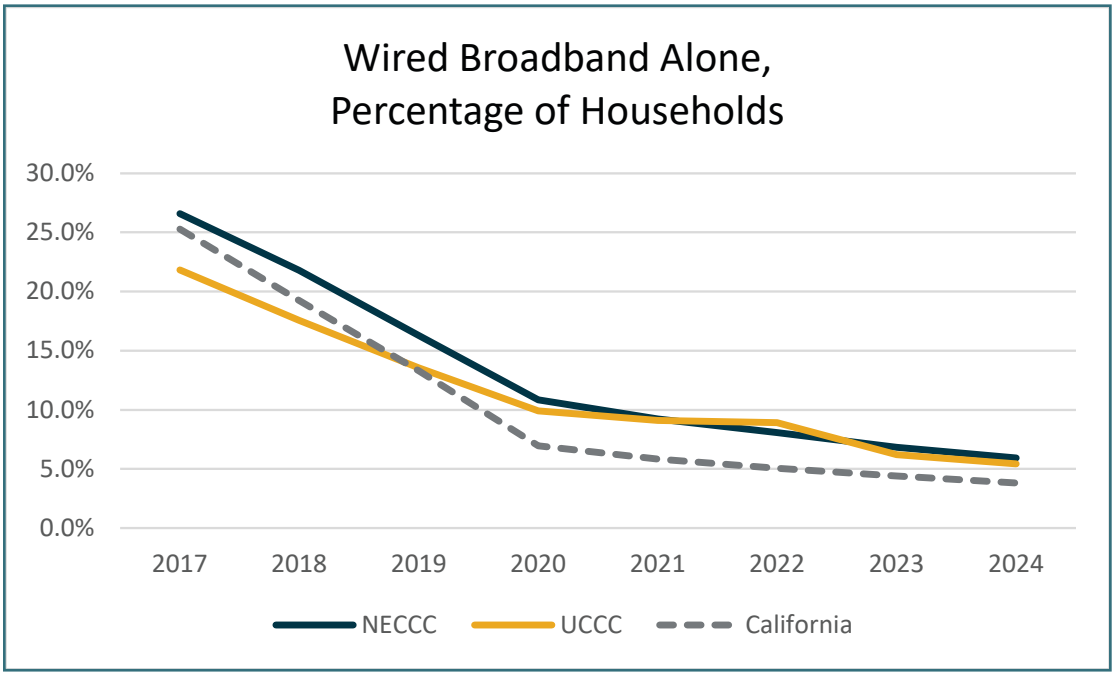
Note. Collective staff use the shorthand "Wired Broadband" to refer to the Census Bureau's category "Broadband such as cable, fiber optic or DSL" in table B28002. Source: U.S. Census Bureau. (2017–2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

TABLE 59: UCCC PERCENTAGE OF HOUSEHOLDS WITH WIRED BROADBAND ALONE

	Colusa	Glenn	Lake	UCCC Total	California Total
2017	21.3%	14.5%	24.7%	21.8%	25.3%
2018	15.6%	14.3%	19.4%	17.6%	19.3%
2019	10.3%	10.1%	15.8%	13.5%	13.3%
2020	7.6%	7.0%	11.7%	9.9%	6.9%
2021	6.1%	6.4%	10.9%	9.1%	5.8%
2022	5.7%	6.9%	10.5%	8.9%	5.0%
2023	4.7%	3.4%	7.7%	6.2%	4.4%
2024	4.3%	4.0%	6.3%	5.4%	3.8%

Note. Collective staff use the shorthand "Wired Broadband" to refer to the Census Bureau's category "Broadband such as cable, fiber optic or DSL" in table B28002. Source: U.S. Census Bureau. (2017–2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

FIGURE 24: PERCENTAGE OF HOUSEHOLDS WITH WIRED BROADBAND ALONE



Note. Source: U.S. Census Bureau. (2017–2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

Percentage of Households with Other Service Alone

TABLE 60: NECCC PERCENTAGE OF HOUSEHOLDS WITH OTHER SERVICE ALONE

	Butte	Lassen	Modoc	Plumas	Shasta	Siskiyou	Tehama	NECCC Total	California Total
2017	0.5%	0.5%	0.4%	0.8%	0.3%	0.8%	0.7%	0.5%	0.2%
2018	0.3%	0.4%	0.1%	0.5%	0.2%	0.5%	0.6%	0.4%	0.2%
2019	0.2%	0.3%	0.1%	0.4%	0.2%	0.4%	0.5%	0.3%	0.1%
2020	0.1%	0.2%	0.1%	0.3%	0.2%	0.2%	0.4%	0.2%	0.1%
2021	0.2%	0.2%	0.1%	0.3%	0.2%	0.3%	0.3%	0.2%	0.1%
2022	0.1%	0.1%	0.1%	0.3%	0.2%	0.2%	0.2%	0.2%	0.1%
2023	0.2%	0.1%	0.2%	0.6%	0.2%	0.1%	0.2%	0.2%	0.1%
2024	0.2%	0.1%	0.1%	0.9%	0.1%	0.1%	0.2%	0.2%	0.1%

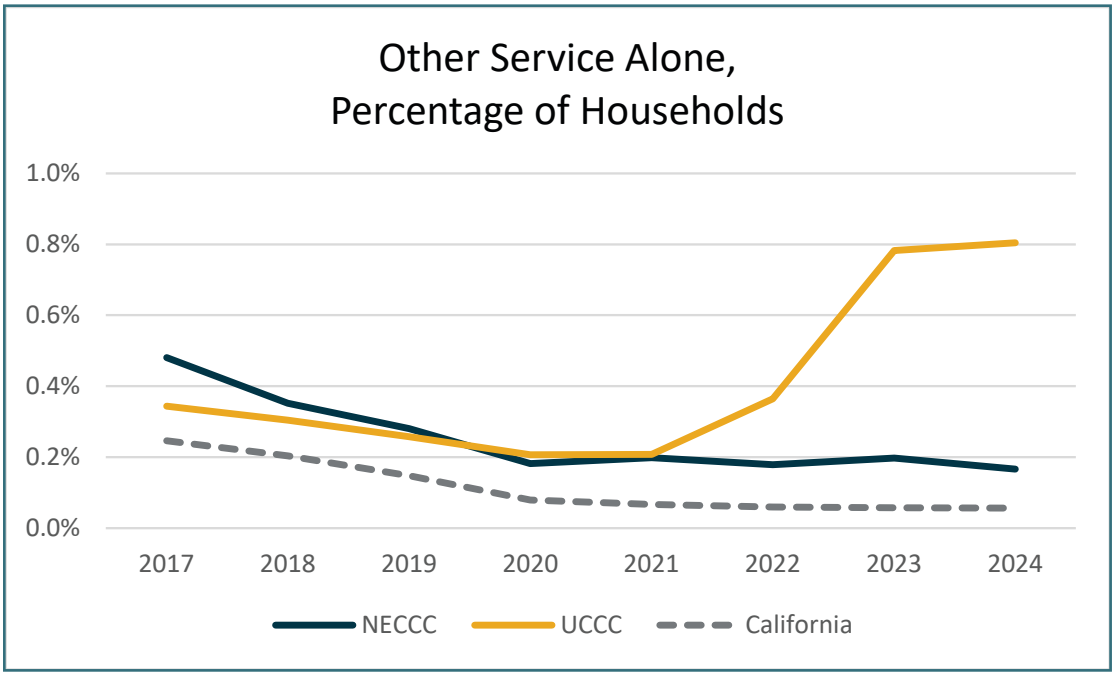
Note. The category "Other Service" includes broadband technologies not specifically listed in table B28002, including fixed wireless.
Source: U.S. Census Bureau. (2017–2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

TABLE 61: UCCC PERCENTAGE OF HOUSEHOLDS WITH OTHER SERVICE ALONE

	Colusa	Glenn	Lake	UCCC Total	California Total
2017	0.7%	0.7%	0.1%	0.3%	0.2%
2018	0.3%	0.8%	0.1%	0.3%	0.2%
2019	0.3%	0.6%	0.1%	0.3%	0.1%
2020	0.2%	0.5%	0.1%	0.2%	0.1%
2021	0.2%	0.5%	0.1%	0.2%	0.1%
2022	0.6%	0.3%	0.3%	0.4%	0.1%
2023	0.8%	0.2%	1.0%	0.8%	0.1%
2024	1.0%	0.3%	0.9%	0.8%	0.1%

Note. The category "Other Service" includes broadband technologies not specifically listed in table B28002, including fixed wireless.
Source: U.S. Census Bureau. (2017–2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

FIGURE 25: PERCENTAGE OF HOUSEHOLDS WITH OTHER SERVICE ALONE



Note. Source: U.S. Census Bureau. (2017–2024). *Presence and types of internet subscriptions in household* (American Community Survey, ACS 5-year estimates detailed tables, Table B28002).

Appendix B: Broadband Cost Analysis

The following findings are an abbreviated version of Janae Bartolome's "Cost Analysis to Achieve Total Broadband Coverage in Northern California Consortia Counties," which aims to estimate the total cost of expanding broadband infrastructure to achieve universal coverage in NECCC and UCCC counties (Bartolome, 2025). Of the 10 counties across both consortia, this analysis identified sufficient data to estimate broadband infrastructure expansion costs for 7 counties.

Summary of Methods

Bartolome's study uses a data-driven approach that combines historical broadband project data with geospatial analysis to estimate the cost of achieving universal coverage across the Northern California consortia region. The analysis draws on California Advanced Services Fund (CASF) and Federal Funding Account (FFA) datasets, which provide information on project costs, households served, and technology types. These data are cleaned and standardized, then used to calculate average cost per household for each county and for different categories of broadband technology (legacy and non-legacy).

These estimates are paired with a GIS-based analysis of unserved and underserved households. Eligibility locations are mapped by county and evaluated based on their proximity to middle-mile infrastructure using a 10-mile buffer. Households within the buffer are assumed to be more cost-effective to serve using non-legacy technologies, while those outside are assumed to require higher-cost solutions. By applying the appropriate cost-per-household estimates to these groups, the study generates county-level and regional cost projections for closing the broadband gap, providing an evidence-based estimate of the scale of investment required.

Findings

TABLE 62: BROADBAND COST ANALYSIS FINDINGS ROUNDED TO NEAREST DOLLAR

County Name	Butte	Colusa	Lake	Lassen	Plumas	Shasta	Siskiyou
AvgCost_Legacy				49,158		780	
AvgCost_NonLegacy	4,515	5,865	2,424	18,758	6,835	559	29,110
Unserved_Underserved_InBuffer	3,455	829	2,572	2,823	4,052	3,645	4,355
Unserved_Underserved_OutsideBuffer	175	272	163	722	266	1,273	229
InBuffer_Cost	15,600,447	4,861,769	6,234,008	52,953,805	27,694,137	2,036,314	126,774,412
OutsideBuffer_Cost				13,543,269		711,174	
TotalCountyCost	15,600,447	4,861,769	6,234,008	66,497,074	27,694,137	2,747,488	126,774,412

TABLE 63: DATA DICTIONARY FOR BROADBAND COST ANALYSIS

Field Name	Description
CountyName	Name of county
AvgCost_Legacy	Average cost per household for legacy tech
AvgCost_NonLegacy	Average cost per household for non-legacy tech
Unserved_Underserved_InBuffer	Count of households within middle-mile buffer
Unserved_Underserved_OutsideBuffer	Count outside buffer
InBuffer_Cost	Total cost inside buffer
OutsideBuffer_Cost	Total cost outside buffer
TotalCountyCost	Sum of InBuffer and OutsideBuffer costs

Appendix C: ISPs in the Consortia Regions

Table 64: Internet Service Providers in the Northeastern California Connect Consortium Region

DBA	DSL (any type)	Copper Wire (non-xDSL)	Cable Modem (DOCSIS or Other)	Optical Carrier / Fiber to the End User	Fixed Wireless
101Netlink					Yes
Allstream Business US		Yes			
AT&T Service, Inc.	Yes			Yes	Yes
Cal-Ore Communications Inc.	Yes			Yes	Yes
CenturyLink		Yes		Yes	
Charter Communications Inc			Yes	Yes	
Comcast Cable Communications Management LLC			Yes	Yes	
Com-Pair Services					Yes
Corridor Wireless LLC					Yes
Digital West Networks				Yes	
DIGITALPATH, INC					Yes
DM-Tech					Yes
Ducor Telephone Company	Yes				
EarthLink Business, LLC	Yes			Yes	
FRONTIER COMMUNICATIONS	Yes			Yes	Yes
GeoLinks					Yes
Hunter Communications & Technologies LLC				Yes	
King Street Wireless, LP					Yes
Level 3 Communications, LLC		Yes		Yes	
MINetworks Inc.					Yes
Northland Communications			Yes		
PAETEC Communications Inc	Yes				
Plumas-Sierra Telecommunications			Yes	Yes	Yes
Root Automation					Yes
ShastaBeam					Yes
Siskiyou Telephone Company	Yes			Yes	
SnowCrest Telephone Inc	Yes				
Space Exploration Technologies Corp.					
Stream IT Networks LLC					Yes
Succeed.Net					Yes
TDS Telecom	Yes				
T-Mobile US					Yes
Tnet Broadband Internet LLC					Yes
TPx		Yes			
Tsunami-Wireless					Yes
UNITED STATES CELLULAR CORPORATION					Yes
Velocity Communications, Inc.			Yes	Yes	Yes
Verizon Wireless					Yes
WillitsOnline					Yes
WISPRENN					Yes

DBA	DSL (any type)	Copper Wire (non-xDSL)	Cable Modem (DOCSIS or Other)	Optical Carrier / Fiber to the End User	Fixed Wireless
ZayoGroup				Yes	
Zito West Holding LLC			Yes	Yes	

Note. Collective staff have grouped technology codes (TechCodes) together to represent general technology types. Code groupings are as follows: DSL (any type) = TechCodes 10, 11, 12, 20; Copper Wire (non-xDSL) = TechCode 30; Cable Modem (DOCSIS or other) = TechCodes 40, 41, 42, 43, 44; Optical Carrier / Fiber to the End User = TechCode 50; Fixed Wireless (any type) = TechCodes 70, 71, 72. Satellite and mobile technologies are not included. Data shown is accurate as of December 31, 2023. Source: California Public Utilities Commission. (2024). *California Interactive Broadband Map* [Interactive map].

Table 65: Internet Service Providers in the Upstate California Connect Consortium Region

DBA	DSL (any type)	Copper Wire (non-xDSL)	Cable Modem (DOCSIS or Other)	Optical Carrier / Fiber to the End User	Fixed Wireless
101Netlink					Yes
AFESNetworkServicesLLC					Yes
AT&T Service, Inc.	Yes			Yes	Yes
CenturyLink		Yes			
Comcast Cable Communications Management LLC			Yes	Yes	
Corridor Wireless LLC					Yes
DIGITALPATH, INC					Yes
DM-Tech					Yes
EarthLink Business, LLC	Yes				
FRONTIER COMMUNICATIONS	Yes			Yes	
GeoLinks					Yes
King Street Wireless, LP					Yes
Lake County Broadband Solutions, LLC					Yes
Level 3 Communications, LLC		Yes		Yes	
Mediacom California LLC			Yes		
North Coast Networks					Yes
PAETEC Communications Inc	Yes			Yes	
Race Communications				Yes	
Stream IT Networks LLC					Yes
Succeed.Net					Yes
T-Mobile US					Yes
TPx		Yes			
Ukiah Wireless					Yes
UNITED STATES CELLULAR CORPORATION					Yes
Valley Internet					Yes
Vast Networks				Yes	
Verizon Wireless					Yes
WillitsOnline	Yes				Yes

Note. Collective staff have grouped technology codes (TechCodes) together to represent general technology types. Code groupings are as follows: DSL (any type) = TechCodes 10, 11, 12, 20; Copper Wire (non-xDSL) = TechCode 30; Cable Modem (DOCSIS or other) = TechCodes 40, 41, 42, 43, 44; Optical Carrier / Fiber to the End User = TechCode 50; Fixed Wireless (any type) = TechCodes 70, 71, 72. Satellite and mobile technologies are not included. Data shown is accurate as of December 31, 2023. Source: California Public Utilities Commission. (2024). *California Interactive Broadband Map* [Interactive map].

Appendix D: Core and Core+1 Programs

TABLE 66: NECCC CORE PROGRAMS

Institution	Program Name	Award Type
American Career Training	Electrical Lineworker	Certificate
Butte College	Applied Construction	Certificate
Butte College	Cisco Networking Administration	Certificate
Butte College	Civil Engineering	Associate's
Butte College	Civil Engineering	Certificate
Butte College	Civil Engineering Technology	Associate's
Butte College	Civil Engineering Technology	Certificate
Butte College	Computer Information Systems	Associate's
Butte College	Computer Engineering	Associate's
Butte College	Computer Engineering	Certificate
Butte College	Computer Science	Associate's
Butte College	Computer Science	Associate's for Transfer
Butte College	Computer Support Technician	Certificate
Butte College	Computer System Administration	Certificate
Butte College	Computer System Administration	Associate's
Butte College	Construction Management	Certificate
Butte College	Construction Management	Associate's
Butte College	Electrical Engineering	Certificate
Butte College	Electrical Engineering	Associate's
Butte College	Engineering Fundamentals	Certificate
Butte College	Engineering Support Technician	Certificate
Butte College	Geography	Associate's for Transfer
Butte College	Heavy Equipment Operator Technician	Certificate
Butte College	Natural Resources Management	Associate's
Butte College	Server Administration	Certificate
Butte College	Welding Technology	Certificate
Butte College	Welding Technology	Associate's
Butte College	Welding Technology Level I	Certificate
Butte College	Welding Technology Level II	Certificate
Northwest Lineman College	Electrical Lineworker Program	Multi-Certification Program
California State University-Chico	Civil Engineering	Bachelor's
California State University-Chico	Computer Information Systems	Bachelor's
California State University-Chico	Computer Science	Bachelor's
California State University-Chico	Computer Science	Master's
California State University-Chico	Construction Management	Bachelor's
California State University-Chico	Electrical and Computer Engineering	Master's
California State University-Chico	Electrical/Electronic Engineering	Bachelor's
California State University-Chico	Geography	Bachelor's
California State University-Chico	Geospatial Literacy	Minor
California State University-Chico	Planning and Development	Minor
California State University-Chico	Heavy Construction	Minor

Institution	Program Name	Award Type
California State University-Chico	Electrical Construction	Minor
College of the Siskiyous	Computer Science	Associate's
College of the Siskiyous	Computer Science	Associate's for Transfer
College of the Siskiyous	PC Network/Hardware/Software	Certificate
College of the Siskiyous	Advanced Level Welding	Certificate
College of the Siskiyous	Basic Level Welding	Certificate
College of the Siskiyous	Welding	Associate's
Feather River Community College District	Geography	Associate's
Lassen Community College	Computer Information Systems	Associate's
Lassen Community College	IT Support Professional	Certificate
Lassen Community College	Computer Support Specialist	Certificate
Lassen Community College	Geographic Information Systems	Certificate
Lassen Community College	Welding Technology	Certificate
Lassen Community College	Welding Technology	Associate's
Lassen Community College	Welding Technology I	Certificate
Lassen Community College	Welding Technology II	Certificate
Shasta College	Agriculture Equipment Operations & Maintenance	Certificate
Shasta College	Heavy Equipment Logging Operations and Maintenance	Certificate
Shasta College	Natural Resources	Associate's
Shasta College	Natural Resources	Certificate
Shasta College	Computer Information Systems	Associate's
Shasta College	Computer Information Systems	Certificate
Shasta College	Computer and Information Systems - CISCO Networking	Certificate
Shasta College	Computer and Information Systems - Systems Management	Associate's
Shasta College	Computer Science	Associate's for Transfer
Shasta College	Engineering	Associate's
Shasta College	Geographic Information Systems	Associate's
Shasta College	Geographic Information Systems	Certificate
Shasta College	Geography	Associate's for Transfer
Shasta College	Welding Technology	Associate's
Shasta College	Welding Technology	Certificate
Simpson University	Engineering	Bachelor's

Note. Minors are only included if other comparable programs from the same institution are absent. PhD programs are not included in this survey.

Table 67: NECCC Core+1 Programs

Institution	Program Name	Award Type
California State Polytechnic University-Humboldt	Computer Science	Bachelor's
California State Polytechnic University-Humboldt	Energy Systems Engineering	Bachelor's
California State Polytechnic University-Humboldt	Geography	Bachelor's
California State Polytechnic University-Humboldt	Geospatial Science & Technology	Bachelor's
California State Polytechnic University-Humboldt	Engineering & Community Practice	Master's
California State Polytechnic University-Humboldt	Environmental & Natural Resources Planning	Certificate
California State Polytechnic University-Humboldt	Environmental Resources Engineering	Bachelor's

Institution	Program Name	Award Type
California State Polytechnic University-Humboldt	Natural Resources	Master's
California State Polytechnic University-Humboldt	Natural Resource Policy & Administration	Certificate
College of the Redwoods	CIS Networking	Associate's
College of the Redwoods	CIS Networking	Certificate
College of the Redwoods	Cisco Networking and Microsoft Server Administration	Certificate
College of the Redwoods	Forestry and Natural Resources Technology	Associate's
College of the Redwoods	Forestry and Natural Resources	Certificate
College of the Redwoods	Construction Technology	Associate's
College of the Redwoods	Electrician Trainee	Certificate
College of the Redwoods	Welding Technology	Associate's
College of the Redwoods	Welding Technology	Certificate
College of the Redwoods	Electric Arc & Oxyacetylene Welding	Certificate
College of the Redwoods	MIG & TIG Welding	Certificate
College of the Redwoods	General Welding	Certificate
College of the Redwoods	Geomatics	Certificate
Mendocino College	Computer Science	Associate's for Transfer
Mendocino College	Information Technology	Associate's
Mendocino College	Natural Resources	Associate's
Mendocino College	Introduction to the Construction Trades	Certificate
Mendocino College	Sustainable Construction and Energy Technology - Efficiency and Performance	Certificate
Mendocino College	Sustainable Construction and Energy Technology - Construction	Certificate
Mendocino College	Sustainable Construction and Energy Technology - Renewable Energy	Certificate
Woodland Community College	Welding Technologies	Certificate
Yuba College	Computer Science	Associate's
Yuba College	Computer Science	Associate's for Transfer
Yuba College	Computer Science	Certificate
Yuba College	Welding Technologies	Associate's
Yuba College	Introductory Welding Technologies	Certificate
Yuba College	Advanced Welding Technologies	Certificate
Yuba College	Geographic Information Systems	Certificate
Klamath Community College	Welding	Certificate
Klamath Community College	Cybersecurity and Networking	Associate's
Klamath Community College	Secure Network Technician	Certificate
Klamath Community College	Computer Support Technician	Certificate
Klamath Community College	Computer Systems Fundamentals	Certificate
Klamath Community College	Computer Engineering Technology	Associate's
Rogue Community College	Computer Science	Associate's for Transfer
Rogue Community College	GTAW Welder	Certificate
Rogue Community College	Information Technology Technician	Certificate
Rogue Community College	SMAW Welder	Certificate
Rogue Community College	Welder's Helper	Certificate
Rogue Community College	Wire Welder	Certificate

Institution	Program Name	Award Type
Rogue Community College	High Technology Studies	Certificate
Rogue Community College	Industrial Welding Technology	Certificate
Rogue Community College	Computer Support Technician	Associate's
Rogue Community College	Industrial Welding Technology	Associate's
Rogue Community College	Civil Engineering	Associate's for Transfer
Rogue Community College	Electrical Engineering	Associate's for Transfer
Rogue Community College	Information Technology	Associate's for Transfer

Note. Minors are only included if other comparable programs from the same institution are absent. PhD programs are not included in this survey.

TABLE 68: UCCC CORE PROGRAMS

Institution	Program Name	Award Type
Butte College	Applied Construction	Certificate
Butte College	Cisco Networking Administration	Certificate
Butte College	Civil Engineering	Associate's
Butte College	Civil Engineering	Certificate
Butte College	Civil Engineering Technology	Associate's
Butte College	Civil Engineering Technology	Certificate
Butte College	Computer Information Systems	Associate's
Butte College	Computer Engineering	Associate's
Butte College	Computer Engineering	Certificate
Butte College	Computer Science	Associate's
Butte College	Computer Science	Associate's for Transfer
Butte College	Computer Support Technician	Certificate
Butte College	Computer System Administration	Certificate
Butte College	Computer System Administration	Associate's
Butte College	Construction Management	Certificate
Butte College	Construction Management	Associate's
Butte College	Electrical Engineering	Certificate
Butte College	Electrical Engineering	Associate's
Butte College	Engineering Fundamentals	Certificate
Butte College	Engineering Support Technician	Certificate
Butte College	Geography	Associate's for Transfer
Butte College	Heavy Equipment Operator Technician	Certificate
Butte College	Natural Resources Management	Associate's
Butte College	Server Administration	Certificate
Butte College	Welding Technology	Certificate
Butte College	Welding Technology	Associate's
Butte College	Welding Technology Level I	Certificate
Butte College	Welding Technology Level II	Certificate
Mendocino College	Computer Science	Associate's for Transfer
Mendocino College	Information Technology	Associate's
Mendocino College	Natural Resources	Associate's
Mendocino College	Introduction to the Construction Trades	Certificate

Institution	Program Name	Award Type
Mendocino College	Sustainable Construction and Energy Technology - Efficiency and Performance	Certificate
Mendocino College	Sustainable Construction and Energy Technology - Construction	Certificate
Mendocino College	Sustainable Construction and Energy Technology - Renewable Energy	Certificate
Woodland Community College	Welding Technologies	Certificate

Note. Minors are only included if other comparable programs from the same institution are absent. PhD programs are not included in this survey.

Table 69: UCCC Core+1 Programs

Institution	Program Name	Award Type
California State University-Chico	Civil Engineering	Bachelor's
California State University-Chico	Computer Information Systems	Bachelor's
California State University-Chico	Computer Science	Bachelor's
California State University-Chico	Computer Science	Master's
California State University-Chico	Construction Management	Bachelor's
California State University-Chico	Electrical and Computer Engineering	Master's
California State University-Chico	Electrical/Electronic Engineering	Bachelor's
California State University-Chico	Geography	Bachelor's
California State University-Chico	Geospatial Literacy	Minor
California State University-Chico	Planning and Development	Minor
California State University-Chico	Heavy Construction	Minor
California State University-Chico	Electrical Construction	Minor
Northwest Lineman College	Electrical Lineworker Program	Multi-Certification Program
Napa Valley College	Computer Science	Associate's for Transfer
Napa Valley College	Welding Technology	Associate's
Napa Valley College	Welding Technology	Certificate
Sacramento City College	Computer Information Science	Associate's
Sacramento City College	Computer Information Science	Certificate
Sacramento City College	Electronics Technology	Associate's
Sacramento City College	Electronics Technology	Certificate
Sacramento City College	Engineering	Associate's
Sacramento City College	Geography	Associate's for Transfer
Sacramento City College	Mechanical-Electrical Technology	Associate's
Sacramento City College	Mechanical-Electrical Technology	Certificate
Sacramento City College	Surveying (Geomatics)	Associate's
Sacramento City College	Surveying (Geomatics)	Certificate
Santa Rosa Junior College	Natural Resources	Certificate
Santa Rosa Junior College	Electrical Union Apprentice	Certificate
Santa Rosa Junior College	Cisco CCNA Certification	Certificate
Santa Rosa Junior College	IT Support	Certificate
Santa Rosa Junior College	Civil Engineering Technology	Certificate
Santa Rosa Junior College	Construction Management Fundamentals	Certificate
Santa Rosa Junior College	Electronic Technology Fundamentals	Certificate
Santa Rosa Junior College	Geospatial Technology Fundamentals	Certificate
Santa Rosa Junior College	Surveying Technology	Certificate

Institution	Program Name	Award Type
Santa Rosa Junior College	Welding FCAW	Certificate
Santa Rosa Junior College	Welding GMAW	Certificate
Santa Rosa Junior College	Welding GTAW	Certificate
Santa Rosa Junior College	Welding SMAW	Certificate
Santa Rosa Junior College	Welding Technology	Certificate
Santa Rosa Junior College	Natural Resources	Associate's
Santa Rosa Junior College	Electrical Union Apprentice	Associate's
Santa Rosa Junior College	Computer Science	Associate's
Santa Rosa Junior College	Civil Engineering Technology	Associate's
Santa Rosa Junior College	Construction Management Fundamentals	Associate's
Santa Rosa Junior College	Engineering	Associate's
Santa Rosa Junior College	Geospatial Technology	Associate's
Santa Rosa Junior College	Surveying Technician	Associate's
Santa Rosa Junior College	Welding Technology	Associate's
Shasta College	Agriculture Equipment Operations & Maintenance	Certificate
Shasta College	Heavy Equipment Logging Operations and Maintenance	Certificate
Shasta College	Natural Resources	Associate's
Shasta College	Natural Resources	Certificate
Shasta College	Computer Information Systems	Associate's
Shasta College	Computer Information Systems	Certificate
Shasta College	Computer and Information Systems - CISCO Networking	Certificate
Shasta College	Computer and Information Systems - Systems Management	Associate's
Shasta College	Computer Science	Associate's for Transfer
Shasta College	Engineering	Associate's
Shasta College	Geographic Information Systems	Associate's
Shasta College	Geographic Information Systems	Certificate
Shasta College	Geography	Associate's for Transfer
Shasta College	Welding Technology	Associate's
Shasta College	Welding Technology	Certificate
Sonoma State University	Computer Science	Bachelor's
Sonoma State University	Electrical Engineering	Bachelor's
Sonoma State University	Electrical and Computer Engineering	Master's
Sonoma State University	Environmental Science, Geography and Management	Bachelor's
Sonoma State University	Environmental Studies, Geography, and Planning	Bachelor's
University of California-Davis	Civil Engineering	Bachelor's
University of California-Davis	Civil Engineering	Master's
University of California-Davis	Community and Regional Development	Bachelor's
University of California-Davis	Community and Regional Development	Master's
University of California-Davis	Computer Science	Bachelor's
University of California-Davis	Computer Science	Master's
University of California-Davis	Computer Science and Engineering	Bachelor's
University of California-Davis	Data Science	Bachelor's
University of California-Davis	Electrical Engineering	Bachelor's

Institution	Program Name	Award Type
University of California-Davis	Electrical Engineering	Master's
University of California-Davis	Environmental Engineering	Bachelor's
University of California-Davis	Environmental Policy Analysis and Planning	Bachelor's
University of California-Davis	Environmental Policy Analysis and Planning	Master's
University of California-Davis	Materials Science and Engineering	Bachelor's
University of California-Davis	Materials Science and Engineering	Master's
Yuba College	Computer Science	Associate's
Yuba College	Computer Science	Associate's for Transfer
Yuba College	Computer Science	Certificate
Yuba College	Welding Technologies	Associate's
Yuba College	Introductory Welding Technologies	Certificate
Yuba College	Advanced Welding Technologies	Certificate
Yuba College	Geographic Information Systems	Certificate

Note. Minors are only included if other comparable programs from the same institution are absent. PhD programs are not included in this survey.

Appendix E: Stakeholder Survey Questions and Responses

General Questions

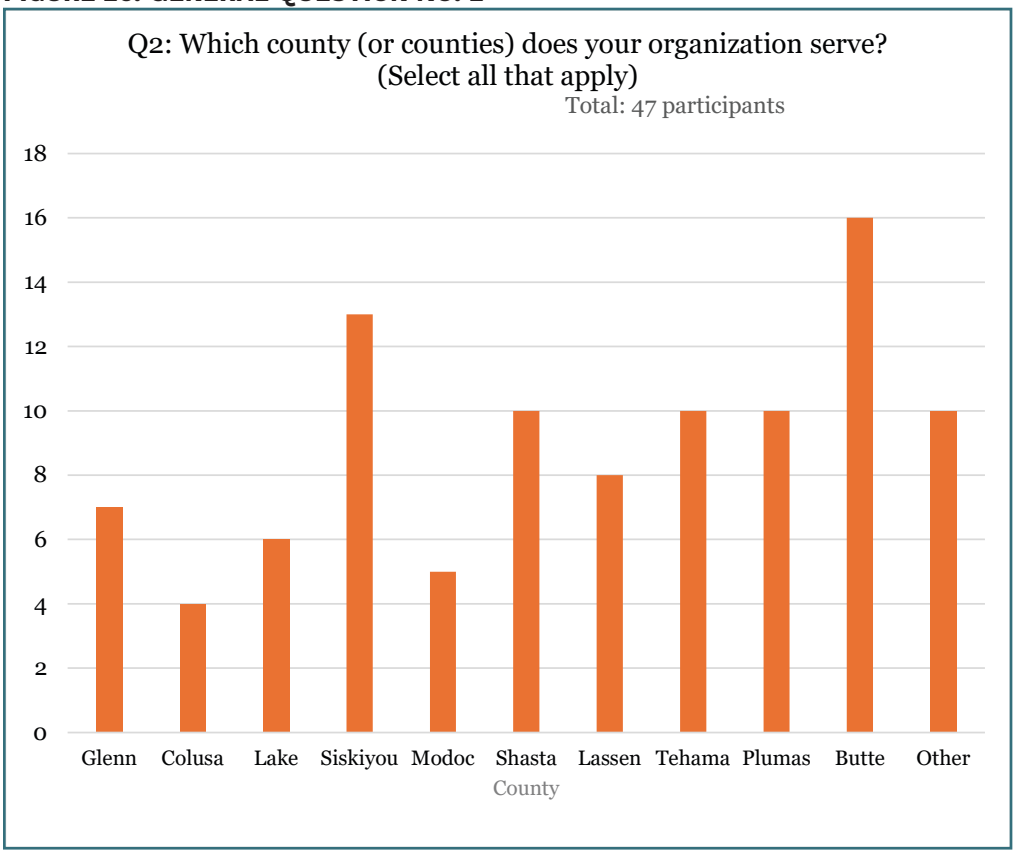
1. **What is the name of your organization? (short answer)**

   Responses to this question have been omitted to respect the privacy of our survey respondents. 47 responses were received.

2. **Which county (or counties) does your organization serve? (Select all that apply)**

   a. Glenn
   b. Colusa
   c. Lake
   d. Siskiyou
   e. Modoc
   f. Shasta
   g. Lassen
   h. Tehama
   i. Plumas
   j. Butte
   k. Other

FIGURE 26: GENERAL QUESTION NO. 2



Other:

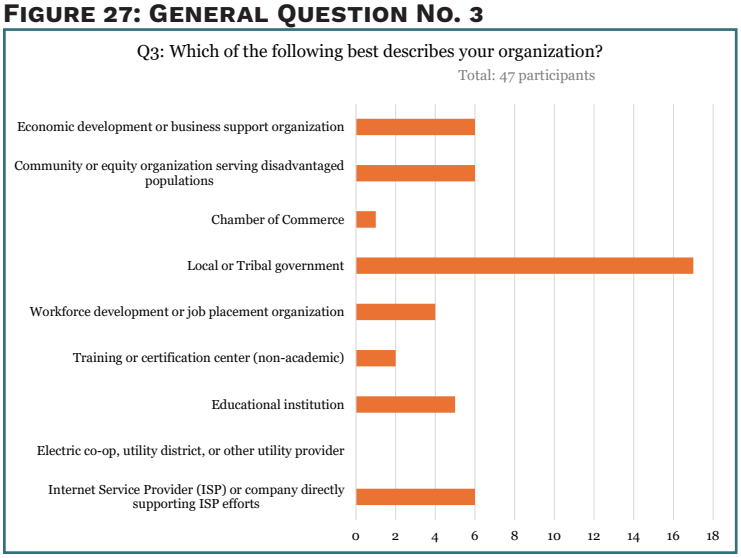
- Placer; El Dorado; Alpine
- Humboldt
- Also Sierra and Trinity
- Sierra
- Humboldt
- Amador
- El Dorado
- Trinity
- Trinity
- Del Norte, Siskiyou, Trinity

3. Which of the following best describes your organization?

a. Internet service provider (ISP) or company directly supporting ISP efforts
b. Electric co-op, utility district, or other utility provider
c. Educational institution
d. Training or certification center (non-academic)
e. Workforce development or job placement organization
f. Local or Tribal government
g. Chamber of Commerce
h. Community or equity organization serving disadvantaged populations
i. Economic development or business support organization

Note: answers (a) and (b) redirect to the Industry Employers bucket; answers (c) and (d) redirect to the Training & Education bucket; answer (e) redirects to Workforce bucket; answer (f) redirects to Local & Tribal Government bucket; answers (g), (h), and (i) redirect to the Community & System Support Partners bucket.

FIGURE 27: GENERAL QUESTION NO. 3

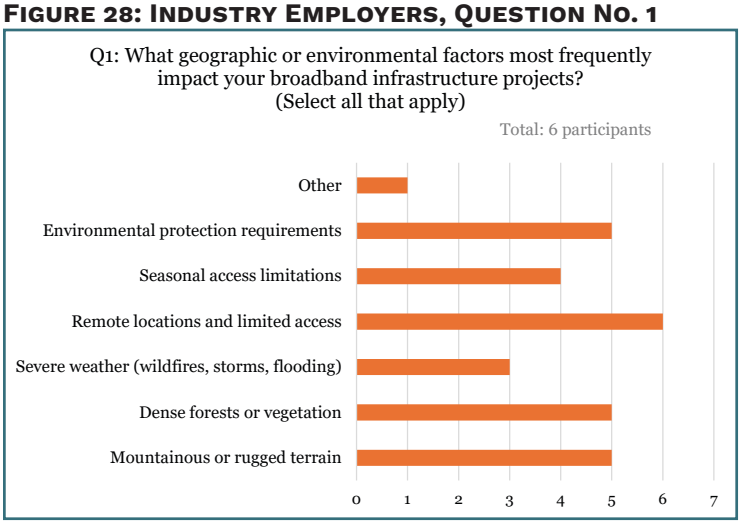


Bucket: Industry Employers

1. What geographic or environmental factors most frequently impact your broadband infrastructure projects? (Select all that apply)

a. Mountainous or rugged terrain
b. Dense forests or vegetation
c. Severe weather (wildfires, storms, flooding)
d. Remote locations and limited access
e. Seasonal access limitations
f. Environmental protection requirements
g. Other

FIGURE 28: INDUSTRY EMPLOYERS, QUESTION NO. 1



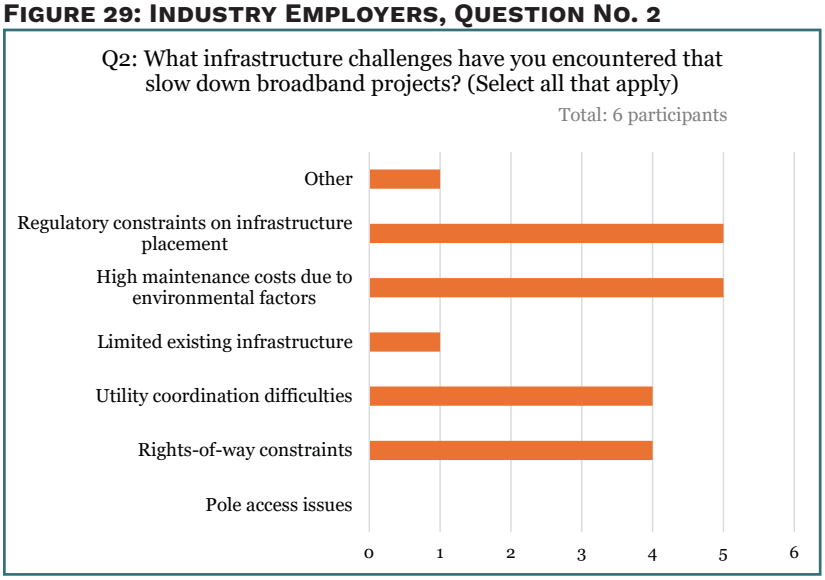
Other:

- water features lakes/rivers as well

2. **What infrastructure challenges have you encountered that slow down broadband projects? (Select all that apply)**

a. Pole access issues
b. Rights-of-way constraints
c. Utility coordination difficulties
d. Limited existing infrastructure
e. High maintenance costs due to environmental factors
f. Regulatory constraints on infrastructure placement
g. Other

FIGURE 29: INDUSTRY EMPLOYERS, QUESTION NO. 2



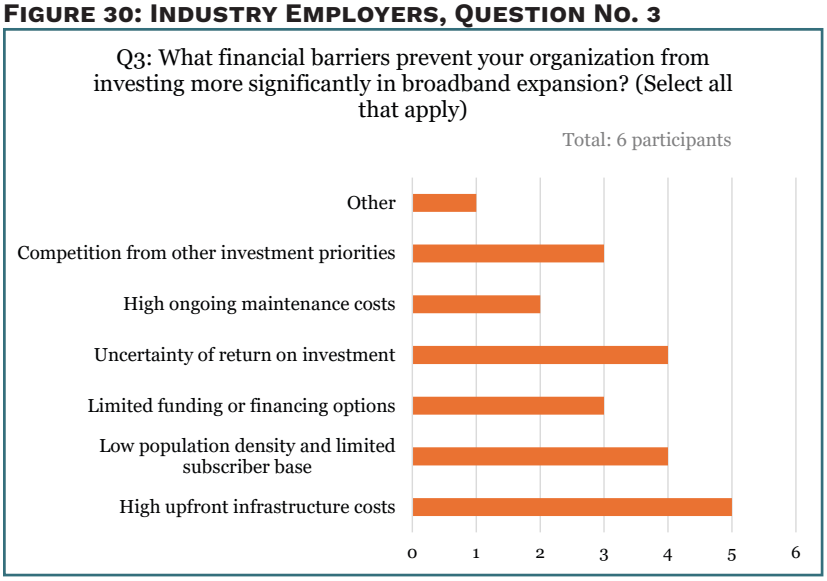
Other:

- permitting and timelines

3. **What financial barriers prevent your organization from investing more significantly in broadband expansion? (Select all that apply)**

a. High upfront infrastructure costs
b. Low population density and limited subscriber base
c. Limited funding or financing options
d. Uncertainty of return on investment
e. High ongoing maintenance costs
f. Competition from other investment priorities
g. Other

FIGURE 30: INDUSTRY EMPLOYERS, QUESTION NO. 3



Other:

- BEAD with VELO could be a variable unforeseen before for us

4. Over the next 2 years, how many additional workers do you anticipate needing in each of the following categories?

TABLE 70: INDUSTRY EMPLOYERS, QUESTION NO. 4 (TOTAL: 6 PARTICIPANTS)

Position	0	1–5	6–10	11–20	20+
Fiber installers and splicers	2	3	1		
Construction or Line workers	2	3		1	
Network technicians	3	2	1		
Field service engineers	4	2			
Electrical engineers	6				
Project managers and Supervisors	2	4			
IT Technical support	3	3			

Other:

- hard to guage timing of release of current awarded grants and how they factor into this question best guess in answer
- Unsure at this time

5. How difficult is it to find candidates with the following skills?

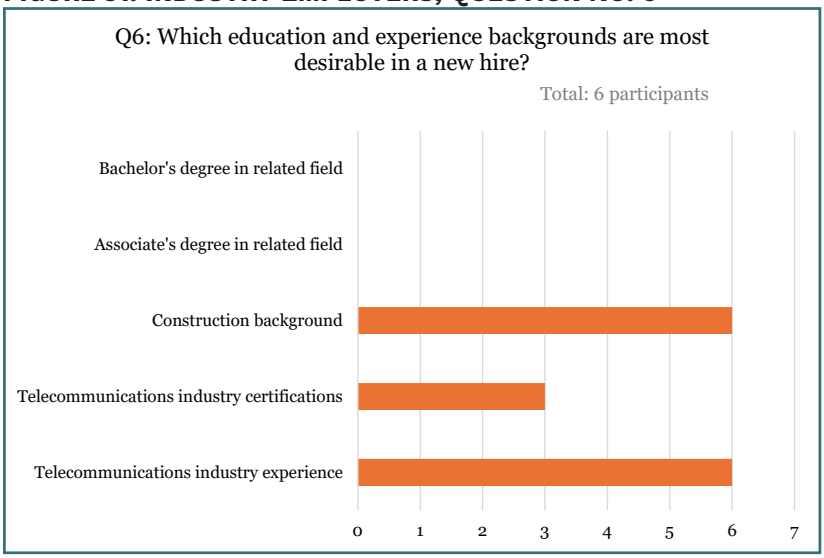
TABLE 71: INDUSTRY EMPLOYERS, QUESTION NO. 5 (TOTAL: 6 PARTICIPANTS)

Skill	Extremely Easy (1)	Somewhat Easy (2)	Neither Easy Nor Difficult (3)	Somewhat Difficult (4)	Extremely Difficult (5)
Fiber-optic splicing and testing			2	2	2
Construction techniques			2	3	1
Network troubleshooting and diagnostic			2	1	3
Safety protocols and OSHA compliance	1	2	1	1	1
Equipment operations			3	2	1
Project management and multitasking		1	4	1	
GIS mapping and documentation		1	2	2	1
Basic electrical knowledge		1	2	2	1
Customer service and communication		2	2	2	

6. Which education and experience backgrounds are most desirable in a new hire?

a. Telecommunications industry experience
b. Telecommunications industry certifications
c. Construction background
d. Associate's degree in related field
e. Bachelor's degree in related field

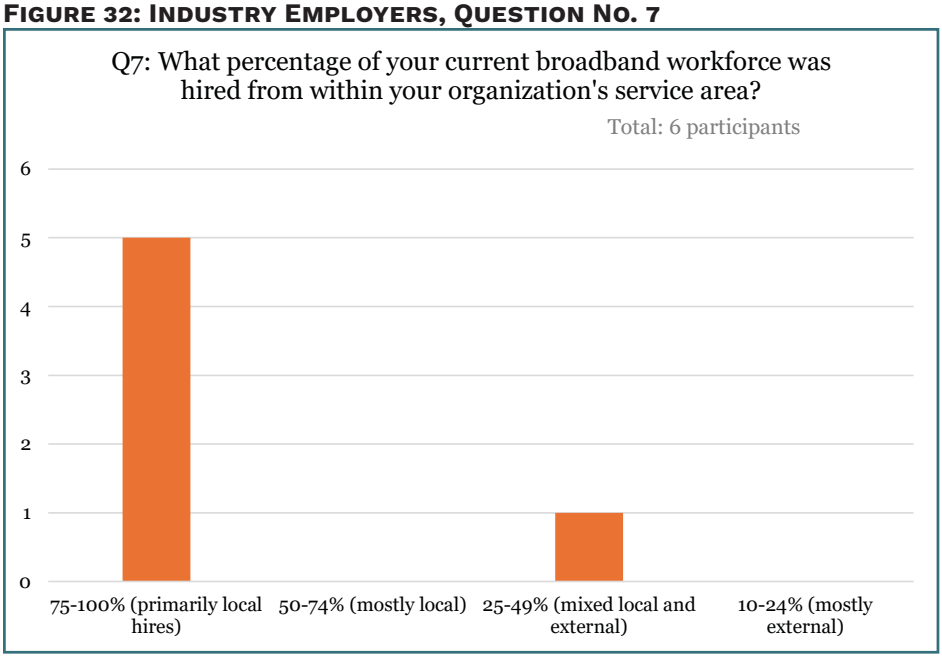
FIGURE 31: INDUSTRY EMPLOYERS, QUESTION NO. 6



7. **What percentage of your current broadband workforce was hired from within your organization's service area?**

a. 75–100% (primarily local hires)
b. 50–74% (mostly local)
c. 25–49% (mixed local and external)
d. 10–24% (mostly external)
e. 0–9% (almost all external hires)

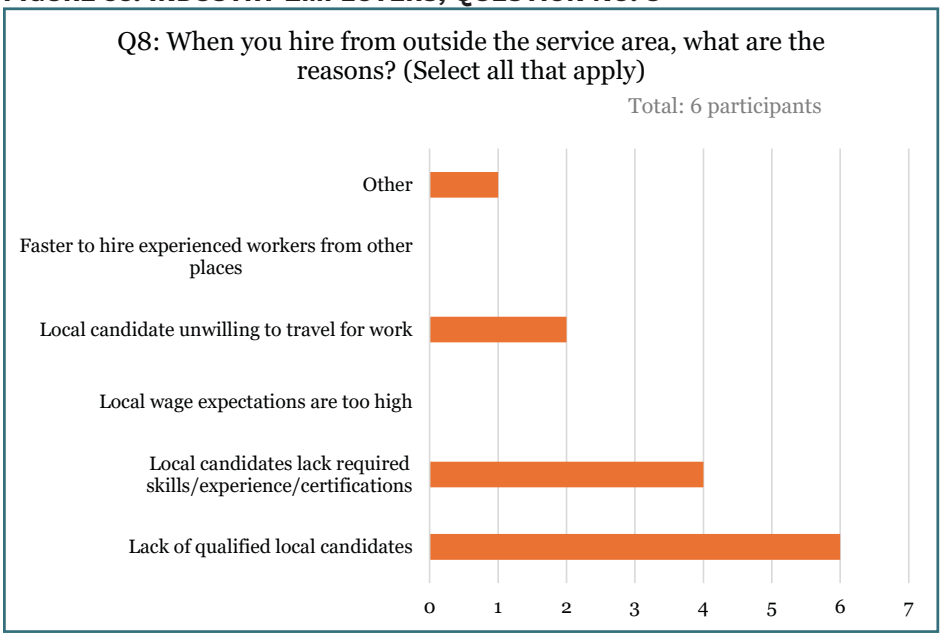
FIGURE 32: INDUSTRY EMPLOYERS, QUESTION NO. 7



8. **When you hire from outside the service area, what are the reasons? (Select all that apply)**

a. Lack of qualified local candidates
b. Local candidates lack required skills/experience/certifications
c. Local wage expectations are too high
d. Local candidate unwilling to travel for work
e. Faster to hire experienced workers from other places
f. Other
g. Not applicable

FIGURE 33: INDUSTRY EMPLOYERS, QUESTION NO. 8

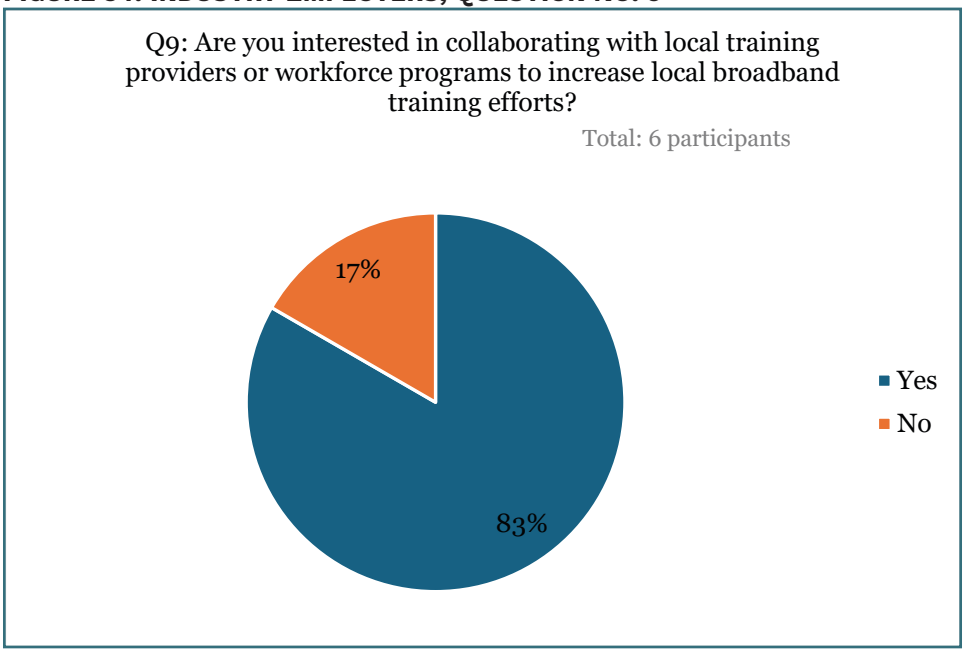


Other:

- especially for anything network IT related

9. **Are you interested in collaborating with local training providers or workforce programs to increase local broadband training efforts?**
   a. Yes
   b. No

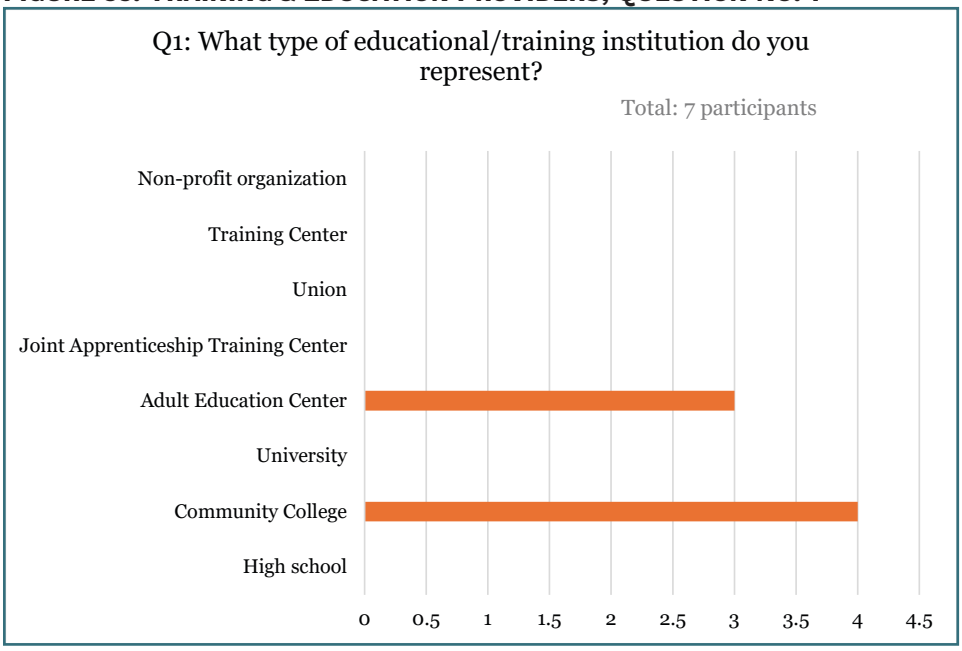
FIGURE 34: INDUSTRY EMPLOYERS, QUESTION NO. 9



Bucket: Training & Education Providers

1. **What type of educational/training institution do you represent?**
   a. High school
   b. Community College
   c. University
   d. Adult Education Center
   e. Joint Apprenticeship Training Center
   f. Union
   g. Training Center
   h. Non-profit organization
   i. Other

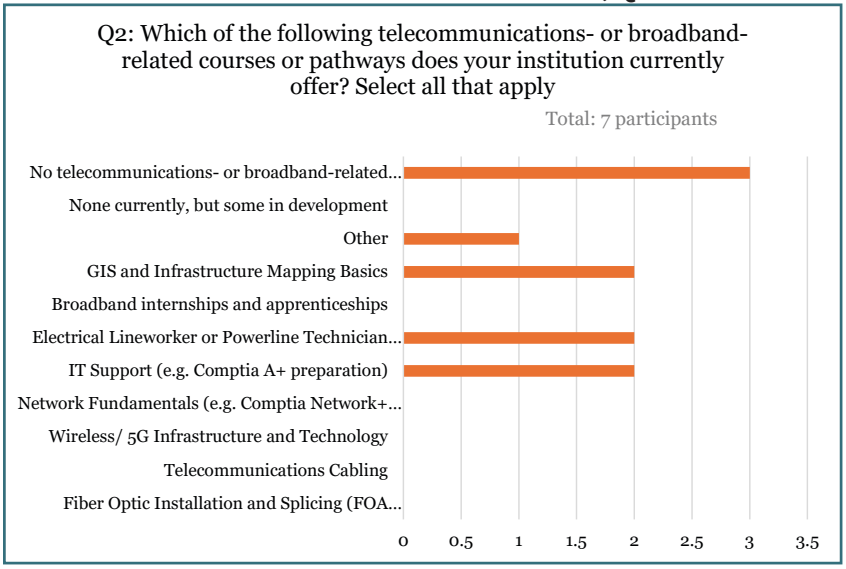
FIGURE 35: TRAINING & EDUCATION PROVIDERS, QUESTION NO. 1



2. **Which of the following telecommunications- or broadband-related courses or pathways does your institution currently offer? Please select all that apply.**

a. Fiber-Optic Installation and Splicing (FOA certified)
b. Telecommunications Cabling
c. Wireless/ 5G Infrastructure and Technology
d. Network Fundamentals (e.g. CompTIA Network+ preparation)
e. IT Support (e.g CompTIA A+ preparation)
f. Electrical Lineworker or Powerline Technician Program
g. Broadband internships and apprenticeships
h. GIS and Infrastructure Mapping Basics
i. Other
j. None currently, but some in development
k. No telecommunications- or broadband-related programs offered

FIGURE 36: TRAINING & EDUCATION PROVIDERS, QUESTION NO. 2



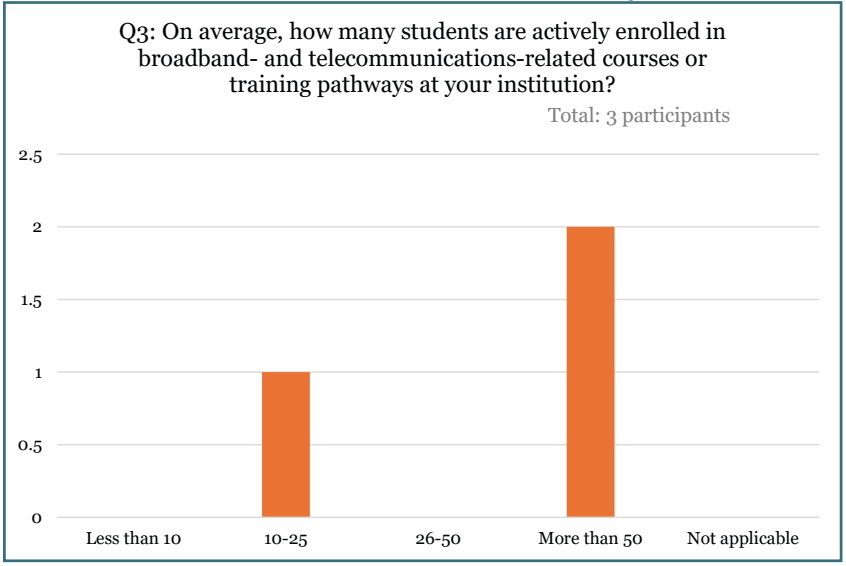
Other:

- Utility Line Clearance Arborist Training

3. **On average, how many students are actively enrolled in broadband- and telecommunications-related courses or training pathways at your institution?**

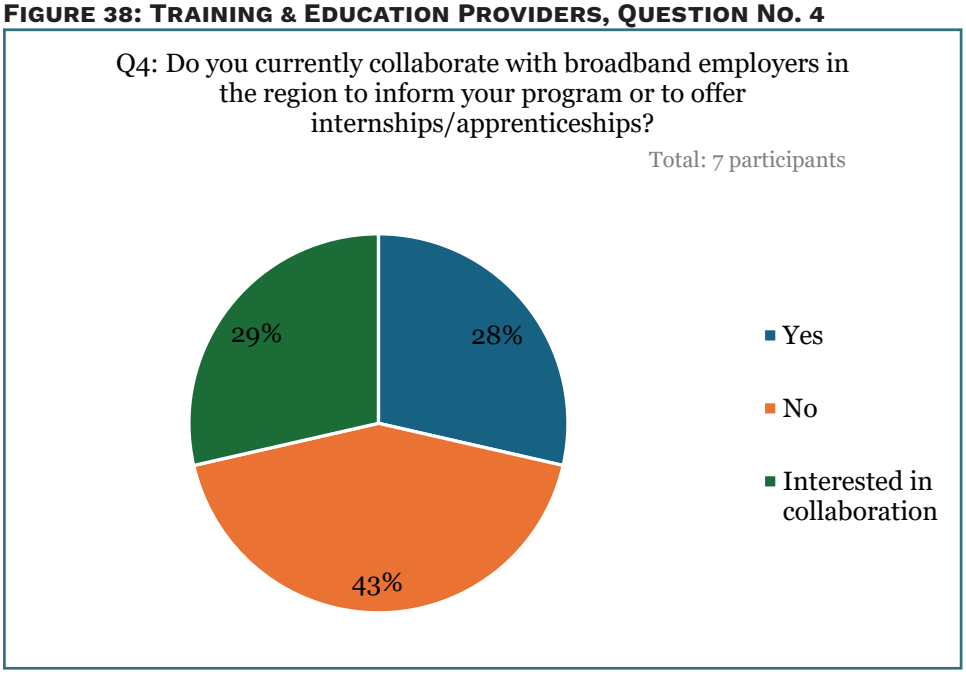
a. Less than 10
b. 10–25
c. 26–50
d. More than 50
e. Not applicable

FIGURE 37: TRAINING & EDUCATION PROVIDERS, QUESTION NO. 3



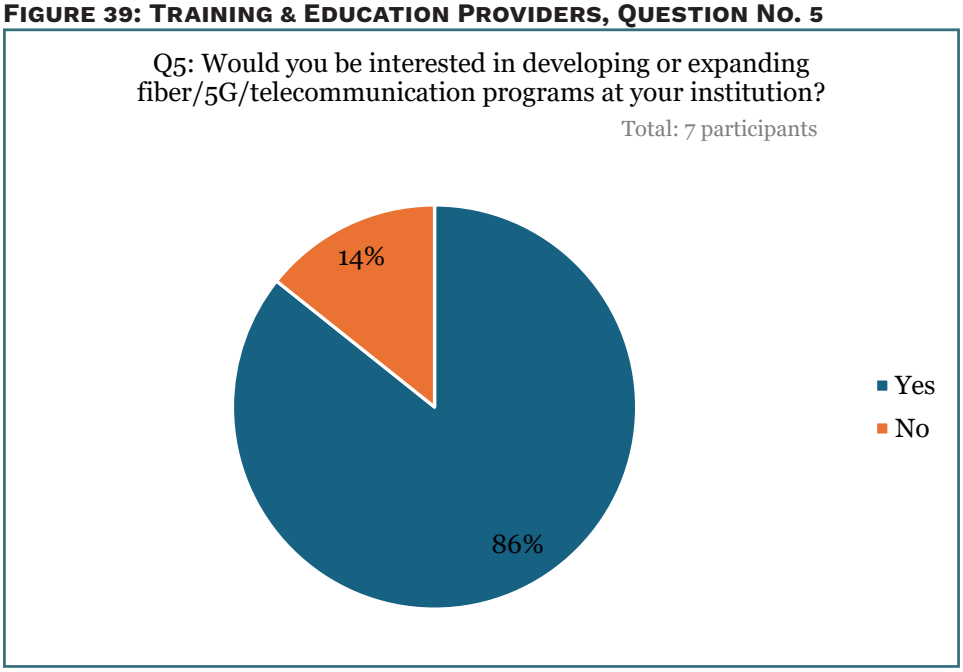
4. **Do you currently collaborate with broadband employers in the region to inform your program or to offer internships/apprenticeships?**
   a. Yes
   b. No
   c. Interested in collaboration

FIGURE 38: TRAINING & EDUCATION PROVIDERS, QUESTION NO. 4



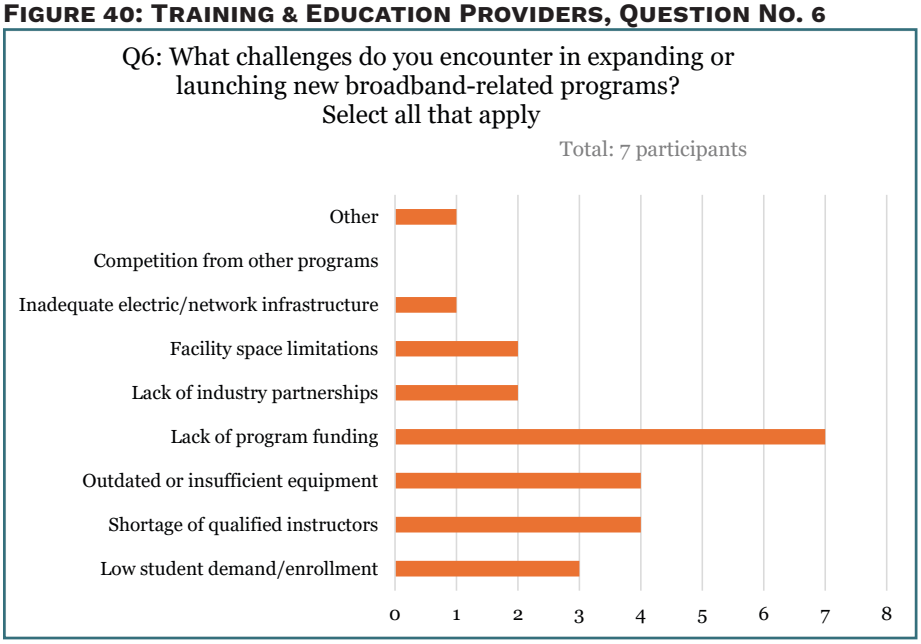
5. **Would you be interested in developing or expanding fiber/5G/telecom programs at your institution?**
   a. Yes
   b. No

FIGURE 39: TRAINING & EDUCATION PROVIDERS, QUESTION NO. 5



6. **What challenges do you encounter in expanding or launching new broadband-related programs?**
   a. Low student demand/enrollment
   b. Shortage of qualified instructors
   c. Outdated or insufficient equipment
   d. Lack of program funding
   e. Lack of industry partnerships
   f. Facility space limitations
   g. Inadequate electrical/network infrastructure
   h. Competition from other programs
   i. Other

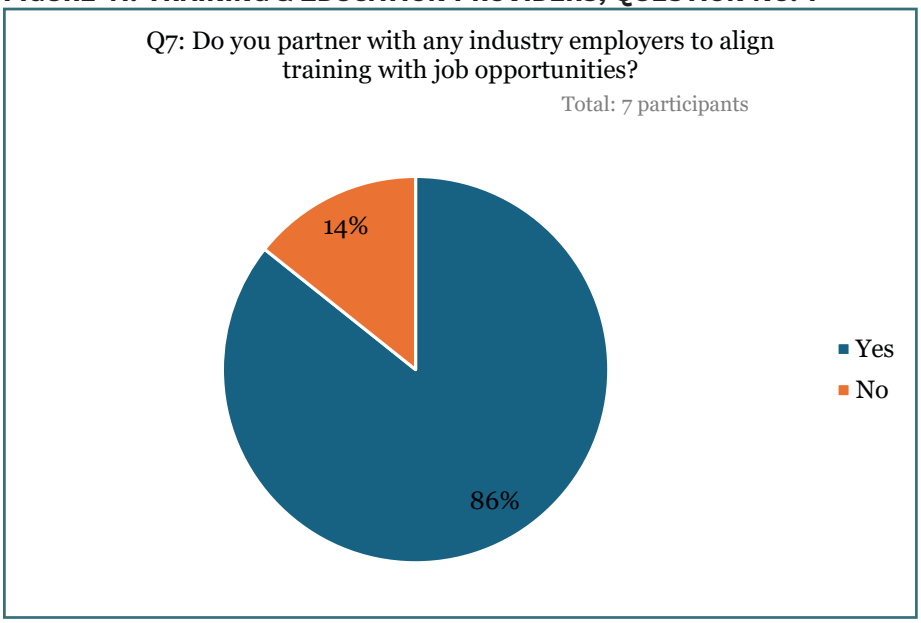
FIGURE 40: TRAINING & EDUCATION PROVIDERS, QUESTION NO. 6



Other:
- limited internet

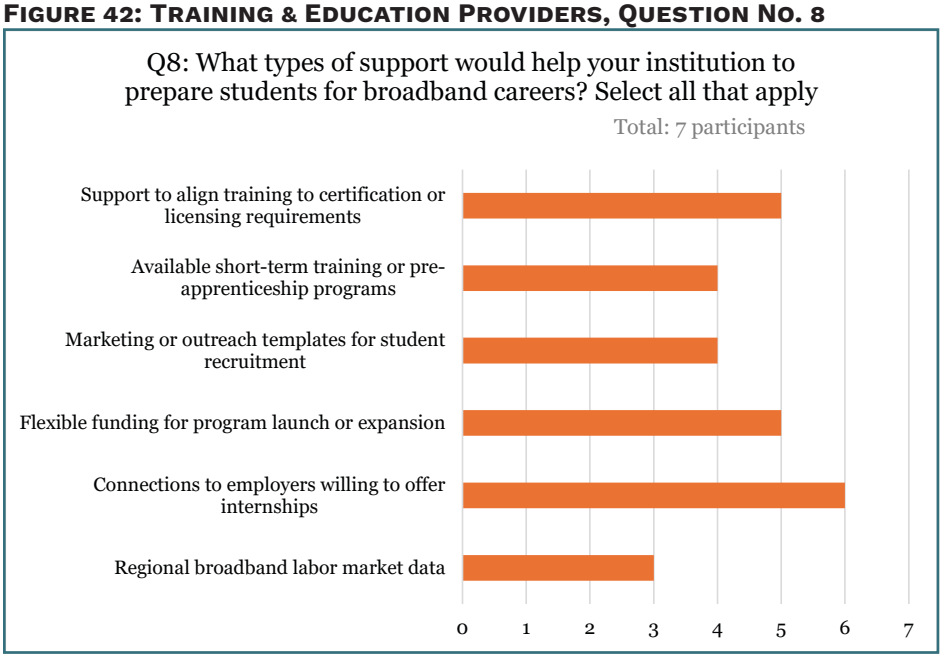
7. **Do you partner with any industry employers to align training with job opportunities?**
   a. Yes
   b. No

FIGURE 41: TRAINING & EDUCATION PROVIDERS, QUESTION NO. 7



8. **What types of support would help your institution to prepare students for broadband careers?**
   a. Regional broadband labor market data
   b. Connections to employers willing to offer internships
   c. Flexible funding for program launch or expansion
   d. Marketing or outreach templates for student recruitment
   e. Available short-term training or pre-apprenticeship programs
   f. Support to align training to certification or licensing requirements
   g. Other

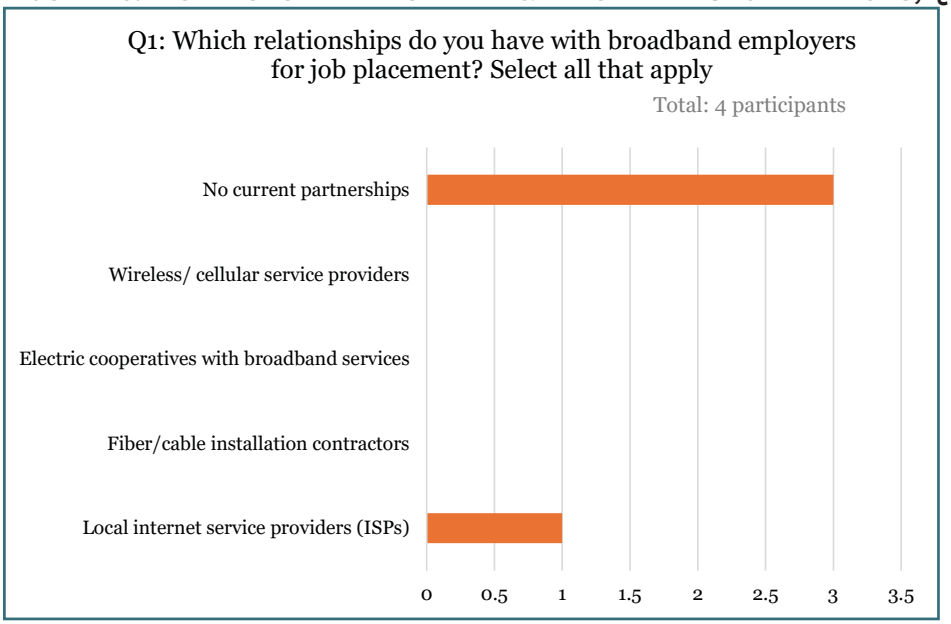
FIGURE 42: TRAINING & EDUCATION PROVIDERS, QUESTION NO. 8



Bucket: Workforce Development & Placement Organizations

1. **Which relationships do you have with broadband employers for job placement?**
   a. Local internet service providers (ISPs)
   b. Fiber/ cable installation contractors
   c. Electric cooperatives with broadband services
   d. Wireless/ cellular service providers
   e. No current partnerships
   f. Other

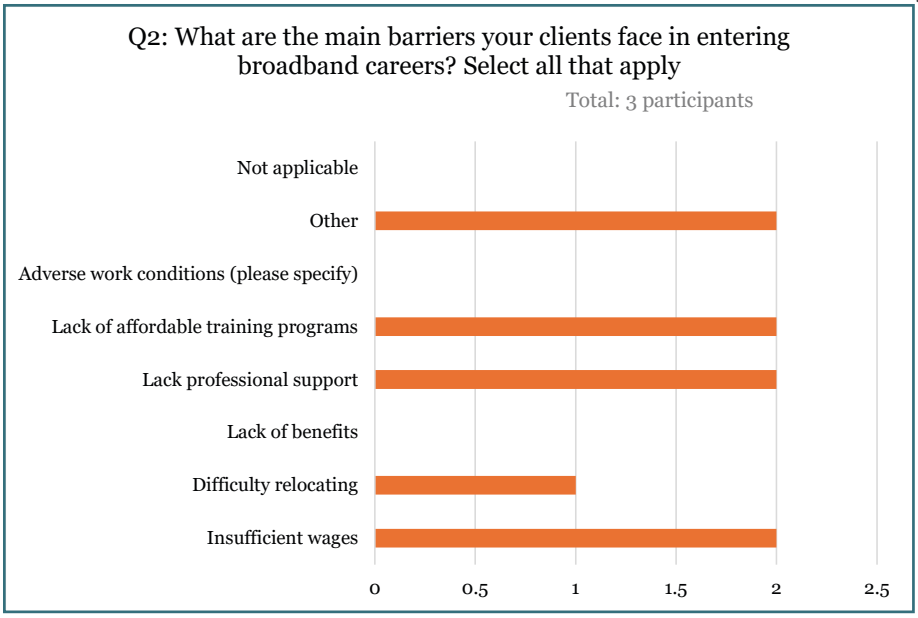
FIGURE 43: WORKFORCE DEVELOPMENT & PLACEMENT ORGANIZATIONS, QUESTION NO. 1



2. What are the main barriers your clients face in entering broadband careers?

a. Insufficient wages
b. Difficulty relocating
c. Lack of benefits
d. Lack professional support
e. Lack of affordable training programs
f. Adverse work conditions (please specify)
g. Other
h. Not applicable

FIGURE 44: WORKFORCE DEVELOPMENT & PLACEMENT ORGANIZATIONS, QUESTION NO. 2



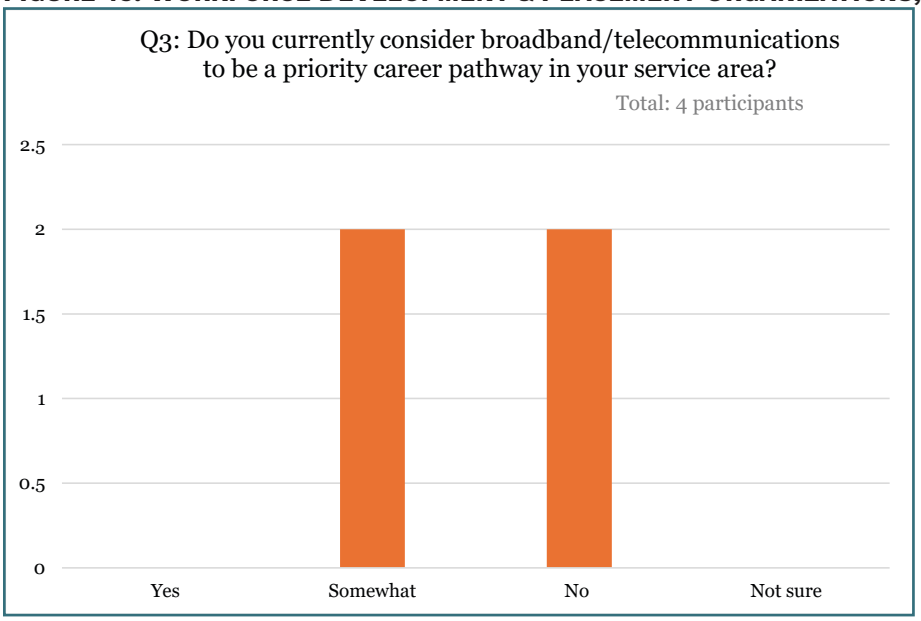
Other:

- not sure
- poor internet connection or clients dont have access to internet in rural regions

3. Do you currently consider broadband/telecommunications to be a priority career pathway in your service area?

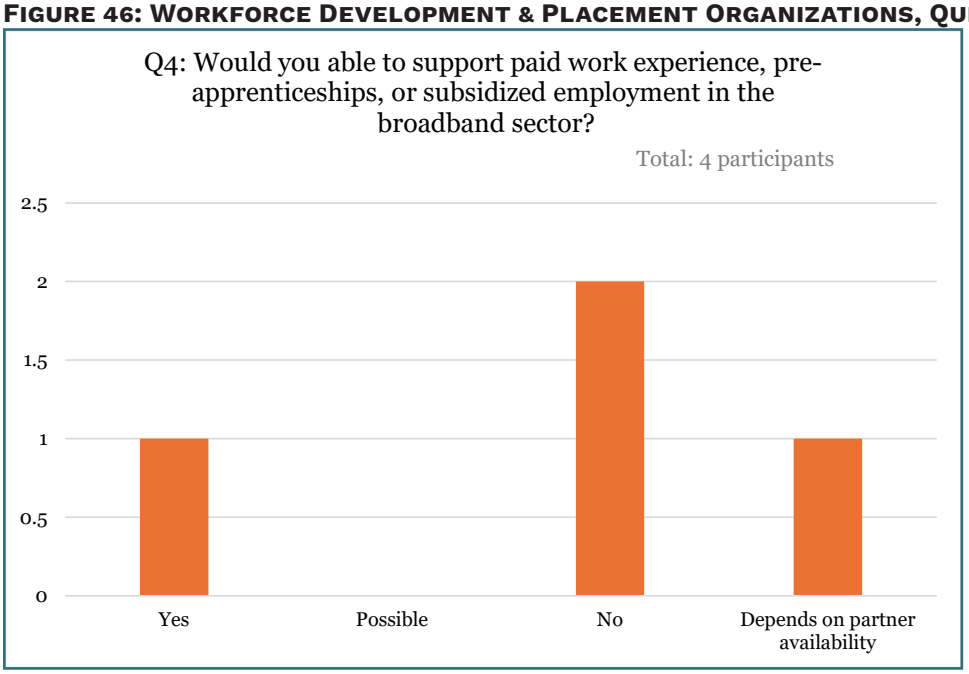
a. Yes
b. Somewhat
c. No
d. Not sure

FIGURE 45: WORKFORCE DEVELOPMENT & PLACEMENT ORGANIZATIONS, QUESTION NO. 3



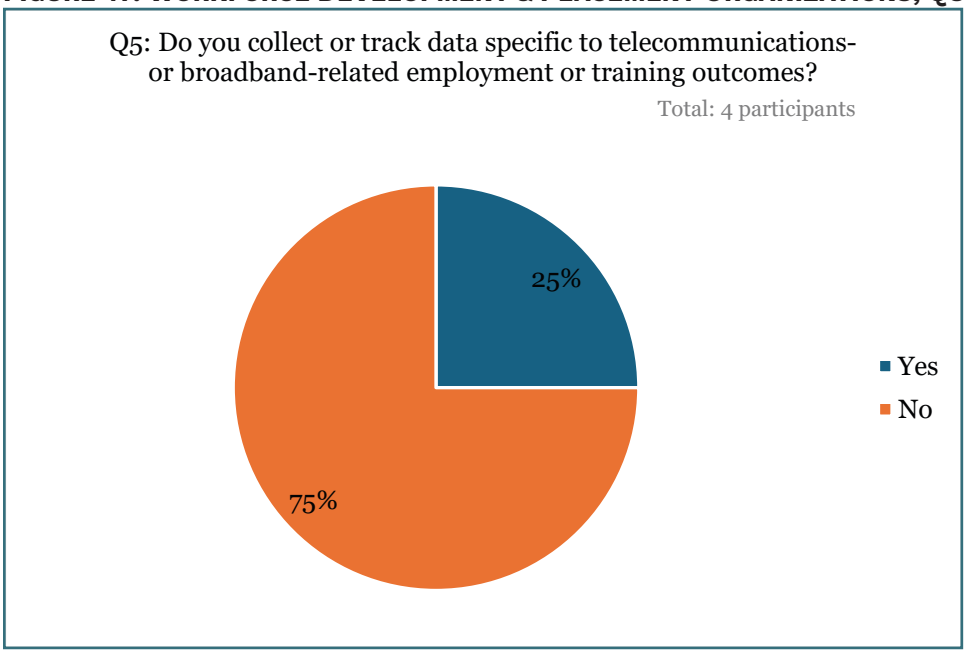
4. **Would you be able to support paid work experience, pre-apprenticeships, or subsidized employment in the broadband sector?**
   a. Yes
   b. Possible
   c. No
   d. Depends on partner availability

FIGURE 46: WORKFORCE DEVELOPMENT & PLACEMENT ORGANIZATIONS, QUESTION NO. 4



5. **Do you collect or track data specific to telecommunications- or broadband-related employment or training outcomes?**
   a. Yes
   b. No

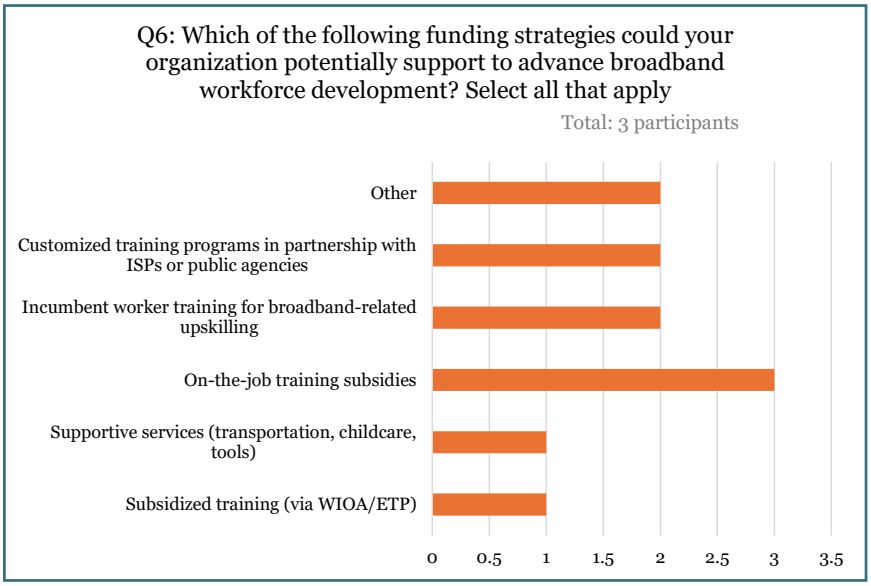
FIGURE 47: WORKFORCE DEVELOPMENT & PLACEMENT ORGANIZATIONS, QUESTION NO. 5



6. **Which of the following funding strategies could your organization potentially support to advance broadband workforce development? (Check all that apply)**

a. Subsidized training (via WIOA/ETP)
b. Supportive services (transportation, childcare, tools)
c. On-the-job training subsidies
d. Incumbent worker training for broadband-related upskilling
e. Customized training programs in partnership with ISPs or public agencies
f. None of the above
g. Other

FIGURE 48: WORKFORCE DEVELOPMENT & PLACEMENT ORGANIZATIONS, QUESTION NO. 6



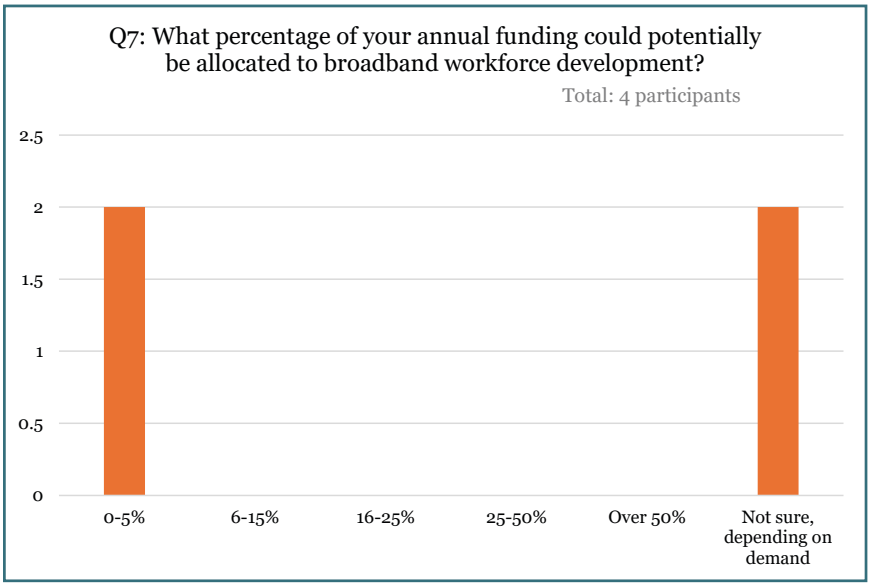
Other:

- access to affordable broadband
- Resume pre screening, free job board, resume referrals.

7. **What percentage of your annual funding could potentially be allocated to broadband workforce development?**

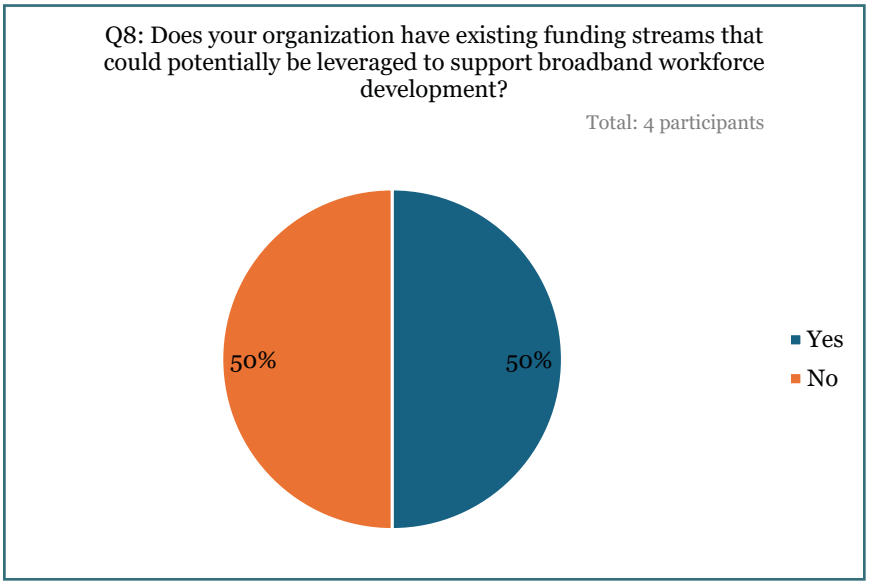
a. 0–5 %
b. 6–15%
c. 16–25%
d. 25–50%
e. Over 50%
f. Not sure, depending on demand

FIGURE 49: WORKFORCE DEVELOPMENT & PLACEMENT ORGANIZATIONS, QUESTION NO. 7



8. **Does your organization have existing funding streams that could potentially be leveraged to support broadband workforce development?**
   a. Yes
   b. No

FIGURE 50: WORKFORCE DEVELOPMENT & PLACEMENT ORGANIZATIONS, QUESTION NO. 8



If yes, please provide the name of the funding source below:

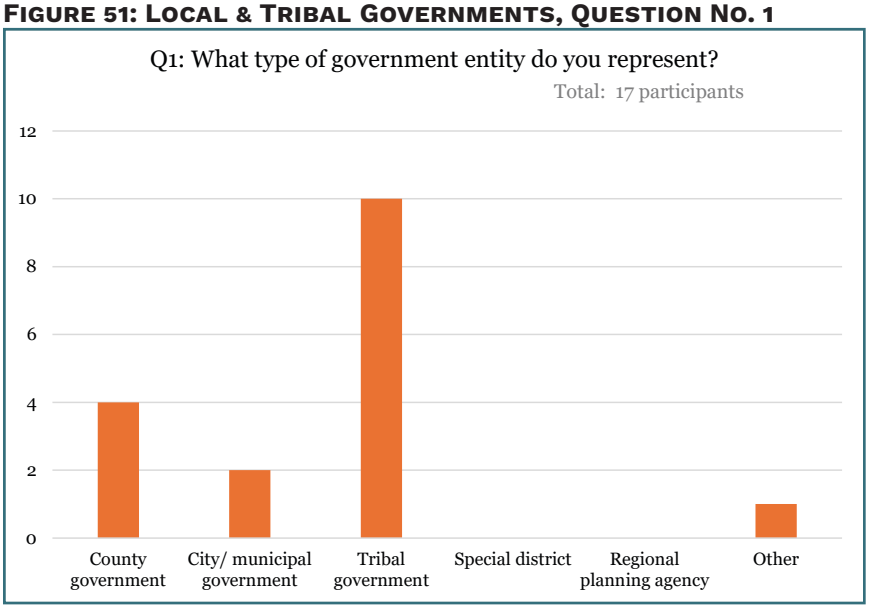
Short answer:

- McConnell, Ford Family Foundation, Friday Night Live,
- HIRE Grant, REALM Grant, assorted young adult work experience programs. Dislocated Worker Grants.

Bucket: Local & Tribal Governments

1. **What type of government entity do you represent?**
   a. County government
   b. City/ municipal government
   c. Tribal government
   d. Special district
   e. Regional planning agency
   f. Other

FIGURE 51: LOCAL & TRIBAL GOVERNMENTS, QUESTION NO. 1

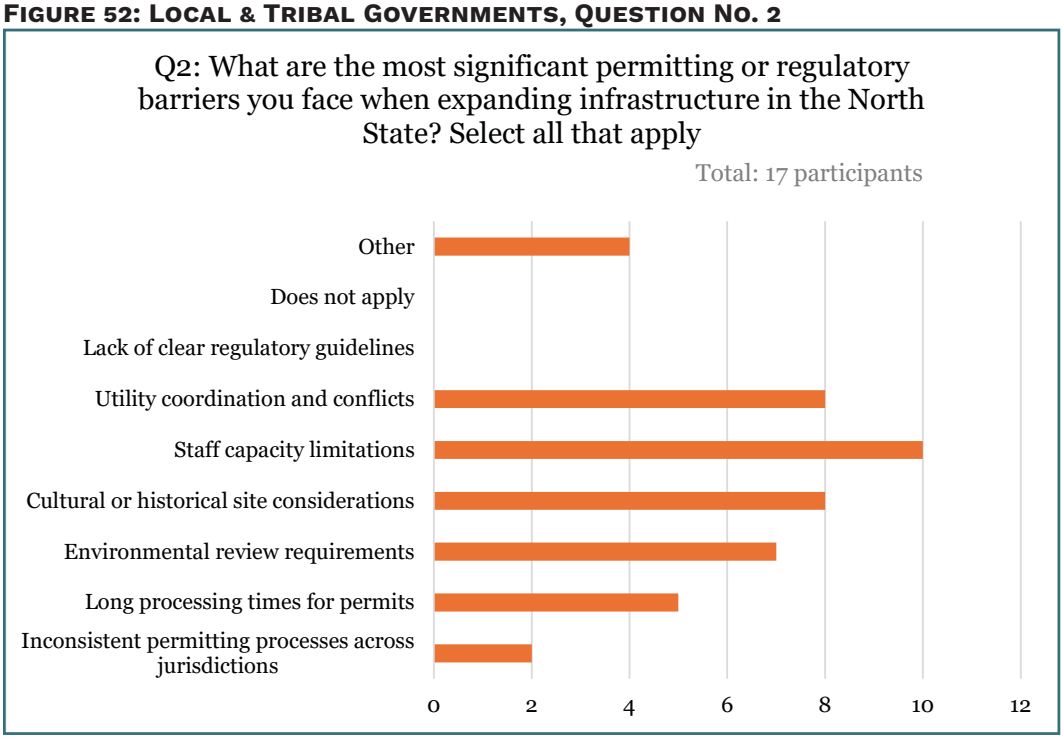


Other:

- Homeowners Association

2. **What are the most significant permitting or regulatory barriers you face when expanding broadband infrastructure in the North State? (Select all that apply)**
   a. Inconsistent permitting processes across jurisdictions
   b. Long processing times for permits
   c. Environmental review requirements
   d. Cultural or historical site considerations
   e. Staff capacity limitations
   f. Utility coordination and conflicts
   g. Lack of clear regulatory guidelines
   h. Does not apply
   i. Other

FIGURE 52: LOCAL & TRIBAL GOVERNMENTS, QUESTION NO. 2

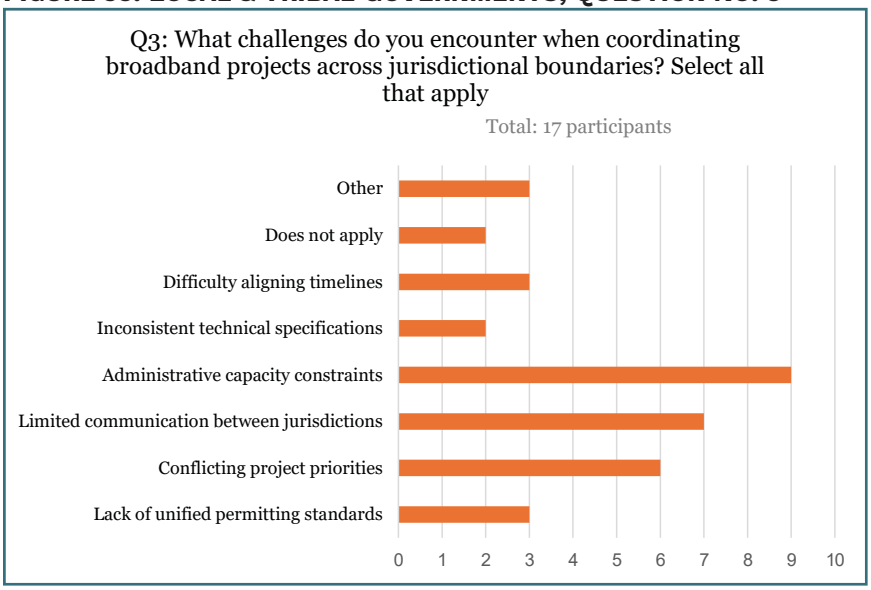


Other:

- Lack of understanding of previous "mistakes" by infrastructure utilities in ROW and ownership -- where we are able to own or co-own infrastructure that wasn't permitted correctly.
- Lack of private investment
- Lack of money
- Lack of funds and expertise

3. **What challenges do you encounter when coordinating broadband projects across jurisdictional boundaries? (Select all that apply)**
   a. Lack of unified permitting standards
   b. Conflicting project priorities
   c. Limited communication between jurisdictions
   d. Administrative capacity constraints
   e. Inconsistent technical specifications
   f. Difficulty aligning timelines
   g. Does not apply
   h. Other

FIGURE 53: LOCAL & TRIBAL GOVERNMENTS, QUESTION NO. 3

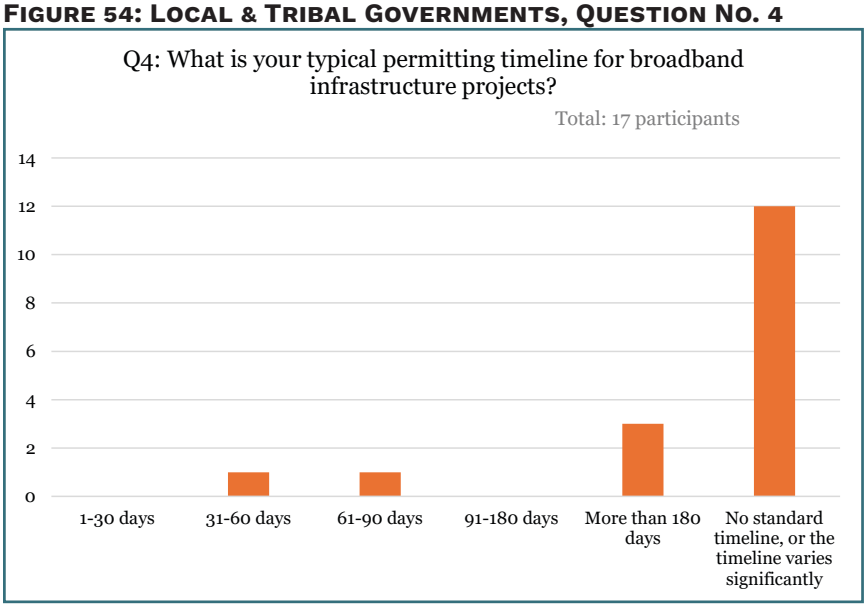


Other:

- Funding uncertainty
- Funding
- Lack of following the NAHC contact list.

4. **What is your typical permitting timeline for broadband infrastructure projects?**
   a. 1–30 days
   b. 31–60 days
   c. 61–90 days
   d. 91–180 days
   e. More than 180 days
   f. No standard timeline, or the timeline varies significantly

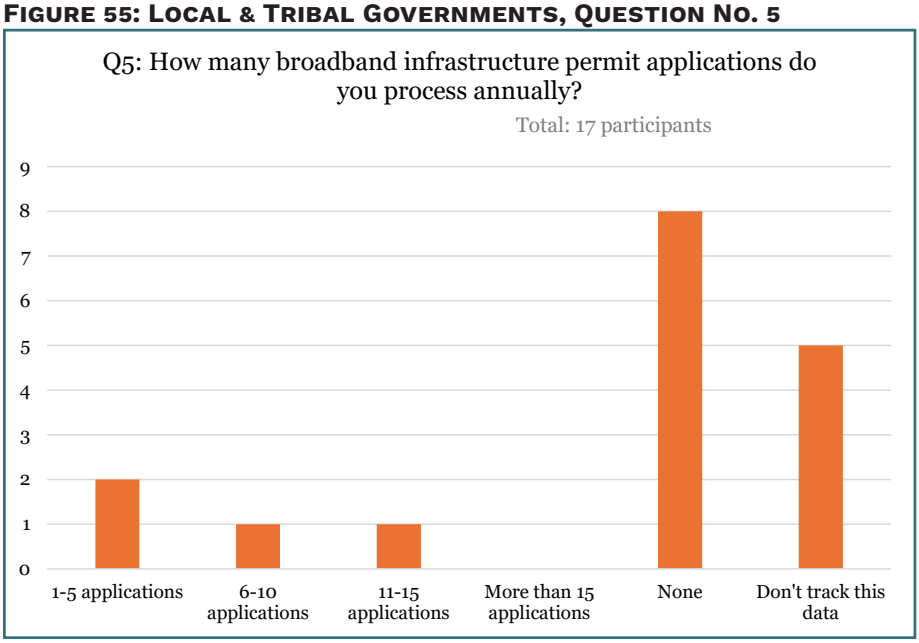
FIGURE 54: LOCAL & TRIBAL GOVERNMENTS, QUESTION NO. 4



5. How many broadband infrastructure permit applications do you process annually?

a. 1–5 applications
b. 6–10 applications
c. 11–15 applications
d. More than 15 applications
e. None
f. Don't track this data

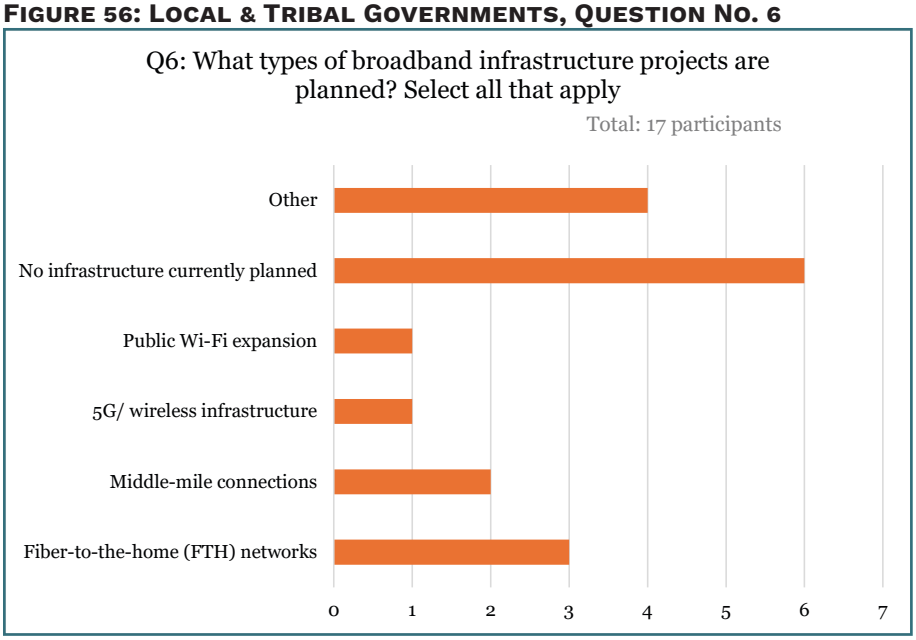
FIGURE 55: LOCAL & TRIBAL GOVERNMENTS, QUESTION NO. 5



6. What types of broadband infrastructure projects are planned?

a. Fiber-to-the-home (FTTH) networks
b. Middle-mile connections
c. 5G/ wireless infrastructure
d. Public Wi-Fi expansion
e. No infrastructure currently planned
f. Other

FIGURE 56: LOCAL & TRIBAL GOVERNMENTS, QUESTION NO. 6



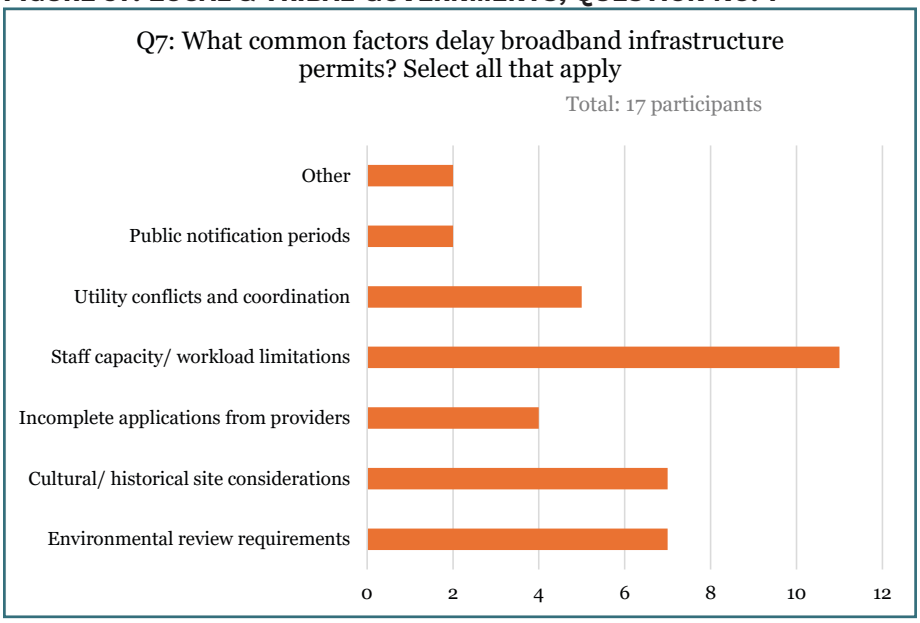
Other:

- Radio and ISP for county use
- All
- Minor infrastructure has been built. We have 3 "hubs".
- FTH & Middle-mile

7. What common factors delay broadband infrastructure permits?

a. Environmental review requirements
b. Cultural/ historical site considerations
c. Incomplete applications from providers
d. Staff capacity/ workload limitations
e. Utility conflicts and coordination
f. Public notification periods
g. Other

FIGURE 57: LOCAL & TRIBAL GOVERNMENTS, QUESTION NO. 7



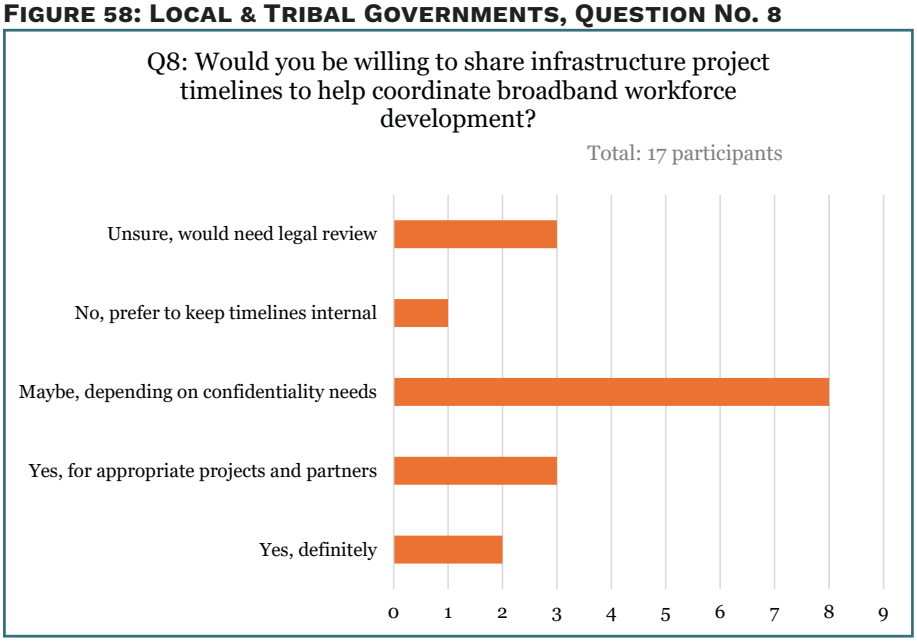
Other:

- Funding uncertainty, delays

8. Would you be willing to share infrastructure project timelines to help coordinate broadband workforce development?

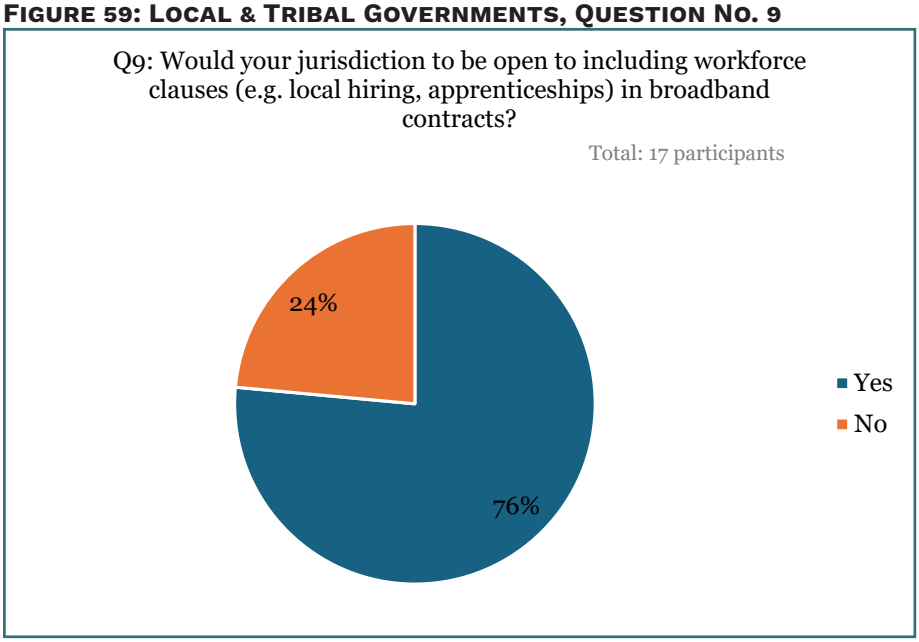
a. Yes, definitely
b. Yes, for appropriate projects and partners
c. Maybe, depending on confidentiality needs
d. No, prefer to keep timelines internal
e. Unsure, would need legal review

FIGURE 58: LOCAL & TRIBAL GOVERNMENTS, QUESTION NO. 8



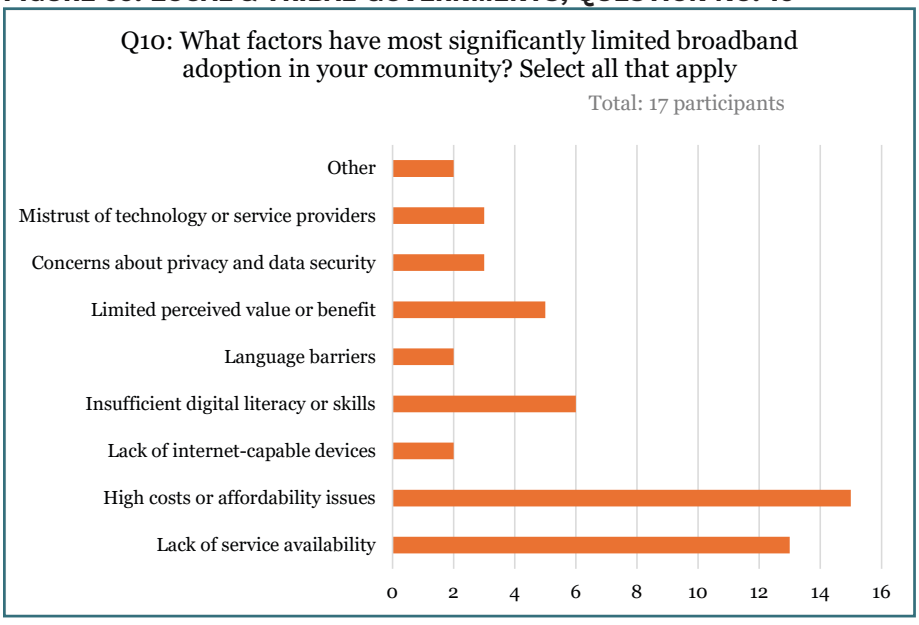
9. **Would your jurisdiction be open to including workforce clauses (e.g., local hiring, apprenticeships) in broadband contracts?**
   a. Yes
   b. No

FIGURE 59: LOCAL & TRIBAL GOVERNMENTS, QUESTION NO. 9



10. **What factors have most significantly limited broadband adoption in your community? (Select all that apply)**
   a. Lack of service availability
   b. High costs or affordability issues
   c. Lack of internet-capable devices
   d. Insufficient digital literacy or skills
   e. Language barriers
   f. Limited perceived value or benefit
   g. Concerns about privacy and data security
   h. Mistrust of technology or service providers
   i. Other

FIGURE 60: LOCAL & TRIBAL GOVERNMENTS, QUESTION NO. 10



Other:

- Lack of broadband in foothills
- I am not sure

Additional Tribal Questions

1. **How would you categorize your role in your Tribal government organization?**
   a. Tribal Council Member
   b. Education Department
   c. Community Department
   d. Economic Department
   e. Other

FIGURE 61: TRIBAL QUESTION NO. 1

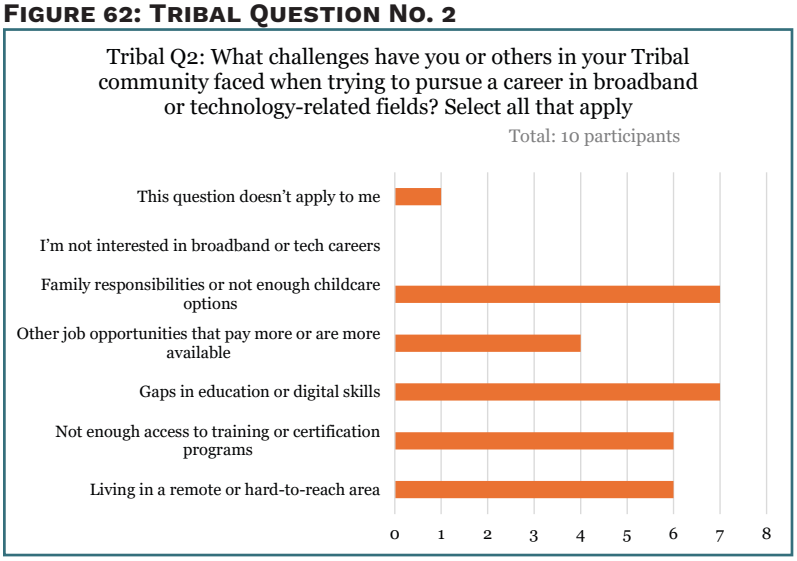


Other:

- IT Director
- Tribal Administrator
- Public Works
- IT
- Executive Director of Tribal Operations
- Grant Development

2. **What challenges have you or others in your Tribal community faced when trying to pursue a career in broadband or technology-related fields? (Select all that apply)**
   a. Living in a remote or hard-to-reach area
   b. Not enough access to training or certification programs
   c. Gaps in education or digital skills
   d. Other job opportunities that pay more or are more available
   e. Family responsibilities or not enough childcare options
   f. I'm not interested in broadband or tech careers
   g. This question doesn't apply to me
   h. Other

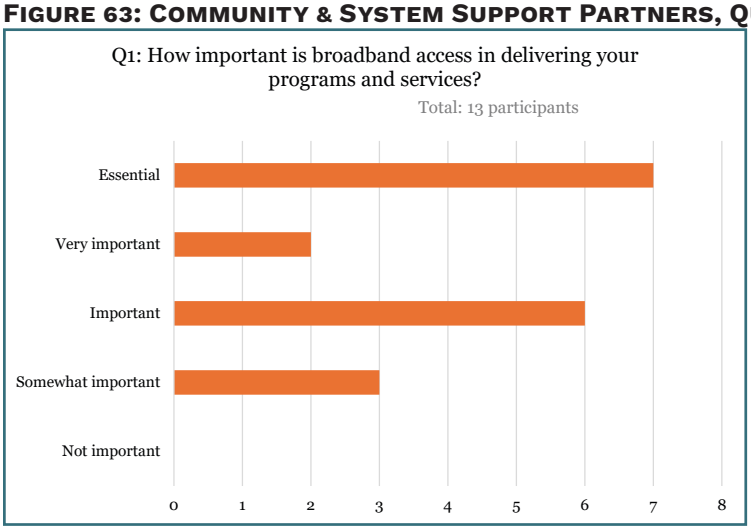
FIGURE 62: TRIBAL QUESTION NO. 2



Bucket: Community & System Support Partners

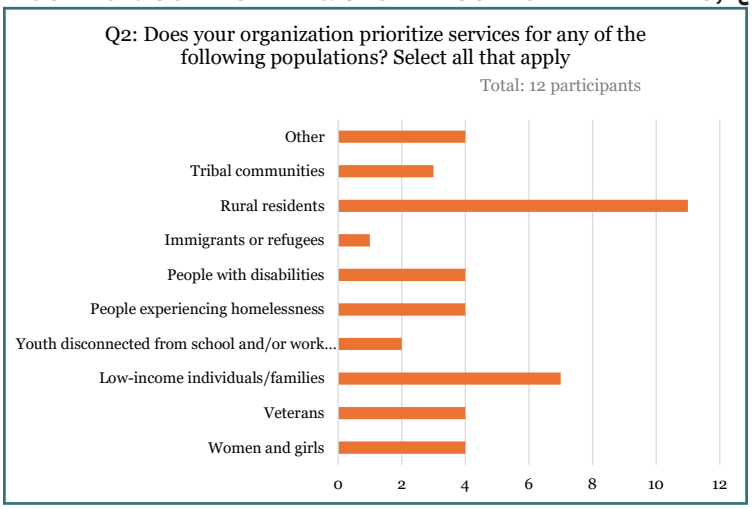
1. **How important is broadband access in delivering your programs and services?**
   a. Not important
   b. Somewhat important
   c. Important
   d. Very important
   e. Essential

FIGURE 63: COMMUNITY & SYSTEM SUPPORT PARTNERS, QUESTION NO. 1



2. **Does your organization prioritize services for any of the following populations? Select all that apply.**
   a. Women and girls
   b. Veterans
   c. Low-income individuals/families
   d. Youth disconnected from school and/or work (ages 16–24)
   e. People experiencing homelessness
   f. People with disabilities
   g. Immigrants or refugees
   h. Rural residents
   i. Tribal communities
   j. Other
   k. Not applicable

FIGURE 64: COMMUNITY & SYSTEM SUPPORT PARTNERS, QUESTION NO. 2



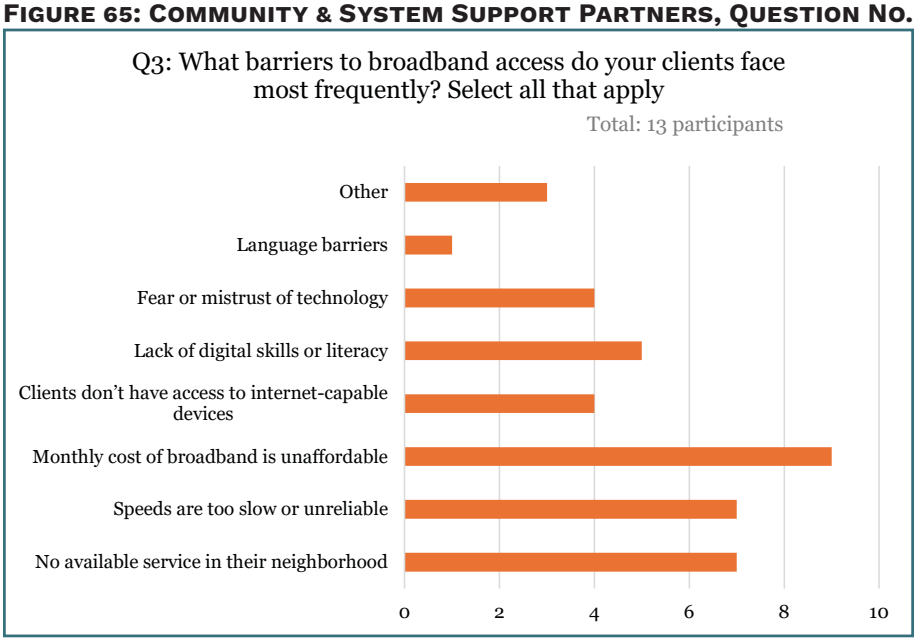
Other:

- College graduates with degrees in forestry and wildlife biology
- Local business development.
- Residents of WUI areas
- families with children

3. What barriers to broadband access do your clients face most frequently?

a. No available service in their neighborhood
b. Speeds are too slow or unreliable
c. Monthly cost of broadband is unaffordable
d. Clients don't have access to internet-capable devices
e. Lack of digital skills or literacy
f. Fear or mistrust of technology
g. Language barriers
h. Other

FIGURE 65: COMMUNITY & SYSTEM SUPPORT PARTNERS, QUESTION NO. 3



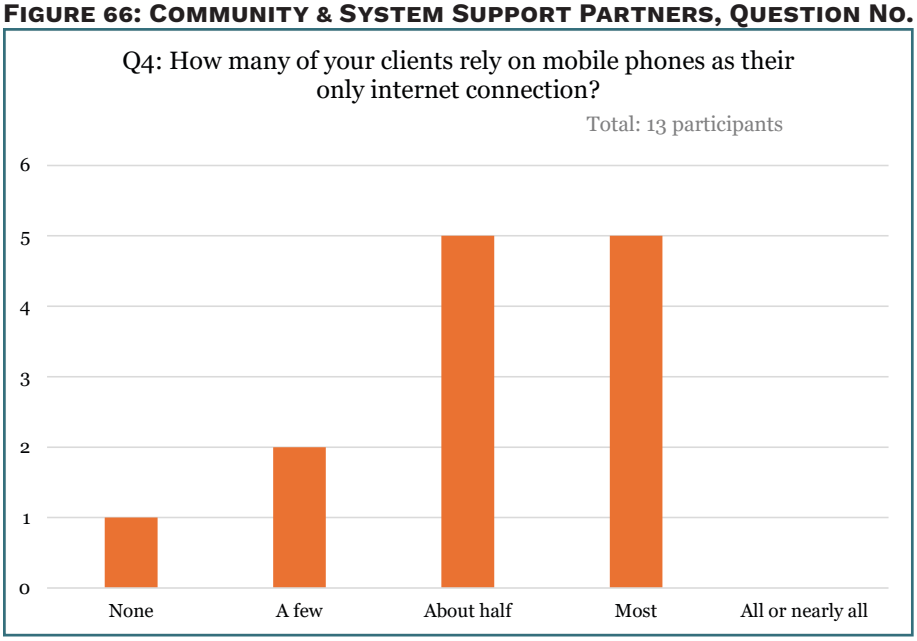
Other:

- unable to operate devices due to type of disability; limited amount of use each month
- We typically hear that folks do not have reliable internet in rural areas.
- ATT Wireless only, very minimal. I have to travel to Placerville to upload large files

4. How many of your clients rely on mobile phones as their only internet connection?

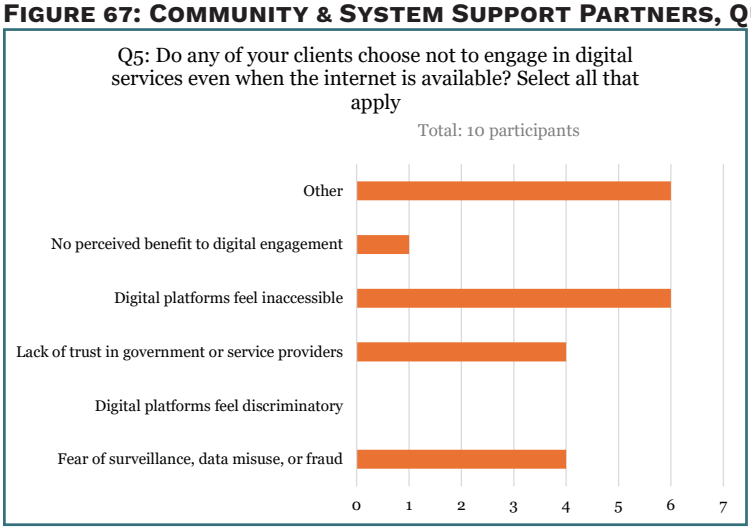
a. None
b. A few
c. About half
d. Most
e. All or nearly all

FIGURE 66: COMMUNITY & SYSTEM SUPPORT PARTNERS, QUESTION NO. 4



5. **Do any of your clients choose not to engage in digital services even when the internet is available? If so, why? Select all that apply.**
   a. Fear of surveillance, data misuse, or fraud
   b. Digital platforms feel discriminatory
   c. Lack of trust in government or service providers
   d. Digital platforms feel inaccessible
   e. No perceived benefit to digital engagement
   f. Other
   g. Not applicable

FIGURE 67: COMMUNITY & SYSTEM SUPPORT PARTNERS, QUESTION NO. 5

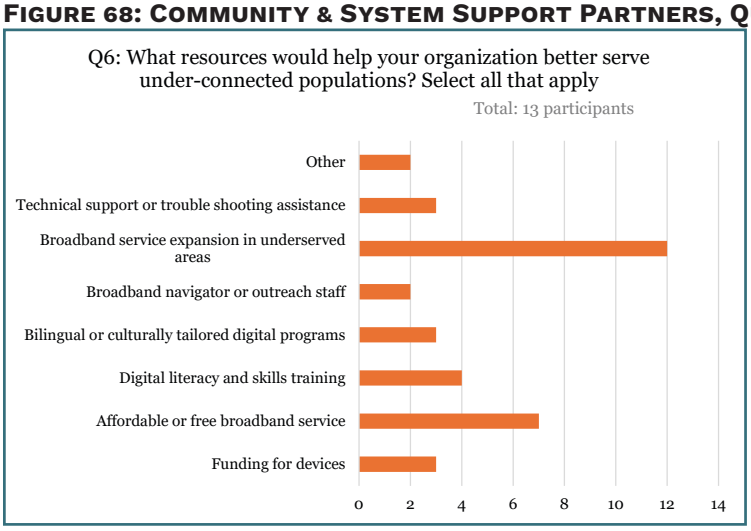


Other:

- inconvenient-eg go to library or wifi site
- Too slow or drop out coverage
- Unknown
- Unreliable networks, scam fears
- Age of users means many don't use the internet even if they have it.
- prefer in person interactions

6. **What resources would help your organization better serve under-connected populations?**
   a. Funding for devices
   b. Affordable or free broadband service
   c. Digital literacy and skills training
   d. Bilingual or culturally tailored digital programs
   e. Broadband navigator or outreach staff
   f. Broadband service expansion in underserved areas
   g. Technical support or trouble shooting assistance
   h. Other

FIGURE 68: COMMUNITY & SYSTEM SUPPORT PARTNERS, QUESTION NO. 6



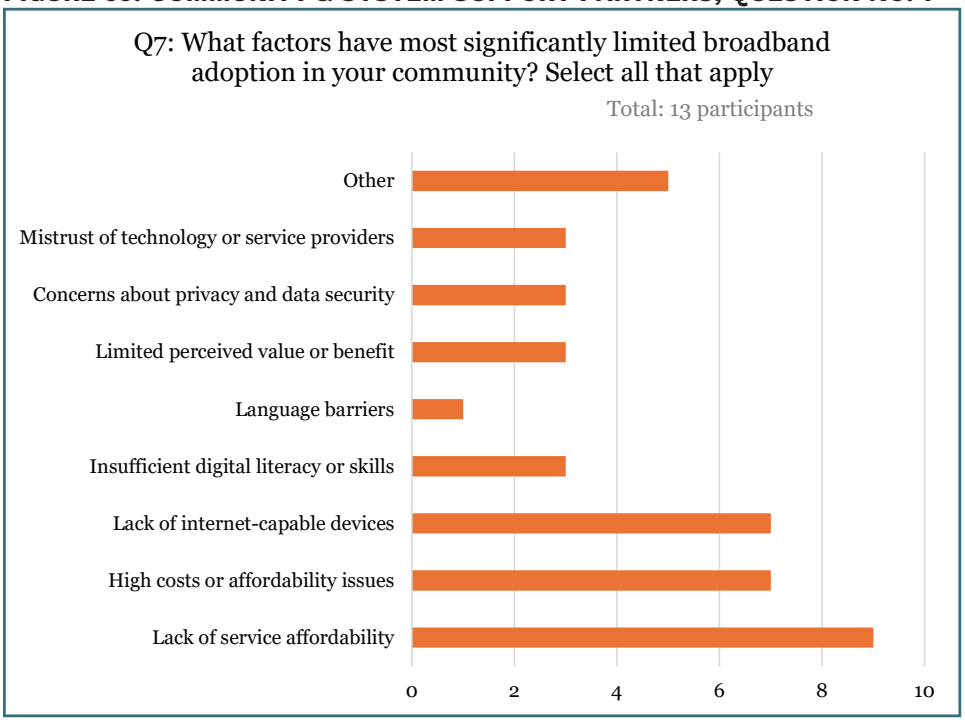
Other:

- We do farmer marketing, state park and county marketing. Need "farmer's market" site

7. **What factors have most significantly limited broadband adoption in your community? (Select all that apply)**

a. Lack of service availability
b. High costs or affordability issues
c. Lack of internet-capable devices
d. Insufficient digital literacy or skills
e. Language barriers
f. Limited perceived value or benefit
g. Concerns about privacy and data security
h. Mistrust of technology or service providers
i. Other

FIGURE 69: COMMUNITY & SYSTEM SUPPORT PARTNERS, QUESTION NO. 7

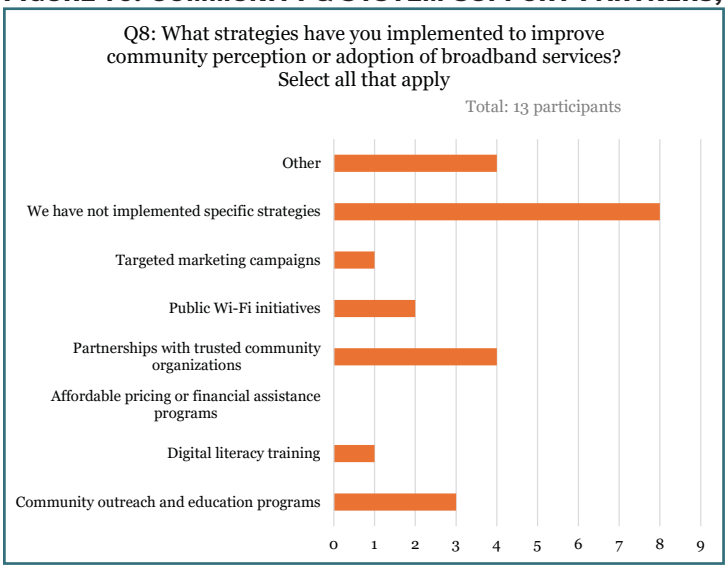


Other:

- limited or lack of service; slow speeds; adaptive equipment for disability
- Its unavailable. No fober to bring it to our neighborhoods
- Unknown
- Bad connections - no service!
- Not available in all areas.

8. **What strategies have you implemented to improve community perception or adoption of broadband services? (Select all that apply)**
   a. Community outreach and education programs
   b. Digital literacy training
   c. Affordable pricing or financial assistance programs
   d. Partnerships with trusted community organizations
   e. Public Wi-Fi initiatives
   f. Targeted marketing campaigns
   g. We have not implemented specific strategies
   h. Other

FIGURE 70: COMMUNITY & SYSTEM SUPPORT PARTNERS, QUESTION NO. 8



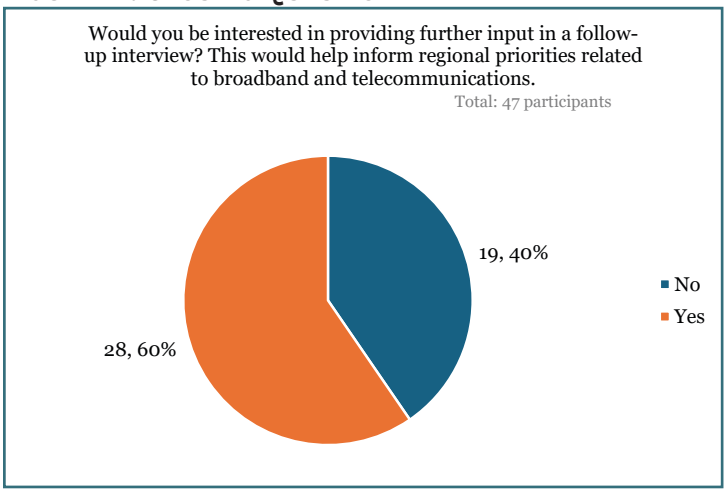
Other:

- Agency on Aging had funds to give away devices & time-limited service. Program ended.
- State and National Lobbyists
- Ag Marketing meetings: need easy farmer's market site to post ripe produce

Closing Question(s)

1. **Would you be interested in providing further input in a follow-up interview? This would help inform regional priorities related to broadband and telecommunications.**
   a. Yes
   b. No

FIGURE 71: CLOSING QUESTION



If yes, please provide your preferred contact information below.

Responses to this question have been omitted to respect the privacy of our survey respondents. 47 responses were received.

Appendix F: ISP-Specific Survey Questions and Responses

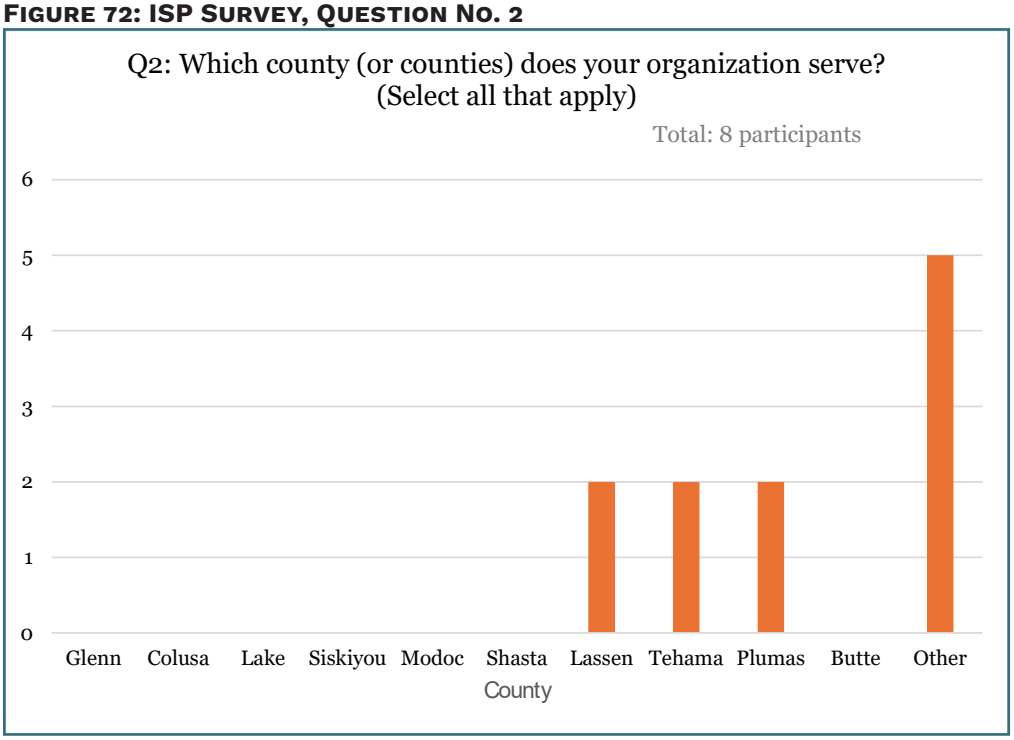
1. What is the name of your company?

Responses to this question have been omitted to respect the privacy of our survey respondents. 8 responses were received.

2. Which county (or counties) does your organization serve? (Select all that apply)

a. Glenn
b. Colusa
c. Lake
d. Siskiyou
e. Modoc
f. Shasta
g. Lassen
h. Tehama
i. Plumas
j. Butte
k. Other

FIGURE 72: ISP SURVEY, QUESTION NO. 2



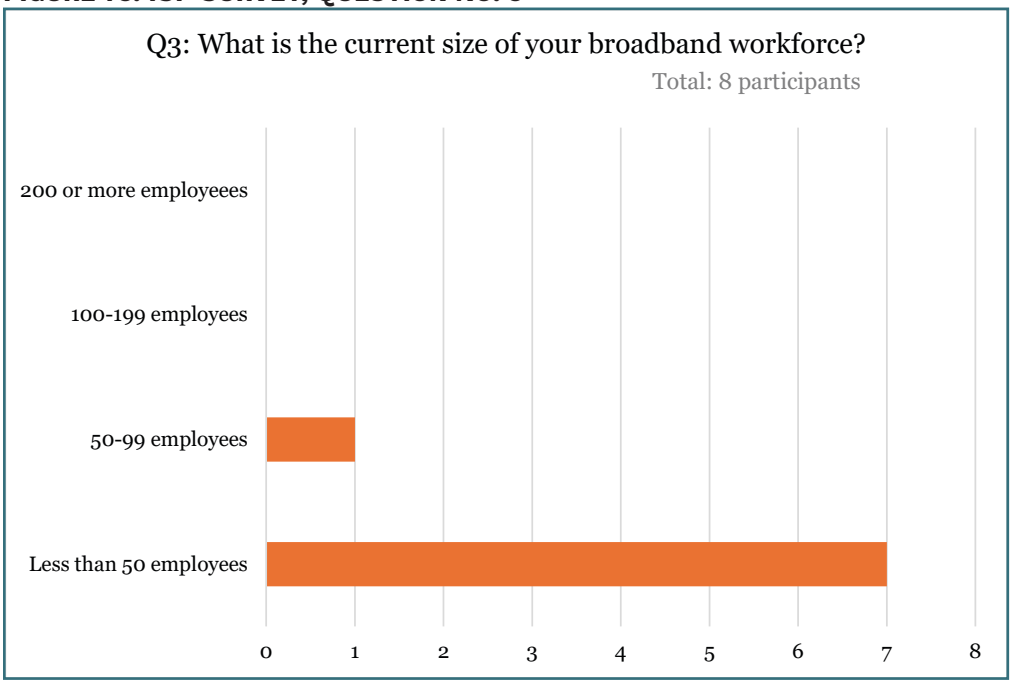
Other:

- Don't provide Broadband but I use it for our workforce
- Sonoma
- looking to get into development of telecommunications infrastructure
- Sierra
- Sierra

3. What is the current size of your broadband workforce?

a. Less than 50 employees
b. 50–99 employees
c. 100–199 employees
d. 200 or more employees

FIGURE 73: ISP SURVEY, QUESTION NO. 3



4. How many employees are working in the following areas?

TABLE 72: ISP SURVEY, QUESTION NO. 4
(TOTAL: 8 PARTICIPANTS)

	0–10%	11–25%	25–50%	51–75%	Over 75%
Network security & management	7	1			
Fields operations & customer support	5		1	1	1
Installation and maintenance	4		2	1	1
Research & development	6				2
Enterprise & wholesale services	7	1			
IT infrastructure	7		1		

5. What percentage of your workforce operates in each of the following categories?

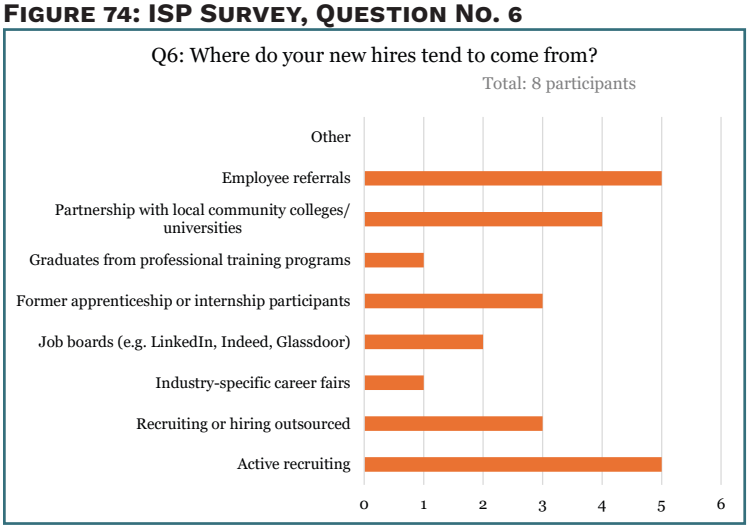
TABLE 73: ISP SURVEY, QUESTION NO. 5
(TOTAL: 8 PARTICIPANTS)

	0–10%	11–25%	26–50%	51–75%	Over 75%
Full-time employees	3			2	3
Part-time employees	5	2			1
Contract workers	5		1	1	1
Seasonal workers	7	1			

6. Where do your new hires tend to come from? (Select all that apply)

a. Active recruiting
b. Recruiting or hiring outsourced
c. Industry-specific career fairs
d. Job boards (e.g., LinkedIn, Indeed, Glassdoor)
e. Former apprenticeship or internship participants
f. Graduates from professional training programs
g. Partnership with local community colleges/universities
h. Employee referrals
i. Other

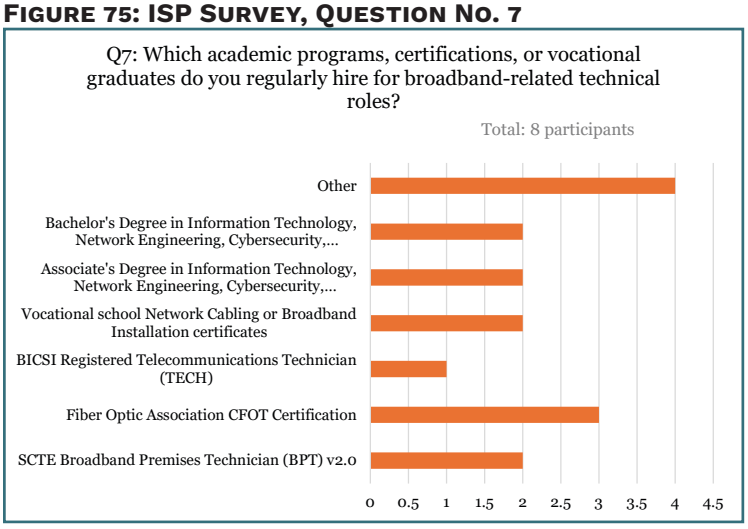
FIGURE 74: ISP SURVEY, QUESTION NO. 6



7. Which academic programs, certifications, or vocational graduates do you regularly hire for broadband-related technical roles? (Select all that apply)

a. Bachelor's Degree in Information Technology, Network Engineering, Cybersecurity, Telecommunications Engineering, Computer Science
b. Associate's Degree in Information Technology, Network Engineering, Cybersecurity, Telecommunications Engineering, Computer Science
c. Vocational school Network Cabling or Broadband Installation certificates
d. BICSI Registered Telecommunications Technician (TECH)
e. Fiber Optic Association CFOT Certification
f. SCTE Broadband Premises Technician (BPT) v2.0
g. Other

FIGURE 75: ISP SURVEY, QUESTION NO. 7



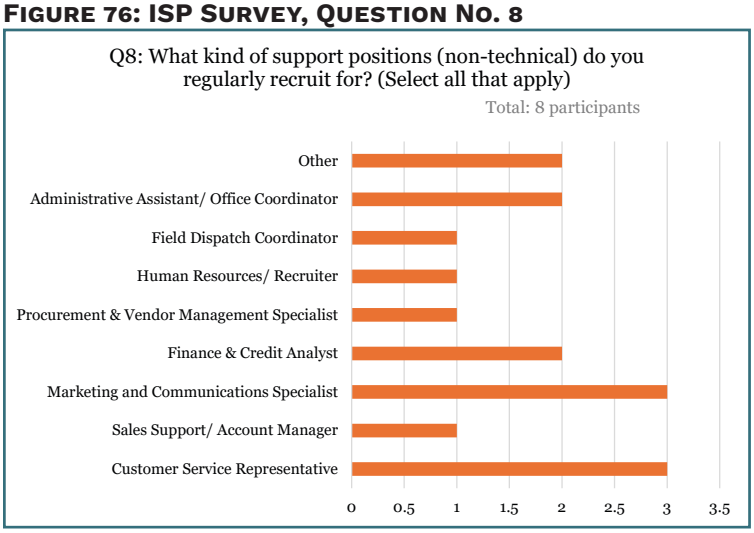
Other:

- None
- None at this time
- We want these certifications but end up training them ourselves.
- Mostly "in house training" from qualified candidates

8. What kind of support positions (non-technical) do you regularly recruit for? (Select all that apply)

a. Customer service representative
b. Sales support / account manager
c. Marketing and communications specialist
d. Finance and credit analyst
e. Procurement and vendor management specialist
f. Human resources / recruiter
g. Field dispatch coordinator
h. Administrative assistant / office coordinator
i. Other

FIGURE 76: ISP SURVEY, QUESTION NO. 8



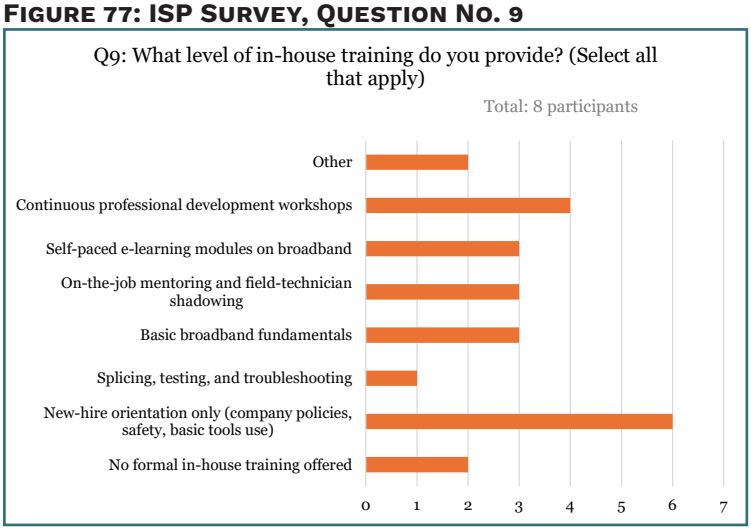
Other:

- no current openings
- We do not tend to do much but if we did usually a CSR if any

9. What level of in-house training do you provide? (Select all that apply)

a. No formal in-house training offered
b. New-hire orientation only (company policies, safety, basic tools use)
c. Splicing, testing, and troubleshooting
d. Basic broadband fundamentals
e. On-the-job mentoring and field-technician shadowing
f. Self-paced e-learning modules on broadband
g. Continuous professional development workshops
h. Other

FIGURE 77: ISP SURVEY, QUESTION NO. 9



Other:

- R&D internships
- start with basics then if work ethic is seen we expand and promote usually

10. What are your most critical hiring needs or employment gaps? (short answer)

Total: 8 participants

Short Answer:

- access to reliable, fast internet
- The lack of rural broadband we ourselves face even in our homes and any business outside of town on the main urban corridor
- field technicians
- Critical thinking/ problem solving and be self-starters, be motivated to learn skills that are “cutting edge” and will make yourself valuable for years to come.
- Network engineers! Both physical plant and data!
- Qualified personnel
- Will commence recruiting in 2026
- R&D capacity, funding acquisition, finance

Appendix G: Interview Questions by Stakeholder Group

Industry Employers

1. How have workforce shortages impacted your ability to meet project goals or timelines? Can you share a recent example?
2. What qualities or experiences do you most value when hiring broadband-related workers that may not be reflected in formal certifications?
3. Have you collaborated with a local training or workforce program? What worked well or didn't? What made the difference?
4. What kinds of support would make you more likely to hire or train local talent?
5. What factors most impact your organization's ability to offer competitive wages?

Training & Education Providers

1. What's the biggest obstacle you face in launching or sustaining broadband-related training programs?
2. Have you seen student interest in broadband or telecommunications careers grow or decline over the past 5–10 years? What do you think drives that trend?
3. What current courses or programs do you offer that prepare graduates to work on broadband infrastructure projects?
4. What equipment or instructional gaps impact your current course offerings in this field? What support would you need to close those gaps?
5. What resources does your institution have to prepare students for employment with fiber-optic and 5G infrastructure projects? Does your institution have capacity to expand these resources?

Workforce Development & Placement Organizations

1. What is your current messaging surrounding broadband or tech career pathways? Does it highlight the need for broadband infrastructure specifically?
2. What support or information would be helpful from employers or education providers to better align your services with broadband workforce demands?
3. Can you describe a successful placement you've made in the broadband sector? What factors contributed to that success?
4. What is missing in your current funding or support structure that would make broadband workforce development more effective?
5. How do you track or measure successful job placement in broadband-related roles, if at all?

Local Governments

1. What has been your jurisdiction's most significant success or difficulty in expanding broadband infrastructure—and what did you learn from it?
2. How do broadband deployment efforts align with your community's broader goals for economic development, education, or health?
3. What would make the permitting process for broadband projects faster or more consistent when spanning multiple jurisdictions?
4. How would you describe your jurisdiction's interest in sponsoring apprenticeships for broadband infrastructure projects? What forms of support would be helpful in this endeavor?
5. Are there other challenges related to broadband you would want to see addressed?

Tribal Governments

1. What have been the most significant challenges your Tribal community has faced in gaining reliable broadband access, and how have you tried to address them?
2. Can you share any examples where broadband access—or the lack of it—has directly impacted education, health, economic development, or cultural preservation in your community?
3. Do you see broadband and/or technology careers playing a significant role in supporting Tribal sovereignty, self-sufficiency, or empowering youth in your community? If so, how?
4. What types of training, support, or partnerships would help Tribal members pursue and succeed in broadband-related careers?
5. In your view, what would a successful partnership with local governments, educational institutions, or industry employers look like in relation to broadband workforce development?

Community & System Support Partners

1. What stories do you hear from your clients about how broadband access—or the lack of it—affects their daily lives?
2. What kinds of trusted messengers or organizations are best positioned to promote broadband use and literacy in your community?
3. How could broadband workforce development efforts also serve your clients or the populations you work with?
4. If funding were no object, what broadband-related services or support would you most want to expand?
5. Are there other challenges related to broadband you would want to see addressed?

Appendix H: Interview Codebook and Definitions

Table 74: Interview Codes and Definitions for Qualitative Analysis

Category	Code	Definition	When to Use
Equity & Inclusion	**Access Barriers**	Mentions of limited broadband access due to geography, cost, or lack of infrastructure.	When participants describe being unserved, underserved, or unable to afford service.
	Digital Literacy Gaps	References to lack of skills or comfort using digital tools and systems.	When participants mention training needs, language barriers, or lack of computer confidence.
	Tribal & Rural Equity	Focus on unique challenges or successes in Tribal or rural communities.	When participants talk about sovereignty, cultural needs, or community-based broadband solutions.
	Affordability Challenges	Comments about high costs of broadband service or devices.	When cost is mentioned as a reason for not subscribing or using broadband.
	Inclusive Workforce Access	Discussion about on-ramps for underrepresented groups (e.g., Tribal youth, veterans, displaced workers).	When stakeholders discuss who is being left out or how to improve participation in broadband jobs.
	Community Impact Stories	Real-life examples of how lack of broadband affects daily life (education, health, work, connection).	When participants share personal or client stories of how limited access impacts well-being.
	Trusted Messengers & Outreach	Community organizations or leaders who can effectively promote broadband literacy or adoption.	When participants identify key partners or "who people listen to" in the community.
Workforce Development & Training	**Workforce Shortages**	Mentions of not having enough trained broadband technicians, splicers, or engineers.	When participants describe hiring struggles or project delays due to limited skilled labor.
	Training Program Gaps	Lack of broadband-specific education, certifications, or workforce pathways.	When colleges, training centers, or workforce boards mention missing programs.
	Career Awareness	Low awareness of broadband career opportunities among students or workers.	When people mention not knowing broadband jobs exist or what skills are needed.
	Skill Alignment	Alignment (or mismatch) between broadband jobs and rural skillsets like construction, forestry, or electrical work.	When participants connect or compare existing local trades to broadband work.
	Training Pipeline Development	Efforts to build structured career pipelines into broadband fields.	When discussing partnerships, apprenticeships, or outreach to new workers.
	Workforce Shortage Impacts	Specific ways staffing shortages affect project timelines, goals, or contracts.	When employers mention project delays, quality issues, or lost opportunities.
	Informal Skill Recognition	Valued qualities, experiences, or soft skills not reflected in formal credentials.	When employers emphasize work ethic, adaptability, or field experience over certifications.
	Employer Training Partnerships	Collaboration between employers and workforce or training entities (successes or failures).	When discussing partnerships with community colleges, workforce boards, or programs.
	Local Hiring Incentives	Supports or resources that would encourage employers to train or hire local talent.	When employers describe funding, policy, or support needs to grow local employment.
	Wage Competitiveness Factors	Challenges affecting employers' ability to offer competitive pay (e.g., funding, market pressures).	When discussing wage constraints or recruitment competition.
	Program Sustainability Challenges	Barriers to maintaining broadband-related training programs (funding, equipment, enrollment).	When educators mention resource shortages or declining interest.
	Student Interest Trends	Perceived changes in student interest in broadband or tech careers.	When educators discuss enrollment trends or student motivations.
	Equipment & Resource Gaps	Lack of specialized tools, labs, or technology for broadband instruction.	When participants discuss what's missing to teach effectively.
	Institutional Capacity to Expand	Current ability or limitations to scale broadband-related training.	When colleges discuss space, staffing, or funding capacity.

Category	Code	Definition	When to Use
Regional Collaboration & Coordination	**Cross-Sector Collaboration**	Examples or calls for partnerships among ISPs, workforce boards, educators, and local/Tribal governments.	When participants talk about teamwork, joint projects, or shared data.
	Coordination Barriers	Lack of communication or alignment between agencies, jurisdictions, or partners.	When participants describe silos, delays, or overlapping responsibilities.
	Local vs. Regional Tension	Differences between county-level goals and broader regional objectives.	When discussing friction, local resistance, or competing priorities.
	Funding Alignment	Discussion about coordinating or combining funding sources effectively.	When participants mention leveraging BEAD, CPF, or local/state funds together.
	Effective Partnerships	Examples of collaboration that successfully supported broadband goals.	When participants describe what made a partnership "work."
	Failed or Ineffective Partnerships	Instances where collaboration did not achieve desired outcomes.	When participants describe lack of follow-through, communication, or clarity.
	Cross-System Communication Gaps	Disconnects between employers, education, and workforce agencies.	When participants note missed connections or misalignment between partners.
	Tribal-Government Collaboration	Discussion about partnerships or potential coordination between Tribal and non-Tribal entities.	When talking about desired or existing partnerships between Tribes and local governments or ISPs.
Infrastructure Challenges	**Geographic Barriers**	Physical difficulties in broadband deployment due to mountainous or remote terrain.	When participants describe topography or distance as obstacles.
	Disaster Vulnerability	Impacts of wildfires, floods, or storms on broadband networks.	When discussing damaged infrastructure or the need for hardening/resilience.
	Cost & ROI Limitations	Financial barriers to expanding broadband where return on investment is low.	When participants cite low population density or unprofitability.
	Infrastructure Resilience	Calls for durable design, redundancy, and disaster recovery planning.	When participants mention future-proofing or stronger network systems.
	Workforce Deployment Barriers	Challenges that workforce shortages or geographic limits create for broadband rollout.	When employers or governments describe physical or labor-based constraints to project execution.
Economic & Community Impact	**Economic Diversification**	Broadband's role in supporting local industries like agriculture, tourism, and clean energy.	When broadband is linked to new market opportunities or business growth.
	Remote Work Enablement	Broadband's importance for telework and home-based business development.	When participants discuss attracting or retaining remote workers.
	Local Economic Growth	Broadband-driven job creation, entrepreneurship, or community resilience.	When participants describe economic improvements tied to broadband.
	Community Perception & Momentum	Local attitudes or energy around broadband efforts (supportive, skeptical, or disengaged).	When participants express enthusiasm, fatigue, or shifting priorities around broadband.
	Job Placement Success	Stories or examples of successful workforce placements in broadband.	When workforce staff or employers share success stories.
	Placement Barriers	Structural or logistical challenges to placing trained individuals in broadband jobs.	When participants describe lack of openings, poor alignment, or mobility issues.
	Funding or Resource Gaps	Missing supports that limit workforce or training success.	When respondents mention lack of funding, grants, or equipment.
	Broadband as Economic Driver	Perception of broadband as a foundation for rural and regional economic vitality.	When participants describe economic or community development impacts.

Category	Code	Definition	When to Use
Policy & Strategic Planning	**Regulatory Hurdles**	Policy, permitting, or compliance challenges that slow broadband projects.	When participants mention bureaucracy, red tape, or delays in approval.
	Strategic Alignment	Efforts to align broadband planning with regional, state, or national strategies.	When discussing planning frameworks or multi-county coordination.
	Public-Private Partnerships (PPP)	Cooperative efforts between ISPs, local governments, and community partners.	When participants reference co-ops, shared investments, or joint build-outs.
	Regional Leadership Needs	Calls for leadership, advocacy, or coordination to advance broadband initiatives.	When participants highlight the need for champions, conveners, or lead entities.
	Permitting Process Challenges	Specific issues with permitting or approval across jurisdictions.	When local government reps describe bottlenecks, duplication, or lack of consistency.
	Apprenticeship Sponsorship Interest	Willingness or barriers to local government involvement in apprenticeship programs.	When discussing incentives, liability, or funding for apprenticeships.
	Policy Support Needs	Types of local, state, or federal policy changes that could support broadband or workforce development.	When participants suggest "what would help" from policymakers.
Digital Inclusion & Literacy	**Digital Skills Training**	Programs or needs for improving residents' ability to use technology.	When participants discuss digital literacy workshops or education gaps.
	Device Access	Availability or affordability of computers, tablets, or routers.	When participants talk about device shortages or outdated equipment.
	Community Support Systems	Trusted local entities promoting broadband use and adoption.	When participants mention libraries, Tribal centers, or nonprofits as digital mentors.
	Digital Confidence & Empowerment	Stories of empowerment, independence, or opportunity created by broadband.	When participants describe how broadband access improved lives or livelihoods.
	Community Literacy Champions	Organizations or leaders already promoting digital literacy locally.	When participants name schools, libraries, or nonprofits leading training efforts.
	Dual Workforce & Digital Inclusion Goals	Discussion of workforce development efforts that also strengthen community broadband use.	When workforce programs benefit clients' digital skills or confidence.
	Funding for Inclusion Programs	Desired or missing funding streams for community digital inclusion.	When participants mention "if funding were no object" or unmet support needs.
Solutions & Opportunities	**Innovative Models**	Creative broadband approaches such as co-ops, municipal networks, or shared infrastructure.	When participants mention new or alternative delivery strategies.
	Funding Opportunities	Identification or pursuit of grants, subsidies, or investment partnerships.	When stakeholders discuss financial strategies or upcoming funding windows.
	Community-Driven Solutions	Locally led broadband or workforce development initiatives.	When participants describe grassroots or community-led actions.
	Future Vision	Aspirations and long-term goals for broadband access, equity, or workforce development.	When participants articulate a desired future state or vision for the region.
	Ideal Partnership Models	Descriptions of what effective partnerships among employers, educators, or governments would look like.	When participants describe "what would work best" in collaboration.
	Local Apprenticeship Opportunities	Ideas or initiatives to create local apprenticeship or training-to-hire models.	When participants talk about work-based learning or mentorship programs.
	Vision for Broadband Workforce	Aspirations for a well-trained, locally based broadband workforce.	When participants articulate their long-term hopes or visions for workforce readiness.
	Scalable or Replicable Practices	Lessons or models that could be replicated in other communities.	When participants discuss what worked locally that others could adopt.