

Broadband Workforce Development GUIDEBOOK

Workforce for implementing BEAD and
other Broadband Deployment Programs



FOREWORD



The internet has become the backbone for communications across the world and is the fabric of our lives. The pandemic demonstrated that every American needs reliable broadband access to the internet to survive and thrive. It is our lifeline to work, friends and family, education, healthcare, and connectivity to the world. Fiber broadband connectivity drives economic development, the ability to work from anywhere, education, access to world-class healthcare, and so much more. As part of the Bipartisan Infrastructure Law (BIL), the Administration is making a historic investment in broadband infrastructure to be administered by the \$42.45B NTIA Broadband Equity and Access Deployment (BEAD) program. NTIA's goal is to ensure that every American is connected through broadband. However, this worthy national imperative can only be achieved if we have the *"boots on the ground"* to ensure that all this broadband can get deployed.

The Fiber Broadband Association has been working closely with NTIA, the Department of Commerce, the Administration, and the Department of Labor to help ensure that our nation can train the workforce needed to get fiber to every American home and business. In 2021, the Fiber Broadband Association began the development of a world-class training program for fiber optic technicians, and is a National Registered Apprenticeship with the U.S. Department of Labor. This intensive program, *OptIC Path* Fiber Optic Technician training includes up to 144 hours classroom and hands-on skills instruction, followed by 2,000 hours of apprenticeship ensures that any student is fully qualified to immediately work in the field as fiber optic technician. The first cohort of students was launched in May 2022 and this training is now being rolled out to all 56 states and territories across the nation.

Workforce development is an eligible expense for funding from the NTIA BEAD program. As each State Broadband Office (SBO) is currently in the process of developing their Five-Year Plan for their allocation of the BEAD funding, workforce development is a crucial component of this plan.

Further, it is essential that each SBO prioritize workforce development to ensure that their state or territory has trained, and qualified fiber optic technicians and other critical workers needed for the build out of this critical broadband infrastructure. The Fiber Broadband Association projects that 205,000 fiber optic technicians will be required across the nation over the next five years. FBA now has the OptIC Path Fiber Optic training program in place and is ramping deployment to community colleges, veteran organizations, and training institutes across the nation. These are well-paid, sustainable jobs and long-lasting careers that are desperately needed to ensure that these fiber broadband infrastructure projects can be delivered on time and on budget as we work to connect all Americans with fiber.

This FBA Workforce Development Guidebook is designed to assist State Broadband Offices and State Workforce Development Offices to create and implement comprehensive workforce development programs in support of the NTIA BEAD program. It is critically important that each SBO prioritize workforce development and kick off their state workforce development initiatives in advance of issuing grants so that the workforce will be in place as our nation works toward closing the digital divide once and bringing digital equity to all.

Gary Bolton
President and CEO
Fiber Broadband Association

CONTENTS

Introduction	3	5 Establishing and Scaling Fiber Broadband Training	28
1 Telecommunications Workforce Landscape	6	5.1 Defining the Curriculum and Operational Model	28
1.1 The Scale of the Challenge	6	5.2 Coordinating Training for the State	33
1.2 Fiber and Wireless Job Roles	9	5.3 Promoting Awareness and Driving Adoption	35
1.3 The Telecom Workforce Supply Chain	9	5.4 Tracking Progress and Success	37
1.4 Current Practices in Hiring and Onboarding	10	Appendix	38
2 Introducing OpTIC Path™	12		
2.1 A Proven Solution to Building the Fiber Workforce	12		
3 Fiber Broadband Workforce Development	15		
3.1 Workforce Development for BEAD	15		
3.2 Sources of Funding	16		
4 Building a Workforce Development Strategy	19		
4.1 Workforce Development Goals	20		
4.2 Creating a Dedicated Team	21		
4.3 Conducting a Workforce Gap Analysis	22		
4.4 Surveying State Resources	23		
4.5 Defining the Workforce Development Strategy	26		

INTRODUCTION

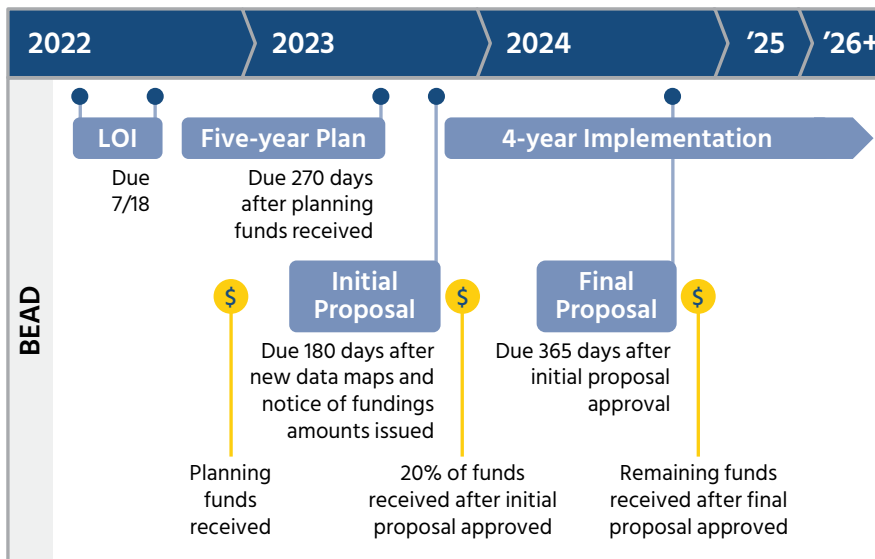


The Broadband Equity, Access, and Deployment (BEAD) Program is a once in a generation opportunity to close the digital divide. Providing \$42.45B for investment in high-speed networks, BEAD will transform the lives of local communities throughout the US.

To create lasting change, BEAD dollars will be primarily directed to fiber broadband infrastructure. Fiber is recognized as a future-proof technology which can scale to meet the needs of both today's applications and those of tomorrow.

Delivery of the BEAD program sits with the governments of States, US Territories, and the District of Columbia. (For readability, States, US Territories, and the District of Columbia will hereafter be referred to as "states"). These entities are responsible for making true on the promise of BEAD.

BEAD Program and Funding Timeline



At the time of writing, states are now working on Five-Year Action Plans that will be submitted to the NTIA later in 2023. Together with the Initial Proposal and Final proposal, these plans will unlock many millions of dollars for each state to build new access networks.

Building this fiber broadband infrastructure will trigger an unprecedented amount of construction activity. The scale of the BEAD program will create a nationwide demand for skilled labor far beyond what the current workforce can support.

Notably, this projected demand for labor sits atop existing structural issues in the telecom workforce. The labor pool is shrinking with too few new workers. There is a lack of standardized training programs for new hires as well as a lack of a trusted industry credential. As it stands, there is no unified approach to develop the talent needed for BEAD projects.

To succeed, each state will need a comprehensive workforce development strategy that invests in skills and training. If unaddressed, the US faces a looming labor problem: more miles of fiber promised than the current workforce has capacity to deliver. Besides safeguarding delivery of BEAD, broadband workforce development goes to the heart of the IJJA – creating quality jobs for US workers in local communities across the nation.

Even states with experience deploying broadband programs will encounter new challenges due to the scale and complexity of BEAD. To help states prepare, the NTIA Workforce Planning Guide outlines four components of the workforce plan that states must address in their Five-Year Action Plans (see next page).¹

While all four components are instrumental to creating a prosperous workforce ecosystem, the primary focus of this guidebook is **fiber training** and **workforce development activities**. Devising a tailored, effective, and long-lasting development program will demand extra attention by states, bringing stakeholders from across the state together, many for the first time.

NTIA – Components of a Workforce Plan

<p>Equitable training and workforce development activities</p> <p><i>Offering on-the-job and professional skills development for all workers.</i></p>	<p>Skilled workforce activities</p> <p><i>Including how employers hire, pay, and consider skills of workers and subcontractors.</i></p>
<p>Federal labor and employment laws</p> <p><i>Legal requirements that apply to all employers in the United States.</i></p>	<p>Contracting requirements</p> <p><i>Concerning direct employment and contracting as well as partnering with minority-owned businesses and other socially and economically disadvantaged businesses.</i></p>

How to Use This Guidebook

This guidebook is the product of many conversations with stakeholders across the broadband and workforce development ecosystem at the state, regional, and local levels. It is intended to serve as a resource for state broadband offices (SBOs), state and local workforce/economic development boards, and equivalent agencies as they formulate their workforce development strategy for the BEAD program and establish statewide training initiatives.

The guidebook is organized in to five sections. The first section provides vital context on telecom labor challenges for readers that may be unfamiliar with the detail. This is followed by an overview of FBA OpTIC Path™ – a program curated by industry experts to address these specific challenges. The remaining sections support states to devise a workforce development strategy alongside practical guidance on how to select, deploy and scale an effective fiber training program.

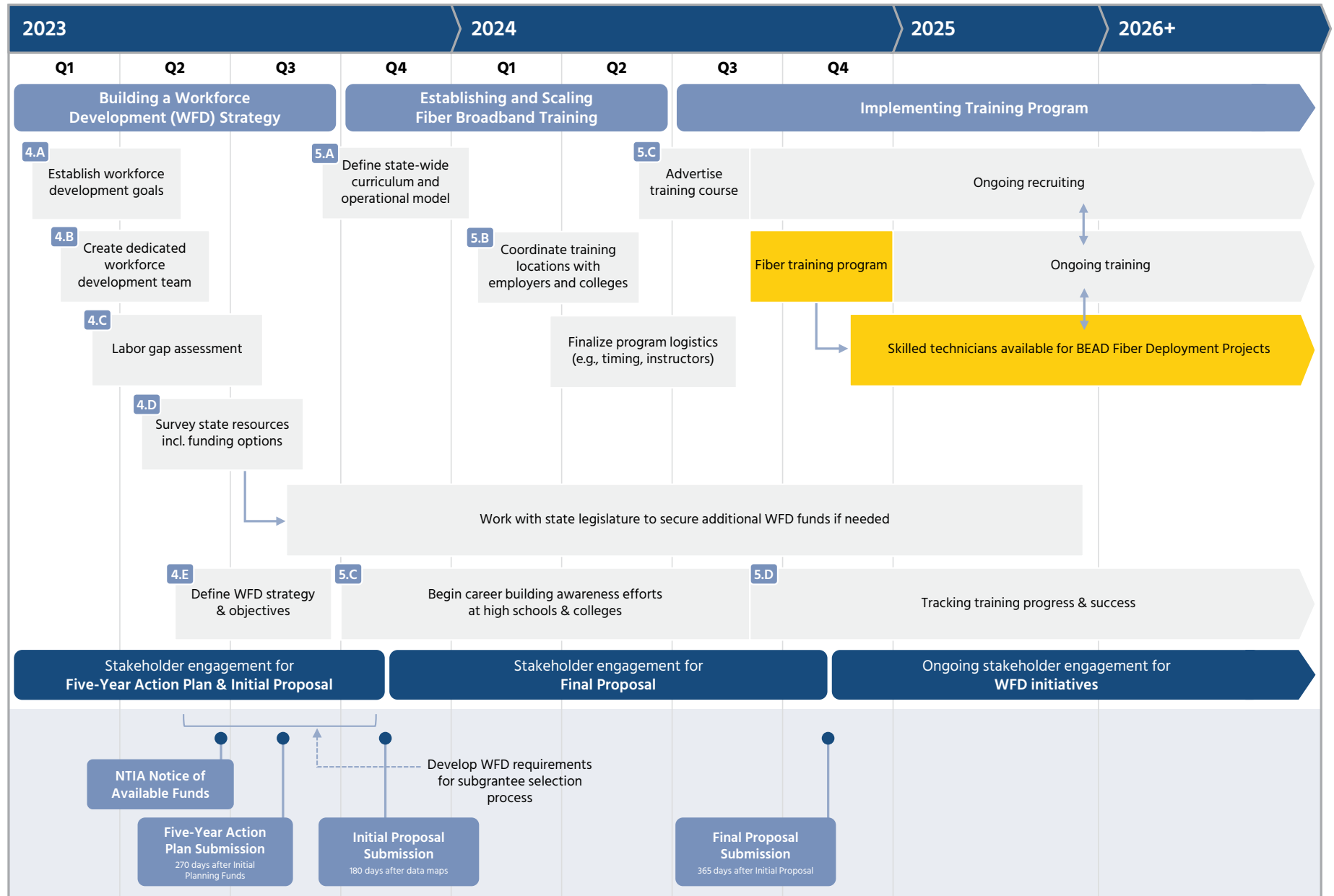
[Section 4](#) and [Section 5](#) align with the activities that states will need to undertake over the next two years to design and execute a successful workforce development strategy and fiber training program as shown in the timeline on the next page. These sections provide practical advice and helpful case studies and illustrate a clear pathway to fiber broadband skills development.

The following additional resources can be found in the [Appendix](#):

- Detailed job descriptions for typical roles in fiber broadband & wireless deployment
- An overview of potential stakeholders

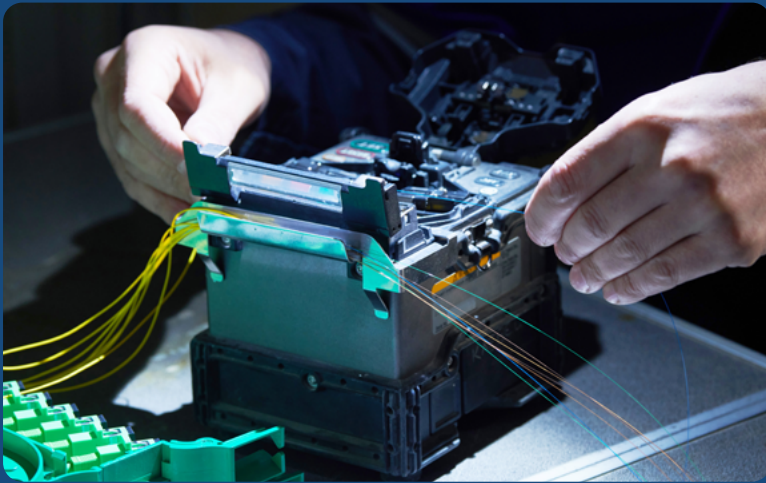
<p>1 The Telecom Workforce Landscape</p>	<p>2 Addressing Industry Needs for BEAD</p>	<p>3 Fiber Broadband Workforce Development</p>	<p>4 A Workforce Development Strategy</p>	<p>5 Establishing and Scaling Fiber Broadband Training</p>
<p>Context-setting for the guidebook via an introduction to the labor challenges facing the telecom industry</p>	<p>Summary of how FBA's OpTIC Path™ program meets industry needs for skilled labor</p>	<p>Overview of workforce development landscape at the state level, including key players and funding options</p>	<p>How to approach workforce planning and create a state-wide strategy that meets the needs of the Five-Year Action Plan</p>	<p>Model for establishing and deploying fiber broadband training that meets state-specific needs</p>

Workforce Planning Process



1

TELECOMMUNICATIONS WORKFORCE LANDSCAPE



In this section, we discuss the labor challenge facing the telecom industry, describe the skilled jobs required for fiber broadband and wireless deployment, and provide insight into current practices for sourcing labor, hiring, and onboarding.

1.1 The Scale of the Challenge

ISSUE 1: The number of jobs needed for BEAD projects is unprecedented and will require hiring and training many thousands of technicians.

BEAD will create thousands of new jobs

BEAD sets out to bring high-speed broadband internet to the millions of Americans that are currently unserved and underserved— estimated to be around 13.1 million locations based on the data in the FCC Broadband Map.²

Building this new infrastructure will be a multi-year endeavor, unlike anything seen before. According to the government's calculations, 150,000 telecom jobs will be created by BEAD³, while research by the Fiber Broadband Association (FBA) estimates the industry will need over 205,000 new jobs in the next five years.⁴

Many different job roles are needed to construct, operate, and maintain the new networks built through BEAD funding – and these will be required in every state. However, the telecoms workforce has been shrinking for years⁵ and the industry lacks an efficient pipeline to bring in new workers.

Considering the above, there is serious risk that there will not be enough feet on the ground to deliver the new networks. For the states, insufficient availability of high-skilled labor will result in workforce bottlenecks, leading ultimately to delayed or failed projects.

Workforce availability is not a new challenge to the telecommunications industry. In preparation for BEAD, the US Government investigated ways to improve recruitment and scale workforce training to address doubts

that states can meet projected expansion plans.⁶ The study found there was a “profound skills gap” in the telecommunications industry workforce.

The telecom workforce is shrinking and lacks diversity

There are three main factors that exacerbate the shortage of skilled labor, namely: the workforce is aging, there is low awareness of high-wage fiber broadband career pathways amongst job seekers, and there is a lack of focus on the specialist training required for critical fiber broadband and wireless jobs.

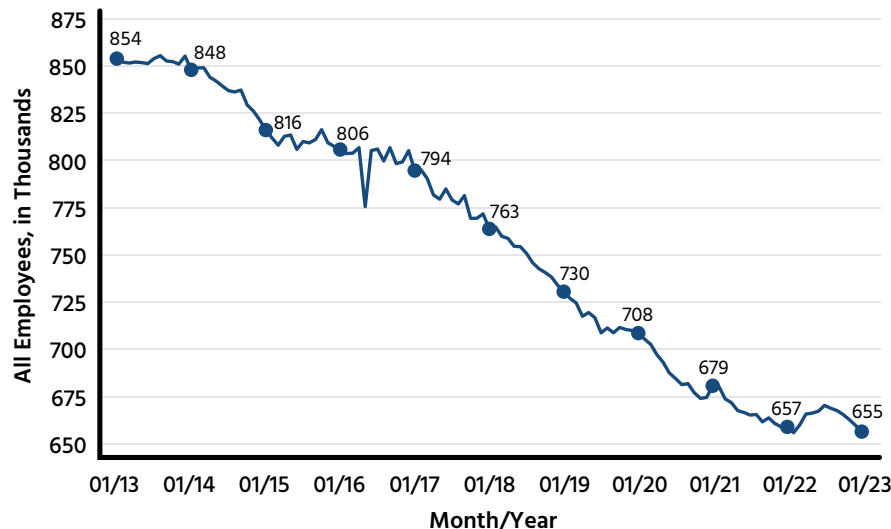
Fiber workers are predominantly white (59.6%) and male (89.8%)⁷ and skew older than the median age worker in the US at 44 years old.⁸ Service providers and contractors alike are starting to feel the effects of an aging workforce, one that is carrying the technical knowledge and deep expertise with them towards retirement.

Retirement and broader retention issues require employers to regularly seek new employees to backfill vacant posts, while low awareness of job opportunities and lack of available skilled workers make it difficult to recruit people in the first place. A common refrain across the industry is that not enough people know about entry-level telecommunications jobs and the associated high starting wages, earning potential, prospect of upward advancement, and/or career opportunities.

To put it into numbers, the telecommunications workforce has declined every year over the past decade, down 23% from 854,200 in January 2013 to a projected 656,700 workers in January 2023.⁹ While the US Government Accountability Office (GAO) finds there are mixed indicators of an industry-wide labor shortage¹⁰, the Bureau of Labor Statistics (BLS) finds average turnover to be 56.9% for construction and 54.9% for utilities.¹¹

Despite many jobs roles being ‘middle skilled’ jobs, which do not typically require post-secondary education, increasingly, there are reports from ISPs that they are struggling to find skilled workers for specialized roles (e.g., fiber technicians). This sentiment is particularly strong among smaller and more rural providers. Whilst there is a general preference for experienced hires, recruiting across a range of experience (including no experience) does not appear to satisfy the staffing shortages here.

Number of US Telecommunications Employees, 2013 to 2023



Source: Bureau of Labor Statistics (BLS), NAICS Code: 517

The profile of these roles – with undemanding education requirements, above-median wages, and full-time employment status – should appeal to individuals from many different backgrounds. BEAD provides a catalyst for expanding these opportunities to a broader range of workers via targeted training initiatives, which can provide pathways to improve geographical, cultural, and economic diversity in the telecom workforce.¹²



Activities and Job Roles in Fiber Broadband & Wireless Networks

Activity	Job Roles	Pre-Construction	Construction	Post-Construction
Network Planning	<ul style="list-style-type: none"> • Network Planner • Network Designer • Project Manager • Estimator 	■		
Surveying	<ul style="list-style-type: none"> • Land Surveyor • Pole Surveyor • OSP Engineer 	■		
Permits	<ul style="list-style-type: none"> • Permitting Officer 	■		
Procurement	<ul style="list-style-type: none"> • Procurement Lead 	■		
Network Construction	<ul style="list-style-type: none"> • Laborer • Pole/Anchor Foreman • Tower/Antenna Foreman • Safety Lead • Locator • Quality Inspector • Field Engineer 		■	
Tower Construction	<ul style="list-style-type: none"> • Tower Technician • Wireless Technician • Tower Climbers 		■	
Fiber Splicing	<ul style="list-style-type: none"> • Fiber Optic Technician • Splicer Technician • Fiber Lineman 		■	
Optical Network Installation & Commission	<ul style="list-style-type: none"> • Fiber Technician 		■	
Wireless Network Installation & Commission	<ul style="list-style-type: none"> • Antennae Installers • Wireless Technician • Electrician 		■	
Customer Installations	<ul style="list-style-type: none"> • Premise Installation Technician • Customer Support Representative 			■
Field Maintenance	<ul style="list-style-type: none"> • Maintenance Technician 			■

Detailed summaries of select job roles with descriptions and typical hiring requirements can be found in [Appendix I](#).

1.2 Fiber and Wireless Job Roles

ISSUE 2: Many roles are needed for fiber and wireless deployment, and skills developed in adjacent industries cannot easily transition into the more specialized roles, such as fiber splicing.

Fiber broadband and wireless network deployment requires a highly skilled, multi-disciplinary workforce

At high-level, network roles can be grouped into pre-construction, construction, and post-construction phases as shown in the diagram on the previous page. Within each phase are a series of activities such as planning and surveying. Each phase and activity will require workers with specific skillsets, experience, and technical knowledge for example Network Planners, Permitting Officers, and Field Engineers.

To run to schedule and budget, all relevant skills must be available at the right time throughout the production line. Any shortages of labor will create bottlenecks in the process and delay the project, or worse, lead to failed projects entirely. Service providers looking to expand their fiber or wireless footprint must consider workforce strategies to guarantee they have sufficient levels of all types of skilled labor throughout the production process to avoid delays.

As outlined above, a significant part of fiber broadband and wireless deployment involves construction-based activities, such as digging trenches to lay fiber or controlling heavy-duty equipment. There is a large pool of workers with the skills and experience to perform these jobs as they are required in several adjacent industries, such as construction or utilities. Therefore, these types of roles may be easier to fill as they can leverage existing skillsets in similar industries.

Conversely, certain job roles are unique to fiber and wireless deployment, such as fiber splicing, and these require specific technical knowledge and skills. Transitioning workers from adjacent industries into these roles is more difficult, and employees will require new training to perform these jobs safely and to a high standard.

1.3 The Telecom Workforce Supply Chain

ISSUE 3: Service providers will be competing for labor, both for full-time workers and contractors; BEAD projects face delays if providers rely on current hiring/sourcing practices.

Networks are built by Service Providers, Prime Contractors, and Subcontractors

A variety of employers are relevant in the telecom workforce supply chain. Internet service providers (ISPs) may choose to hire and train staff directly for network construction or outsource some of the work to a contracting firm.

Contracting and subcontracting is widespread across the industry. Prime contractors tend to be used by larger ISPs, who have the capital and scale to outsource their end-to-end construction needs. Both ISPs and prime contractors will supplement their workforce with subcontractors, who they use to backfill specific roles and avoid hiring full-time employees for time-limited projects. This enables ISPs to expand their fiber broadband footprint more quickly and cost-effectively. For example, a mid-size ISP looking to expand their footprint within a state county may only require an uplift in network construction labor for up to 12 months, which does not commercially justify hiring and training full-time employees. Our research indicates ISPs tend to contract out the pre-construction and construction phases, utilizing their own labor the immediate post-construction and maintenance work.

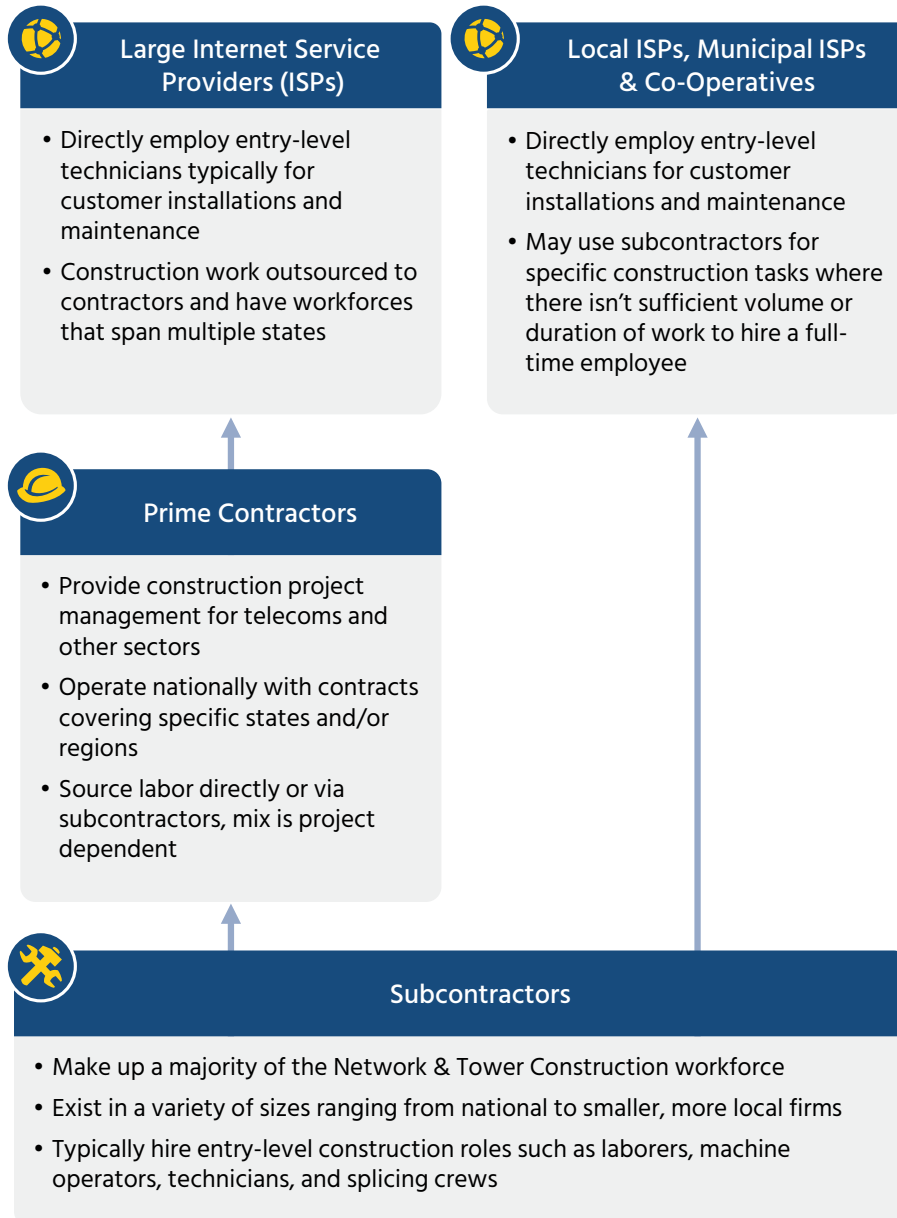
ISPs may hire directly for more specialist roles, such as fiber optic or wireless technicians, that they can train in-house on their specific equipment and customer service processes.

The diagram on the next page outlines the workforce supply chain in the telecommunications industry and their typical hiring approaches.

Shared resources increase competition for labor

Competition for labor is higher within states that have concurrent infrastructure projects and between states where employers are reliant

Telecommunications Workforce Supply Chain



on contract labor, which tends to be mobile. Large contracting firms can take workers and move them between states, following shifting demand. ISPs cannot risk relying on this labor source being readily available at short notice if demand rises quickly.

Service providers seeking BEAD dollars will need to pay careful consideration to investment in training to ensure there's adequate time to procure, train and scale the required workforce for when construction starts. Service providers that aren't seeking BEAD dollars will still be impacted due to shared potential labor sources to pull from. The complexity is heightened when adding in the fact that many subgrants will be awarded in batches, kicking off simultaneous projects—and labor needs—across and between states. Lack of preparation to meet the uptick in skilled labor demand could result in delayed or failed projects.

KEY CONSIDERATION: Contractors and subcontractors are subject to the same workforce requirements outlined in the NOFO. The NTIA encourages equity in contracting by using minority businesses whenever possible.¹³

1.4 Current Practices in Hiring and Onboarding

ISSUE 4: Current training practices are too slow and will not scale to meet the needs of BEAD.

It can take three to six months for a new fiber technician to become productive

Direct hiring approaches differ across service providers and contractor firms, however, the preference is to find and hire skilled staff who can be deployed in the field and quickly become productive.

The ideal applicants will have previous industry experience, a relevant 2-years associates degree, or may have completed a certified training program and/or registered apprenticeship. A valid driver's license is also commonly required, along with a clean background check and/or drug screening.

However, the shortage of experienced hires has pushed ISPs and contractors to onboard inexperienced staff who require thorough on-the-job training, thus lengthening the time to productivity. Research from ISPs tells us that it can take approximately three to six months for an inexperienced hire to produce work of sufficient quality.

Lack of standardized training reduces the availability of skilled workers

Driving the lack of available experienced hires is a lack of widespread and standardized training opportunities to replenish the skilled labor pool. At present, there is no industry-wide approach to training for prospective fiber broadband and wireless workers.

Industry has instead largely relied on in-house onboarding (at times, minimal) and unstructured on-the-job training. This piecemeal approach has led to a shortage of specialist skills, will not scale to meet the needs of BEAD, and does not provide solid foundations for future career advancement.

Due to disparate and oftentimes insufficient training available, many service providers expend extra time reskilling or upskilling new hires, particularly when it comes to quality/safety and problem solving (e.g., fiber troubleshooting). This is on top of the extra time required to seek out and recruit viable new hires. Having a relevant credential often signals to service providers that an applicant is familiar with the requirements of the job and will most likely stick around longer than someone without any prior experience or training.



2

INTRODUCING OPTIC PATH™



In this section we highlight FBA’s OptIC Path™ training program as a live and ready-to-deploy solution to meet industry training needs.

2.1 A Proven Solution to Building the Fiber Workforce

In response to industry needs, FBA developed the OptIC Path™ course and certification with input from industry and technical education experts: a training program of up to 144 hours that incorporates classroom knowledge and hands-on experience to build the skills required for advanced entry-level employment in fiber optics.

By providing a scalable, skills-first fiber optic technician training program, FBA aims to address many of the skilled labor issues facing the industry. As outlined in [Section 1](#), employers will face a rapid uptick in demand for skilled labor and heightened competition along the supply chain when BEAD funds begin flowing to subgrantees. This impact will be felt most acutely in specialist roles – such as fiber technicians – that benefit less from transferrable skills accessible in adjacent industries. Without action, providers will be facing a shortage of skilled labor with no mechanism to sustainably grow the talent pool.

When administered in local communities, the OptIC Path™ course and certification generates awareness and demand for telecom careers, instills a consistent set of skills and knowledge among potential workers, and ultimately increases the number of skilled workers available for fiber deployment projects.

For employers, the program decreases “time to productivity” in the field and increases work quality, as proven by pilot programs enacted across America. For example, Greenlight Community Broadband saw the time to competent field work cut in half for employees that went through FBA’s OptIC Path™ program. The program is also flexible in terms of where it sits within the employment cycle: as a precursor to a registered DOL apprenticeship, internship, or direct employment in the telecom industry.

We return to the OptIC Path™ program in [Section 5](#) where we look at the benefit of having a standardized training curriculum and present an operational model that states can customize to fit their unique needs.



OpTIC Path™ Training Program is a training course offered by the Fiber Broadband Association, which is the nation’s leading industry association dedicated to advancing fiber-optic broadband deployment.

What is the OpTIC Path™ Program?

The OpTIC Path™ Training Program is an industry-designed national training course created to train the next generation of fiber optic technicians. It is an up to 144-hour mix of theory and hands-on learning where students will build and develop the skills required for entry-level employment.

The program provides individuals with the skills and knowledge needed to plan, design, install, and maintain fiber-optic networks. The course covers topics such as fiber-optic cabling, splicing, testing, and troubleshooting. By the completion, graduates will be able to install, test, and troubleshoot components to completed systems, including at subscriber’s Fiber-to-the-Home (FTTH) locations.

Successful graduates of the program receive the Fiber Broadband Association OpTIC Path™ 3-year certification, plus a complimentary annual FBA membership, access to additional FBA content, and networking opportunities with industry experts.

Availability	Nationwide, currently offered or being considered across 32 states
Format & Content	<p>Flexible course with 40/60 mix of knowledge & skills training</p> <ul style="list-style-type: none"> • Classroom can be offered in-person or virtually • Skills training must be on-site <p>Developed by multi-decade career experts with input from fiber broadband service providers and vendors</p>
Training Facilities	<p>Taught in various facilities in partnership with a local service provider:</p> <ul style="list-style-type: none"> • Community Colleges • Trade & Technical Schools • Community Centers <p>Train-the-trainer course available for college instructor or current employee to upskill and run the training</p>
Apprenticeship Training	Program training hours will apply toward related technical instruction requirements for fiber optic and broadband related apprenticeships
Employment Opportunities	Designed to lead graduates to a registered apprenticeship and/or entry-level employment for fiber installation, splicing and maintenance technician job roles
Cost	~\$200 per student license

Benefits

Benefits to Participants

- ✓ Industry recognized certification and credential attractive to employers
- ✓ Detailed curriculum emphasizing safety and quality
- ✓ Develops soft skills for customer service roles and attention to detail for documentation
- ✓ Low-cost fee
- ✓ Entry to gainful employment with ample advancement opportunities
- ✓ Training available locally
- ✓ Suitable for students with no prior experience

Benefits to Employers

- ✓ Nation-wide scalable program ready for deployment to meet fiber technician workforce needs
- ✓ Designed to upskill workforce rapidly and deploy fiber faster
- ✓ Provides standardized approach to fiber skills
- ✓ Create and maintain new skilled labor pipeline via pairing with apprenticeships or internships
- ✓ Reduces turnover by giving students an accurate depiction of the fiber technician role
- ✓ Meet BEAD NOFO training requirements
- ✓ Protect infrastructure investment with high-caliber workforce and quality fiber builds
- ✓ Train-The-Trainer program to develop instructors to teach course

"The Fiber OpTIC™ Path Program sets employees up for long-term success"

*Brandon Curry, Manager of Broadband Service
Ace Fiber*

"S&N Communications **strongly believes** in the OpTIC Path™ certification and program...We view OpTIC Path™ as a solution to a serious problem."

*Andy Gibson, Senior Director of Fiber Optic Services
S&N Communications*

OVERVIEW OF CURRICULUM MODULES:

- Applications and Advantages of Fiber
- Fiber Theory, Types, Geometry
- Safety & Tools
- Cables & Cable Structures
- Architectures & Topologies
- Connectors, Splicing & Splitters
- Cable and Fiber Management (including Documentation, Values & Success in the Field)
- Test Equipment and Testing
- Outdoor/Outside Plant and Premises Installation
- Systems Overview
- Optical Network Terminals
- Troubleshooting

3

FIBER BROADBAND WORKFORCE DEVELOPMENT



This section outlines the role of the state in supporting workforce development for the BEAD program and identifies available funding sources for training.

3.1 Workforce Development for BEAD

States are unlikely to have faced a labor shortage similar to that facing the BEAD program

Over the years, state governments have taken on a more significant role in workforce development, enacting a wide range of policies and programs to enhance the skills, education, and training of their labor force. Examples include job training, apprenticeships, adult education, and workforce placement services, among others.

The machinery of workforce development is therefore well-established at the state level, and state agencies have many years of experience to draw upon. That said, it is unlikely that states will have faced a labor shortage like that facing the BEAD program, one that is nationwide in scale, highly time sensitive, and requiring many different specialist skills.

Beyond the obvious need to ensure sufficient labor for fiber construction, the NTIA has stressed the opportunity that BEAD provides for developing a highly skilled, equitable and diverse workforce. Importance has also been placed on ensuring that workforce training and development investments deliver long-term socio-economic benefits.¹⁴

To ensure that states meet these goals, they must include specific workforce development content in their Five-Year Action Plans.¹⁵ Workforce-related content requirements include strategies to ensure an available and highly skilled workforce to complete BEAD projects (e.g., partnerships, training) and alignment of the Action Plan with other existing/planned workforce development priorities.¹⁶

“Workforce development and job training in support of the infrastructure workforce is an eligible use of [BEAD] program funding...NTIA is proud to support the Department of Commerce’s commitment to a diverse, equitable and inclusive workforce.”¹⁷

Lucy Moore, Special Policy Advisor, National Telecommunications and Information Administration (NTIA)

A strong partnership with the state workforce development office is essential

Workforce-related policies and programs are typically administered by state workforce development offices (for readability, state workforce development office or “SWDO” will hereby refer to the entity or entities within the state government tasked with administering workforce development programs and services). Creating a fiber broadband workforce development strategy for BEAD will require close and ongoing coordination between the SBO and SWDO.

SBOs should partner with the SWDOs to understand the local workforce development landscape, including challenges, goals, current initiatives and programs, funding options, and entities involved. Further, representation from the SWDO will be central to workforce planning given their expertise in serving as the hub of workforce development within the state.

Interagency coordination also enables SBOs to take advantage of existing state infrastructure to reach local communities and underrepresented populations for workforce education and training. These structures (e.g., One-Stop Centers) should be utilized for BEAD-related workforce initiatives. SWDOs are also the link between the state and local workforce development boards, employers, and local colleges, which have the on-the-ground understanding of local labor markets. SWDOs often have existing relationships with educational institutions that enable them to facilitate connections between community colleges and local service providers to strategically deploy regional training programs.

Furthermore, given the existing role of SWDOs in administering workforce development funding, these agencies will be invaluable in navigating the funding options discussed in the next section.

3.2 Sources of Funding

Knowing where to look for funds and having the resources to apply for grants is key

There are many funding sources available for workforce development besides BEAD. States will want to consider the full range of options given that BEAD Program funds are not yet available and, in some cases, may be constrained. As noted above, the SWDO will have knowledge as to how these funds work within the state and can quickly assess the scale of funding available for fiber broadband.

A common sentiment among state officials appears to be that the availability of funding for workforce development initiatives is not as much the problem as knowing where to look and having the resources to apply for grants—federal grants for workforce initiatives can be distributed across many departments and have onerous application requirements. This is particularly obstructive for states with small or newly developed broadband offices that split responsibilities among fewer individuals.

There are several funding sources states can leverage. The most notable being the BEAD program, which lists workforce development as an eligible use of funds—further highlighting the importance of establishing skill-based training programs to support fiber deployment. Additionally, Workforce Innovation and Opportunity Act (WIOA) provides state with recurring funding for these types of initiatives, which SWDOs will have a strong understanding on its eligible uses.

Details of select funding sources are provided in the following table.

Funding Sources

Grant/Program	Funding Source	Amount	Provisions for Funding WFD / Cited Eligible Use	Availability of Funds
Infrastructure Investment and Jobs Act (IIJA)				
BEAD Program	Department of Commerce	At least \$100M per State At least \$25M per Territory	Workforce development and vocational training as eligible use of BEAD funds	2023/2024 <i>20% of total allocation released upon NTIA acceptance of Initial Proposal, remaining funds upon acceptance of Final Proposal</i>
American Rescue Plan Act (ARPA)				
Coronavirus State and Local Fiscal Recovery Funds (SLFRF)	Department of the Treasury	\$350B across State, Local, and Tribal governments	Job training for impacted households and communities as eligible use of funds per US Treasury Final Rule	2021 – 2024 <i>Started administering funds May/June 2021; to be obligated by December 31, 2024, and spent December 31, 2026</i>
Capital Projects Fund (CPF)	Department of the Treasury	\$9.8B for States \$100M for Territories \$100M for Tribal Governments	Muti-purpose community facility projects to build or improve community schools	
Workforce Innovation and Opportunity Act (WIOA) ¹⁸				
WIOA Title I	Department of Labor	\$3.18B	Workforce development programs for unemployed or underemployed Includes dedicated funding for Native Americans	Ongoing <i>Set annually by Congress</i>
WIOA Title II – Adult Education and Family Literacy Act (AEFLA)	Department of Education	\$704.2M	Education assistance programs for adults looking to complete secondary education or beyond	

Funding Sources

Grant/Program	Funding Source	Amount	Provisions for Funding WFD / Cited Eligible Use	Availability of Funds
Workforce Innovation and Opportunity Act (WIOA) - Continued				
WIOA Title IV	Department of Education	\$3.72B	Employment-driven vocational rehabilitation services to individuals with disabilities	Ongoing <i>Set annually by Congress</i>
Strengthening Career and Technical Education (CTE) for the 21st Century Act				
Perkins V Program Title I	Department of Education	\$1.2B	Aim to increase quality of career and technical education	Currently reauthorized annually through FY2024
Additional Funding				
Federal Grants	Departments of Labor	Varies	Dedicated grants that fund apprenticeships and similar programs	Ongoing
Private Investment	Industry	Varies	Typically want to see return on investment through faster time to worker competency and retention	Ongoing <i>Note: Quickest way to unlock funding by engaging critical industry stakeholders</i>
Non-profit Programs/ Sponsorships	Non-profit Organizations	Varies	Typically dedicated to advancing equity, access, or inclusion in the workforce for marginalized or disadvantaged communities	Ongoing

4

BUILDING A WORKFORCE DEVELOPMENT STRATEGY



In this section we outline key considerations for a fiber broadband workforce development strategy. Our recommendations are aligned to NTIA guidance and provide a plan for states to follow to meet the workforce development requirements of BEAD including the Five-Year Action Plan.

Workforce development is a broad topic area with many components and, when it comes to BEAD, it's a large undertaking that's ambitious in nature. A comprehensive strategy necessitates engagement from more than just the telecommunications industry—construction, secondary and post-secondary education, community partners/organizations, and other state agencies are all needed to shape and support state initiatives.

The section is organized in five subsections as follows:

1. **Workforce Development Goals:** Aligning the strategy with the BEAD program
2. **Creating a Dedicated Team:** Establishing a core team to lead the workforce research, analysis and strategy development
3. **Conducting a Workforce Gap Analysis:** Estimating the gap between labor needed for BEAD deployment and projected available labor in the state
4. **Surveying State Resources:** Engaging stakeholders to gather their input and understand the resources available for workforce development in the state
5. **Defining the Workforce Development Strategy:** Synthesizing findings from stakeholder discussions and create strategy that meets Five-Year Action Plan requirements

“So, we are encouraging states when they’re putting together their plan, it’s not just about laying fiber, it’s about what are the workforce needs that you will have and what are the working training and other initiatives that you’re going to invest in in order to meet those needs”

Gina Raimondo, Secretary of Commerce¹⁹

4.1 Workforce Development Goals

The starting point for strategy development is to be clear on the goals

BEAD requires states and subgrantees to make appropriate investments to develop a skilled, diverse workforce for the jobs that the subgrantees need to fill. This requirement flows through to the contents of the Five-Year Action Plan, the Initial and Final Proposal, and ultimately to subgrantee selection criteria as advocated by NTIA.

Specifically for the Five-Year Action Plan, states must:

- Describe strategies for **ensuring availability** of a highly skilled workforce
- Describe plans to **attract, retain, or transition the skilled workforce** that is needed
- Describe the involvement and partnerships of subgrantees, contractors, and sub-contractors with existing **in-house skills training programs**, unions and worker organizations, and **quality workforce training providers**
- Include any plans to ensure strong labor standards and protections

Following the plan, in the Initial and Final Proposals, states must describe how they will:

- Outline long-term objectives for enhancing economic growth and **job creation**
- Ensure that subgrantees support the **development and use of a highly skilled workforce** capable of carrying out work in a manner that is safe and effective
- Develop and promote sector-based partnerships to attract, train, retain, or transition to **meet local workforce needs** and increase high-quality job opportunities
- Create **equitable on-ramps into broadband-related jobs** while maintaining job quality for new and incumbent workers engaged in the sector
- Ensure the BEAD Program and other broadband funding programs **create job opportunities available to a diverse pool of workers,**

including traditionally underrepresented populations in the sector

- Provide evidence of coordination with tribal governments, local community organizations, unions and worker organizations including **efforts to achieve workforce development goals**

Aside from BEAD, states will want to ensure that the workforce development goals align with existing workforce development initiatives in the state. States will also want to look beyond BEAD and consider the career path of workers after the fiber networks have been built. For example, transitioning technical staff to customer installation and maintenance roles and other long-term (and career advancing) positions in the wider telecoms industry.

Vermont



A Workforce Study conducted in partnership between Vermont Community Broadband Board (VCBB) and the Vermont Department of Labor in 2021 identified that the Vermont telecom industry believed they had adequate capacity but were largely unaware of the impact of incoming infrastructure funding. The study found that industry had historically prioritized low labor costs over retention, and often did not sufficiently consider the quality of work, safety, employee development, and variability in how much fiber can be laid in a day in their workforce planning.

As a result, VCBB started working with education institutions, the Fiber Broadband Association, and others to set up a fiber technician program.

The stated goals of this effort include²⁰:

- Facilitate the establishment and scaling of education and training programs
- Focus on local residents
- Provide Vermonters with opportunities for better-paying jobs
- Provide job and career opportunities for the marginally employed
- Create career paths
- Improve employee retention

Maine



Maine’s Connectivity Authority recently published their ‘Workforce Analysis & Strategy’ document, which sets out four core workforce development goals²¹:

1. Promote Broadband and Career Awareness and Exploration
2. Coordination of Training and Career Pathways
3. Leverage Partnerships to Create a Talent Pipeline
4. Reduce Barriers to Hiring and Employee Retention

4.2 Creating a Dedicated Team

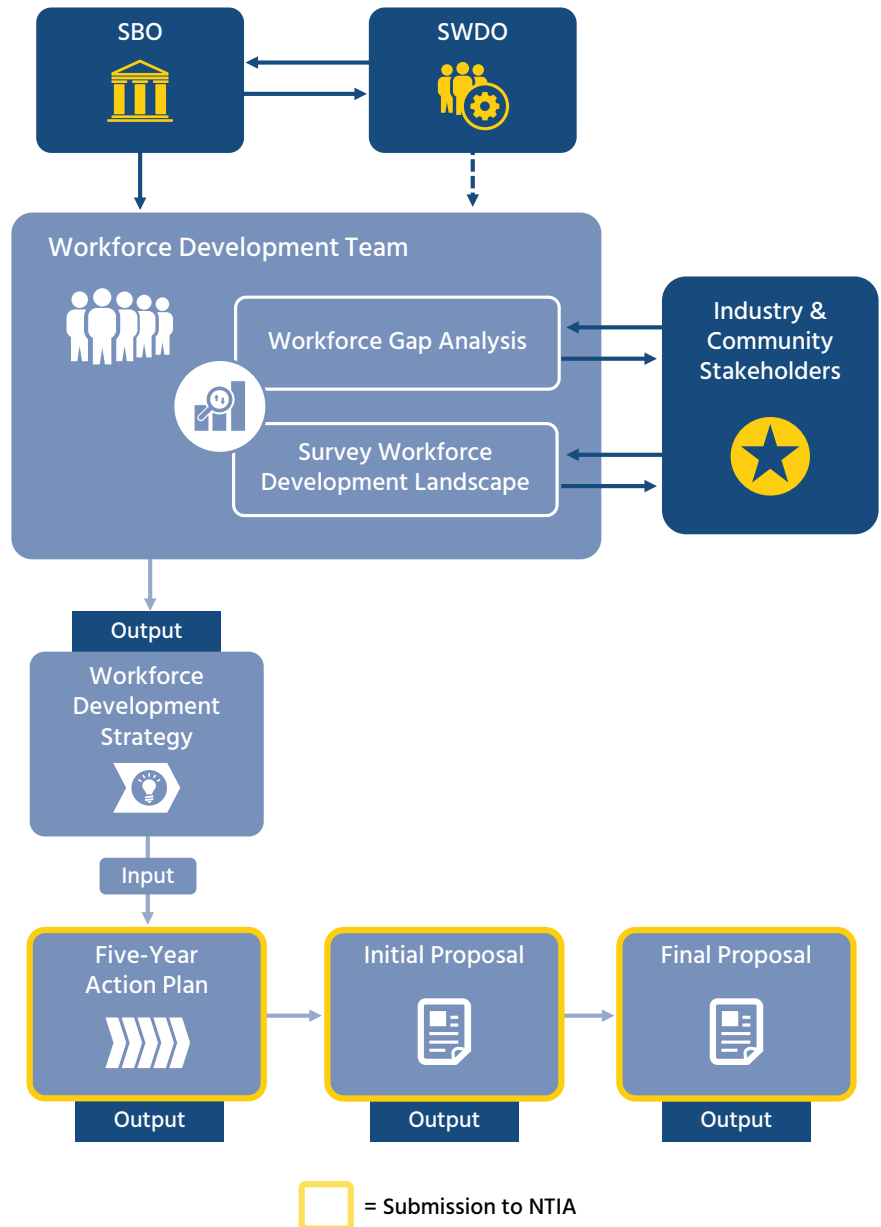
A dedicated team will ensure that the strategy development gets the focus it needs

Equipped with a clear set of objectives, we recommend SBOs create a dedicated team for fiber broadband workforce development. This team will be responsible for crafting the state’s strategy and laying out a path to addressing labor needs.

This team should be led by the broadband office and leverage the expertise of state workforce development officials. Additionally, if different entities are leading BEAD and Digital Equity (DE) planning efforts, both should have representation on the workforce development team. As per NTIA guidance, states should view projects funded by BEAD and DE as “complementary efforts aimed at the unified objective of closing the digital divide”.²²

A robust strategy will be underpinned by local research and analysis including a state-level workforce gap analysis and a broad survey of the workforce development landscape. The team will need to engage with stakeholders, coordinate with the state legislature for funding if needed, prepare NTIA submissions, connect with the NTIA Federal Program Officer (FPO), and define subgrantee workforce requirements among other things.

Role of the Workforce Development Team



4.3 Conducting a Workforce Gap Analysis

The strategy must be underpinned by a solid understanding of the labor challenge

The first step in scoping the “what, where, and when” of workforce needs is to document current and expected capacity. To quantify this workforce shortfall, states will need to conduct a workforce gap analysis. This analysis will provide vital insight into the size and shape of the existing workforce and identify the nature and scale of upcoming workforce supply risks. The output of this activity provides the foundation and context on which to build the workforce development strategy.

KEY CONSIDERATION: The NOFO requires states to identify known or potential obstacles or barriers to the successful implementation of the BEAD Program and the Eligible Entity’s corresponding plans to address them in the Five-Year Action Plan.²³

A workforce gap analysis will follow the following steps:

- 1. Assemble the analysis team:** The team should include data analyst expertise and experience with job classifications systems, statistics, and/or quantitative research on labor markets.
- 2. Survey employers to understand current workforce composition:** Gather data from employers within the state on the job roles needed for fiber broadband deployment (e.g., fiber splicers, surveyors, construction managers, etc.), number of employees, age profile by role, and historical recruitment and attrition rates. Map out the workforce to understand locations (e.g., rural geographies) where labor is scarce.
- 3. Define which occupations are in scope:** Select job classification system/approach to use in scoping roles for the gap analysis. At this stage, it’s imperative to be aware of all jobs involved in a deployment project, as a worker shortage along any part of the process can cause delivery delays.

- While not all telecom job roles fit cleanly into the BLS Standard Occupational Classification (SOC), there is extensive and readily accessible time-series data for these occupation codes, making this system an easy option to use.

- States will then need to select occupational titles for inclusion in the analysis based on the chosen classification system. For simplicity, states may choose to focus on the top occupations per deployment phase (pre-construction, construction, post-construction) or other grouping mechanisms.

4. Quantify projected employment under current hiring/training: Forecast employment by job role over the BEAD Program timeline. This will provide a baseline workforce—essentially, the workforce available if there is no intervention to increase the labor pool.

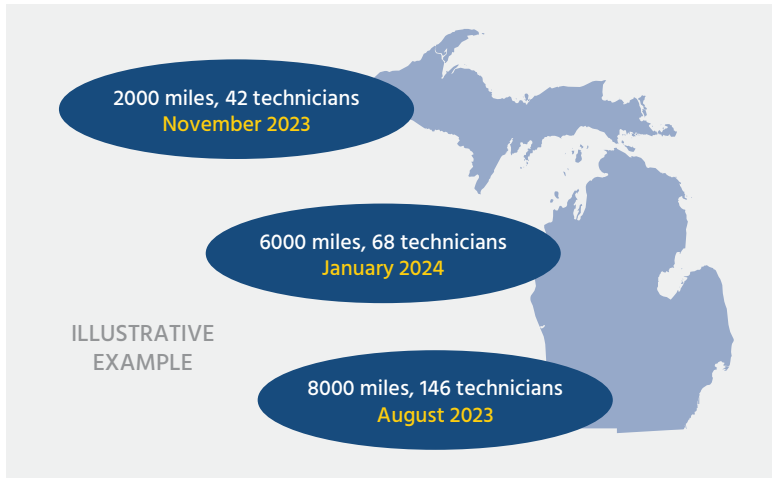
- Apply anticipated macro-level employment shifts to industry patterns on an annual basis; industry patterns calculated annually as: current workforce + rate of new hires into industry – retirees – job leavers.

5. Quantify workforce needs: Forecast the number of jobs per year needed for steady-state business as usual, BEAD-sponsored projects, and any state funded programs. There are several methodologies that can be applied, each with its own strengths and limitations. SBOs should connect with other state agencies (e.g., Department of Labor) to understand what data is already collected at the state level and whether existing methodologies can be applied to the broadband industry. Potential approaches include:

a. **Input-based:** Calculate the number of new jobs needed based on ongoing and anticipated private and public funding (incl. matching funds), using employer data about job creation from historical investments as a baseline.

b. **Output-based:** Divide state into regions and calculate using regional estimates for new fiber miles generated by BEAD and industry data on fiber miles that can be laid per person, repeated for all regions in the state. Analysis should be done at regional level to loop in region-specific ISPs and account for geographical differences that impact fiber pacing.

- FBA/WIA can provide estimates of infrastructure per day per person.
- VCBB (Vermont) used this method to estimate their labor shortfall.



c. **Employment Share-based:** Calculate by weighing occupation employment shares by estimated industry weights for industries involved with broadband expansion. Industry weights found by mapping estimated expansion cost structure of a project into industry shares of total output created by the spending.

- Brookings Institution utilized this approach to estimate 200,000 job-years nationwide from \$80 billion in spending.²⁴

6. **Calculate the gap:** The workforce gap is the difference between the estimated levels of employment under current conditions (Step 4) and expected number of jobs that will be needed (Step 5). This can be done annually or cumulatively, based on the approach taken in previous steps.

7. **Validate results and expand upon findings:** Review findings with employers (service providers, construction firms, contractors, etc.) for validation. These companies can sense check the outputs based on first-hand experience; their input should be used as context for interpreting the analysis results.

Following the workforce gap analysis, states should be able to answer the following:

- How many total positions will be needed for BEAD deployment?
- Which roles face the biggest shortages in the short, medium, and long term? Do any of these roles require specialized skills?
- Are there any bottlenecks at certain levels/roles?
- How will retention and retirement impact the workforce?
- How much funding will be needed to provide sufficient training resources?

4.4 Surveying State Resources

Engage widely to gather insights and secure buy-in from stakeholders

Armed with an understanding of the size of the fiber broadband workforce needs, the SBO should identify stakeholders at the local, regional, and state level to speak with on workforce development, starting within their network while standing up broader meetings. Engaging a wide array of stakeholders is crucial to solicit feedback on labor needs, existing training programs, successful outreach initiatives, and the other pillars of workforce development.

Relevant stakeholders may include, but are not limited to, workforce development offices/boards, industry associations, educational institutions/boards, labor unions, tribal associations, public utility commissions, vocational non-profits, community partners, and more — see [Appendix II](#) for a detailed overview of potential stakeholders.

In selecting who to engage with, the SBO should give regard to the direction in the NOFO to ensure plans/activities include “**meaningful engagement and outreach to diverse stakeholder groups, labor organizations, and community organizations, including to promote the recruitment of women and other historically marginalized populations for workforce development opportunities and jobs related to BEAD-funded eligible activities**”.²⁵

Fiber Broadband Workforce Development Stakeholder Ecosystem



Through stakeholder engagement, SBOs should seek to understand the following: industry recruiting and training approaches, technical college processes for launching training programs (including equipment and facilitator resource needs), existing state fiber training programs, the role of community partners in engaging underrepresented groups for workforce opportunities, and how to fund initiatives. Particular attention needs to be given to the time needed for employers to train workers to competency in specialized roles and how long it takes technical colleges to offer a training program and the factors that go into these timelines. Across all stakeholders, SBOs will need to consider the role each will serve in deploying a workforce development strategy.

KEY CONSIDERATION: The BEAD NOFO requires states to provide evidence of engagement with unions and worker organizations, tribal governments, and local community organizations.

Engage and establish feedback loops with stakeholders

SBOs will want to consider the depth, timing, and frequency of each stakeholder engagement. Establishing a feedback loop supports transparency and allows SBOs to monitor on-the-ground responses to planned development activities, which are both pivotal to a successful strategy (see Ohio and Georgia examples on next page).

Developing strong relationships with employers is of the utmost importance, as any training or deployment will require service provider support and engagement. Service provider conversations may be further complicated by the fact that they do not know if they will be awarded BEAD subgrants at this point (or whether or how to participate); however, regardless of whether employers plan on applying for funds, all service providers will be impacted by changing labor force dynamics— such as competition in hiring and contractor availability—spurred by BEAD.

SBOs should also use this engagement as an opportunity to reinforce workforce development as a priority among employers. Having a skilled workforce is a component of NTIA’s Workforce Plan and is an attribute states may want to incorporate into the selection process as an obligation

for successful subgrantees. This could take the form of a commitment to hiring individuals trained in a state accredited program.

Ohio



To manage the different levels and types of stakeholders, Ohio's SBO and Governor's Office of Workforce Transformation holds multiple concurrent workstreams for their Broadband & 5G Workforce Strategy:

1. 10 initial meetings across 4 weeks for the purpose of identifying preliminary issues facing the state and soliciting feedback on how to address them.
2. Bi-weekly interagency calls with the Governor's Office of Workforce Transformation, Ohio State, and the Wireless Infrastructure Association to work through deliverables for quarterly implementation sprints.
3. Quarterly broadband/5G sector partnership meetings to review progress on quarterly deliverables and determine new deliverables for the next implementation sprint.

Georgia



Georgia's SBO recently launched a community listening tour across the state with a three-prong approach: in person townhalls across the state open to all, virtual stakeholder meetings with industry players (upwards of 40 people per session) and conducting a statewide survey to thousands of Georgians to understand their digital connectivity challenges.

The SBO has also created two advisory committees on BEAD and DE challenges and opportunities in the state: one for digital equity and the other with trade associations and service providers.

Establishing pathways for both local and state-level input, from key industry players and community members, will bolster states' strategies with a wider net of viewpoints and considerations.

Investigate workforce development funding options, starting with BEAD

Alongside surveying stakeholder groups to understand opportunities for training and development, states are required by the NOFO to identify available funding for broadband deployment and other broadband-related activities in their Five-Year Action Plans.²⁶

BEAD funds are an obvious first choice, and many states will have a surplus of funding here because of the allocation formula. Even those states that face constraints must still consider whether to assign a share of funds to workforce development or risk BEAD projects becoming stranded due to a shortage of skilled and available workforce.

In partnership with the SWDO, SBOs should also seek to identify other state and federal grants (e.g., through the Department of Labor) that can be used to support new workers to enter the fiber broadband industry over a multi-year period. Creating a pathway for multi-year financial backing will ensure the longevity of development initiatives defined in the SBO's workforce development strategy.

Most likely, WIOA will be a strong candidate due to its scale and recurring disbursements. ARPA and other federal grants can also be explored. Non-BEAD options such as these are ideal for jumpstarting initiatives, particularly for states that are already facing labor shortages.

State budgets offer another option. Ohio, for example, has demonstrated its commitment to workforce development using state funds prior to BEAD (see panel). If this is of interest, then SBOs will need to work on proposals to include dedicated fiber/broadband workforce development initiatives in the state budget for future years.

Ohio



As part of the 'Strengthening Ohio's Broadband & 5G Workforce' initiative, Ohio's Office of Workforce Transformation has successfully raised \$15 million for broadband and 5G workforce development ahead of BEAD funding allocations. The office cited that this was enough funding for two calendar years until end of 2024.

Vermont is another example of a state that has not waited on BEAD funds to finance training initiatives. VCBB has received approval from the state’s Department of Labor to fund a broadband/fiber apprenticeship program.

Vermont



Vermont has applied federal/state grant money to contribute to their “Pay it Forward” fund, a workforce fund that is replenished by training graduates once they are gainfully employed via an income sharing agreement. This grant is used to fund both worker training and wages during initial employment, helping both employees and companies overcome financial obstacles to apprenticeships. Vermont states that recycling capital increases the number of individuals able to be trained and links financing to positive workforce outcomes.²⁷

KEY CONSIDERATION: Due to the critical importance of workforce development to BEAD, states cannot leave training up to chance. As such, states will need to find solutions to fund these workforce initiatives, starting with allocating funding from BEAD and supplementing with ARPA, WIOA, or other state programs.

4.5 Defining the Workforce Development Strategy

Set clear objectives based on stakeholder engagement and development goals

In the final phase, the SBO identifies strategic objectives for workforce development from the qualitative and quantitative insights obtained above. Where the strategy can fit into existing workforce development initiatives in the state, the SBO should take advantage of the benefits that overlap affords.

These objectives should sit under the broader goals created in [Section 4.1](#) and follow the SMART framework: Specific, Measurable, Attainable,

Realistic and Time-Bound. Essentially, these action-oriented objectives ground the strategy with tangible outcomes.

Michigan



Michigan’s Broadband Roadmap²⁸ includes several goals for the Michigan Office of High-Speed Internet (MIHI). To address the goal of ensuring “high-speed internet is available to every household, business, anchor institution, and community in the state”, the MIHI Office has laid out strategies that include workforce development:

Strategy / Objective	Timeline	Anticipated Outcomes	Key Performance Metrics
Strategy: Improve the workforce pool for the telecommunications industry			
Objective 1: Develop training programs for telecom-related skills and licenses	Short Term	1 Number of workers with telecommunication related skills	1 Training programs created 2 Certifications or degrees completed
Objective 2: Improve communication between ISPs and Michigan’s post-secondary institutions	Ongoing		
Objective 3: Develop online education programs and certifications	Long Term	2 Number of telecommunications occupations available	3 Funds invested in scholarships and internships
Objective 4: Develop funding support for scholarships and internships for telecom-related programs	Long Term		

Organize state needs into pillars of a workforce development strategy

While nuances will differentiate individual states' workforce gaps (unearthed in stakeholder discussions), all states will need a strategy that aims to fill the skilled labor gaps in the fiber industry and address the NTIA requirements for "equitable training and workforce development activities".²⁹ Therefore, objectives will need to balance unique state needs and the workforce goals laid out in BEAD.

Accordingly, several facets to a development strategy can be applied. States should consider organizing objectives into the following development pillars to ensure a robust strategy.

Workforce Development Strategy Pillars



Adaptable training programs prove to be the most effective way to upskill workers, which is why the workforce development pillars center on training. Each pillar mutually supports the success of the others and together, they provide states with a path to achieving the overarching goal of gainful employment in the telecom industry. By increasing career

awareness and decreasing barriers to training/employment alongside skill development itself, training programs can reach more individuals and achieve a more diverse and equitable workforce.

Finally, it's worth seeking stakeholder input to strengthen the strategy with additional perspectives and secure buy-in from those that will help enact it.

Ohio



Ohio's workforce development plan includes the overarching goal to "ensure broadband and 5G deployment will be supported by a workforce capable of building and maintaining it."³⁰

The strategy addresses three key issues:

- Increasing broadband industry career awareness by exposing middle school and high school students to the industry through curriculum and internships.
- Developing and supporting more education and training programs to educate and train Ohioans.
- Capitalizing on state and federal funding programs, like TechCred and WIOA, to help finance the education and training that will bring to market the talent supply needed for the broadband and 5G industry in Ohio.

Section 5 will focus on laying out actions for each pillar needed to implement the strategy, starting with selecting the training model, then working to drive program adoption and implementing longer-term initiatives to generate interest in the industry.



5

ESTABLISHING AND SCALING FIBER BROADBAND TRAINING



In the final section, we step through the actions to build a fiber broadband training program to meet the needs of BEAD and help address the industry labor challenges. Deploying a scalable, flexible, and industry-leading fiber training program will need to be a top priority for states to ensure BEAD projects have the human-power to proceed. Without state and industry action, the vision of the IJJA and digital equality is at risk of being delayed or unmet.

States will need to tailor these activities to precisely fit their training needs and the existing resources they can leverage. Every state will have its own specific local circumstances, and these will be captured in the workforce development strategy outlined in [Section 4](#).

The section is organized in four subsections as follows:

1. **Defining the Curriculum and Operational Model:** Establishing a state-wide training curriculum through course selection criteria
2. **Coordinating Training for the State:** Structural features to align on prior to enacting a program, including funding, timing, role of employers, and addressing accessibility barriers
3. **Promoting Awareness and Driving Adoption:** Strategies and tactics to build awareness and take-up of a training program
4. **Tracking Progress and Success:** Recommended metrics for success to track and evaluate efficacy of training program

5.1 Defining the Curriculum and Operational Model

Established training programs offer states an easy implementation path

With the workforce development strategy in hand, states will need to move forward with defining an operating model for training that meets their needs, particularly for the projected skills gap in specialized fiber roles. This involves selecting a training option and laying out the process for implementing the program, including stakeholder roles and responsibilities at each stage. As outlined in [Section 2](#), FBA's OpTIC Path™

Program is well positioned to meet industry demands for specialist skilled labor.

Community and technical colleges will be keen to assist states in developing the future workforce and playing a role in closing the digital divide. Nonetheless, creating a new curriculum from the ground up is a considerable effort on both time and resources. Not only will colleges need to create course materials, but also find experienced instructors and ensure that the course meets the needs of employers. The additional time needed to create a new curriculum further extends the time needed to start up a program. Such concerns are well-placed with colleges facing other demands on time and budgets, creating new fiber broadband training curriculums may be seen as difficult or risky.

Fortunately, there exists a far easier path. By adopting an existing program that is already recognized by industry, colleges can avoid this unnecessary effort and states can be confident that the course will equip students with the skills they need to enter the fiber broadband workforce and meet the needs of service providers and contractors across the industry. A survey of training programs currently used in the telecom industry, as shown on page 31, indicates a variety of formats and methods, each with their own benefits and intended audiences.

In addition to delivery format and method, there are certain characteristics emblematic of best-in-class programs that states will want to consider when deploying a large-scale initiative:



High Quality: The quality of the course, the depth of its content, and the time spent training students directly impacts training outcomes. Students that have received more detailed training, with a mix of classroom and practical sessions, will be better prepared for the workplace. Additionally, proper training will ensure quality networks are built the first time around, requiring less repairs further down the line.



Safety-First: Curriculums with an emphasis on safety training provide students with a solid foundation to build on with further on-the-job training. Training focused on both skills and safety is conducive with a higher-caliber workforce and output.



Hands-On: Training programs that encompass hands-on training are essential to develop the practical skills needed by technicians in the field. Skills such as fiber splicing can only be obtained through repeated practice using real equipment. The skills gained through hands-on training greatly reduce the time it takes for a worker to become competent and productive.



Field Experience: Fiber and wireless network deployment are outdoor jobs and providing on-site experience during training will enable the students to connect what they have learnt in the classroom with a real-world example. Not only does this consolidate and extend their understanding, but it also prepares new hires for their first day on-site.



Scalability: Evidence of the ability to scale will be important too, such as programs that include train-the-trainer materials to ensure instructors can scale alongside program offerings. Courses that can be rapidly rolled out across the state not only allow for a more efficient delivery process, but states will benefit from a standardization to credentialed fiber training. Readily scalable programs also allow states to quickly roll out training that can upskill workers and reduce time to productivity, meeting the rapidly increased labor demand that will come with subgrant awards.



Flexibility: Programs with flexible classroom formats will broaden the reach to more communities and reduce barriers-to-entry. For example, evening or weekend courses will suit those with current jobs or are in school and cannot meet during the normal workday. Endorsing flexible programs will also help states to meet equitable training requirements of the BEAD program.



Proven Track Record: States should consider programs that have a proven track record of rapidly upskilling prospective employees into full-time fiber-based roles. Speaking to employers that have hired course graduates will provide insight into the quality and value of the training.



Industry Recognition: States should look out for reputable courses with strong industry backing. Recognized, trusted course will support scaling requirements and facilitate stakeholder approval. Those supported by service providers offer the potential to pair the training program with employment opportunities, such as Registered Apprenticeships. Going with the industry-leading option also contributes towards a standardized set of fiber skills for entry-level positions.

FBA & WIA WORKING IN PARTNERSHIP: COLLECTIVE WORKFORCE DEVELOPMENT AGREEMENT

The Fiber Broadband Association (FBA) and the Wireless Infrastructure Association (WIA) have entered into a Collaborative Workforce Development Agreement to advance critical workforce education and training for the broadband communications industry.

This agreement helps to promote both associations’ workforce development programs: the Telecommunications Industry Registered Apprenticeship Program (TIRAP) that is nationally sponsored by WIA for broadband and 5G technicians and the Fiber Broadband Association’s Optical Telecom Installer Certification (OpTIC Path™) program that trains fiber technicians. The associations work together to promote Registered Apprenticeships, develop world-class curriculums, establish industry-recognized credentials and certifications, and articulate telecommunication career pathways.

In evaluating existing training programs, states may look to scale one that has already been piloted locally – as identified in the state survey in [Section 4.4](#) – or has found success elsewhere (see Virginia example).

After choosing a path, states will want to understand how the training will operate among existing structures (e.g., employment pathways) and stakeholders in the state. Laying out roles and responsibilities for each of the involved stakeholders— the SBO, employers, technical colleges, training partner, prospective students— will be essential for coordination

Virginia



Virginia’s State Broadband Office is currently surveying existing training programs within the state to see if any can serve as a model for deploying statewide trainings. Being able to scale a program that is adaptable to local needs is a top priority for the SBO. For them, credentialed programs may unlock opportunities to meet current and future demand for a workforce to support broadband expansion as well as operations and maintenance.

The office has spoken to representatives from Southside Community College, which is piloting the FBA OpTIC Path™ Program to learn more about how the college established the program.

Based on initial discussions, the key considerations in finding a program to use as a statewide template are funding, faculty, and employment demand.

as discussed in [Section 5.2](#). For example, bringing employers and technical colleges/training facilities together so they can balance training graduate supply and labor demand.

A scalable training model is included on page 32, demonstrating how states can leverage FBA OpTIC Path™ to quickly deploy a statewide fiber training program that is both flexible to meet local needs and comprehensive to deliver quality training. Other variations may be better suited for unique state needs, but all should look have the SBO mediate between employers, colleges, job seekers, and the training partner.

ACTION ITEMS

- Research potential options for state-wide standard curriculum
- Select training program that meets the state and industry needs
- Define operational model linking employers, colleges, and job seekers

Fiber Training Options

Format



Registered Apprenticeship

Not currently widespread in the telecommunications industry, but promotes retention via mentorship and hands-on opportunities, unlocks additional funding options



On-the-job Training

Found in every company, key for learning company-specific processes/ methods and upskilling or cross-training, will look differently at every company with varying levels of mentor/manager engagement



Credentialed Industry Program

Provides standardized skillset and signals worker quality, created by industry veterans with focus on quality technical skills, pairs with all other forms of training and serves as option for upskilling or cross-training



High School CTE

Targeted to high-school students and teaches job-specific skills; to be completed alongside classes, often paired with internships or job-shadowing



Internal Onboarding

Typically alongside HR/legal onboarding in early weeks, formal approach to learning internal methods, systems, equipment before field work

FBA OpTIC Path™ compatible

Delivery Method



1 to 3 week course

Condensed timeline meeting every workday, best for students with schedule flexibility and daytime availability



4 to 10+ week course

Ideal for those with current jobs or are in school and cannot meet during the normal workday



Online

Best for disparately located individuals, requires internet access, limits hands-on experience options



Classroom

Trainer-led in person, can incorporate both textbook/ curriculum-based content and basic forms of hands-on experience (e.g., fiber splicing)

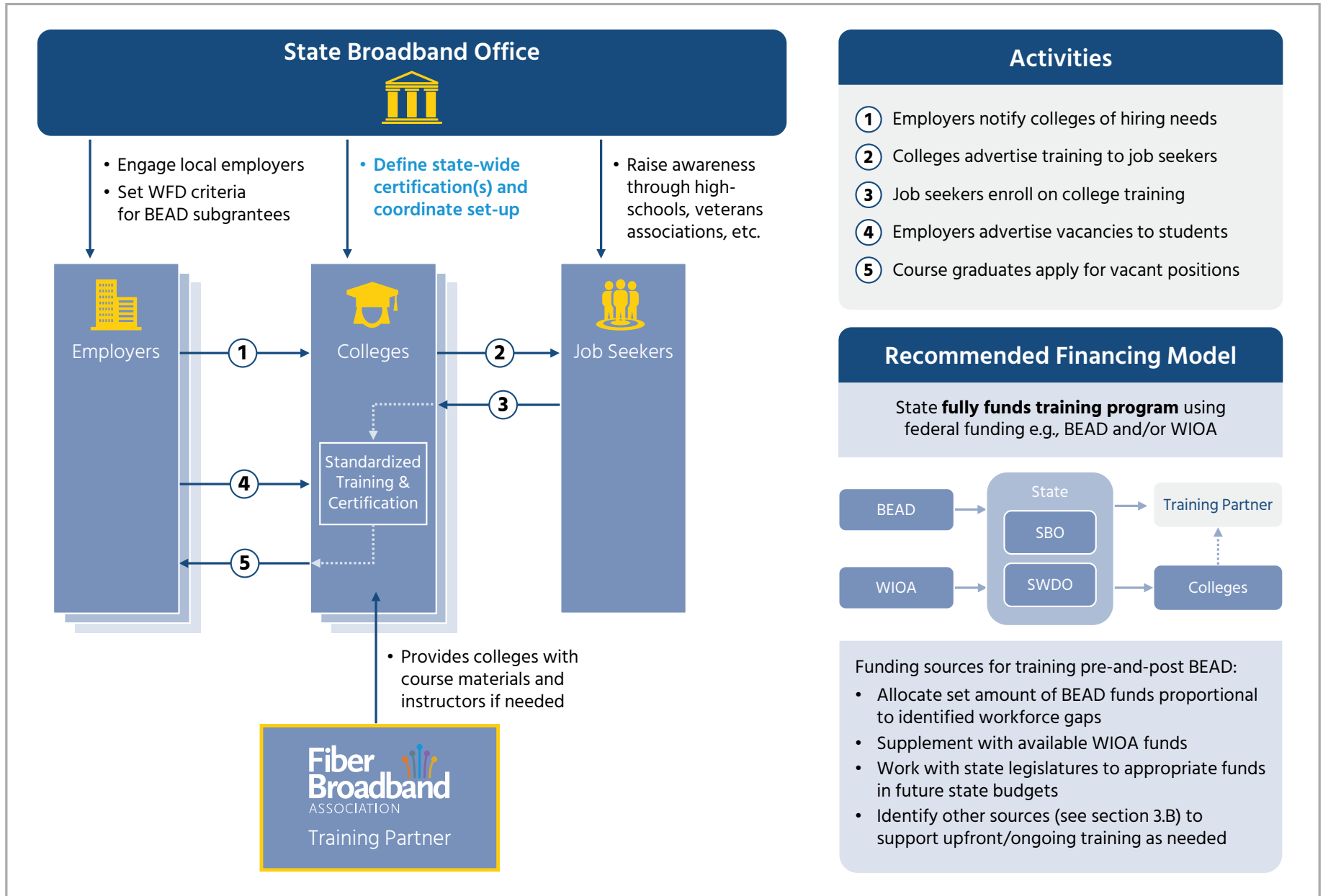


In-field

Requires additional infrastructure (e.g., towers) but allows students most authentic experience to see what job will be like, such as physicality required or heights

FBA OpTIC Path™ compatible

Fiber Training Operational Model



5.2 Coordinating Training for the State

Pre-employment training opens upskilling opportunities to the widest group

Working with the chosen training partner, thought must be given to when in the employment cycle training should occur (e.g., pre-employment or as part of onboarding), and how the course will be scheduled. A variety of options may be needed to meet all the strategic goals, but the primary focus should be on pre-employment training as outlined in [Section 5.1](#).

Pre-employment training addresses the need for workforce expansion by engaging individuals not currently in the broadband industry. Additionally, given that any training program is likely to face dropouts, service providers may be reluctant to hire individuals prior to going through credentialed training. That said, training should be made available to employers that wish to fill skills gaps in their current workforce by reskilling and upskilling current workers.

Location will also be a critical factor here, in terms of the training centers, students, and jobs. Rural areas face unique challenges, as technical colleges, prospective hires, and service providers are all geographically spread out. Further, individual smaller service providers may not need enough talent to justify spinning up an entire training program at a nearby college. SBOs should support training partners to disperse training regionally, connecting multiple service providers with a regional institution to show collective labor demand. SBOs will be vital in coordinating this connection, bringing together groups of employers and technical colleges, to meet collective labor needs.

Employers may be reluctant to provide firm commitments on future recruitment as this will be contingent on the outcome of the subgrantee award process. Considering this, states may need to progress with soft commitments knowing that whichever subgrantee is successful will need to recruit. Furthermore, as mentioned in [Section 4.4](#), states can reinforce training as a means for achieving an equitable and skilled workforce by mandating workforce development-related requirements in subgrantee applications.

Long lead-times mean states need to start planning training now

Our research indicates that it typically takes three to twelve months to deploy a new regional training program. The biggest factors being (i) whether a new curriculum is created from scratch versus adopting existing course content, and (ii) whether the course is added to a credited degree program or offered via an institution's continuing education department. Having adopted an industry-recognized program, states are able to accelerate this process.

Working back from the expected 2025 start date for BEAD construction indicates that states will need a pipeline of students going through training from 2024. However, some states are already experiencing worker shortages now and many states expressed they are behind in workforce development, in some cases by many months.

Aligning the timing of training to employer needs will be crucial, as training workers too soon or too late will result in a mismatch of labor supply and demand. Some states expressed concern that if they train too soon (before BEAD projects ramp up) they risk losing talent to neighboring states with active projects and available jobs. Whereas training too late could require employers to outsource work to non-local workers to avoid large construction delays. Given the lead time required to scale a statewide training program, states will want to start preparing now in any event.

KEY CONSIDERATION: States must prioritize workforce development now to ensure there's sufficient time to implement training initiatives that will be ready to rapidly scale in advance of BEAD.

States will need to prioritize accessibility to fulfill inclusion efforts

To ensure successful take-up of training – and representation from a diverse pool of students – states will need to consider potential barriers to access. Common barriers are listed in the following table, with potential solutions that can be used to increase accessibility.

Barrier	Issue	Potential Solutions
Affordability	Student unable to afford tuition and/or materials	<ul style="list-style-type: none"> • Allocate funding to course subsidies. • Identify and leverage skills development grants, e.g., WIOA, GI Bill Benefits. • Explore employer assistance and private sponsorship. • Consider student loans/ income bonds/scholarships
Transportation	Student lives far from training location or may not have driver's license	<ul style="list-style-type: none"> • Use multiple training centers to reduce travel distances. • Identify opportunities to provide transport to broaden participant reach. • Consider residential training centers. • Explore funding from WIOA for travel and accommodation.
Childcare	Student unable to leave children unsupervised	<ul style="list-style-type: none"> • Identify training facilities with options for on-site childcare support. • Explore funding sources for external childcare.
Living Costs	Student needs to maintain an income while training	<ul style="list-style-type: none"> • Provide training formats that can work alongside employment, e.g., evening classes, weekends. • Explore potential stipends and other sources of financial support.

Illinois



Illinois' Department of Commerce & Economic Opportunity's 'Illinois Works' initiative aims to diversify the construction industry workforce and create more equitable ramps into the construction industry. Key programs include a 'Bid Credit Program' which gives contractors an opportunity to earn bid credits for future state-funded public works projects if they hire apprentices who have completed the Illinois Works Pre-Apprenticeship Program. The Pre-Apprenticeship Program deliver skills training for underrepresented populations in the construction industry, which is tuition-free, and participants receive stipends and supportive services to overcome barriers to entry.³¹

NTIA encourages states to engage with underrepresented communities (e.g., women, people of color, Tribal communities, veterans, incarcerated persons) and states will need to think about how to encourage training participation from these groups. Given the telecom industry offers typically good paying jobs, states will be keen to promote the financial opportunities training unlocks. For example, if a high-school or college-aged student enrolls in a training program and enters the telecom industry in Mississippi, their median annual income would be about \$12,000 more than the state's median salary.³² New policies and measures may be needed to reduce barriers to participating in workforce development programs. States and training partners can also meet the needs of a wider cohort of prospective students by offering different variations of select training programs.

For individuals that have not previously considered a career in telecoms, introductory classes can provide useful orientation and overcome perceptions that the roles are too technical and outside their abilities. So called 'broadband bootcamps' offer a bitesize snapshot of broadband networks and typical roles, but do not offer enough hands-on skill training to shorten time to ROI. However, these introductory sessions pair nicely

with credentialed training, breaking down perceptions and allowing individuals to engage with hands-on training.

TRIBAL RESOURCE CENTER & INSTITUTE OF LOCAL SELF RELIANCE

‘Broadband Bootcamps’ have proven to be successful method to engage and educate tribal communities on building tribal owned networks and more broadly, broadband career pathways.

Since mid-2021, the Tribal Resource Center (TRC) and Institute for Local Self Reliance (ILSR) have provided 3-day bootcamps covering introductory classroom and hands-on training to fiber-optic and wireless networks to various tribal communities nationwide.³³

ACTION ITEMS

- Work with training partner, employers, and technical colleges to lay out timeline for implementing training program
- Define how fiber workforce training fits into employment cycle
- Identify strategies to reduce barriers-to-entry to state training programs

5.3 Promoting Awareness and Driving Adoption

Local and state-level marketing pushes can help promote training program

Raising awareness of the new training opportunities, and fiber broadband career pathways in general, is imperative to success. To ensure this has sufficient focus, the state’s project plan should contain a workstream dedicated to marketing activities and outreach to prospective students.

Wider stakeholders including employers, industry associations, training partners, nonprofits, and local community partners should be engaged to implement marketing activities that drum up interest and awareness

of new training opportunities. Specific consideration should be given to best practices in marketing to underrepresented groups to engage a more diverse workforce. Service providers and other employers will be key in demonstrating employment opportunities waiting on the other side of training.

To this end, states will want to engage in outreach to underrepresented groups such as: tribal communities, veteran associations, women workforce organizations, and re-entry organizations. Doing so will further support the goal of BEAD to achieve greater participation from underrepresented community groups in the fiber broadband workforce.

Such efforts could include targeting veterans nearing their end of service with reskilling opportunities for a career in broadband and fiber. Here, training partners, service providers, and workforce development offices could create opportunities within the SkillBridge program.³⁴

CREATIVE MARKETING EXAMPLES

Vermont’s Community Broadband Board understands the importance of marketing broadband training opportunities to younger audiences. To drum up interest for fiber training at the Vermont Technical College, their marketing activities include promoting and speaking to prospective students at local, youth-orientated events such as Tough Mudder.

A mid-size ISP in Virginia changed marketing tactics to drive more demand for their broadband vacancies after failing to get enough applicants from local newspaper job advertisements. To broaden their reach, they hosted a job fair with a community partner and received much greater traction.

Longer-term initiatives are needed to drum up interest in the broadband industry

The broadband industry has historically suffered with low awareness levels of career pathways into the fiber workforce. State-wide training initiatives must include longer-term marketing strategies to maintain

a pipeline of demand for skilled training programs. On-going demand generation and recruitment activity both regionally and at the state level will help to address this.

The project marketing plan should include activities aimed at cultivating perceptions of broadband as a well-regarded, well-paid career path for students or job seekers looking for a trade-based role.

Example activities include:

- **Create a centralized Broadband ‘Career Hub’** as a go-to online resource to discover more information about broadband careers. Include detail on career pathways, salary information, training opportunities and job postings.
- **Work with state and regional workforce development entities to promote fiber broadband career pathways and jobs on central websites and key literature:** include broadband and fiber roles in career guides; promote training programs; consider adding broadband and fiber roles to career clusters and the ‘in-demand’ jobs list.
- **Run ‘show & tell’ sessions in middle and high schools on broadband related careers.** Where possible, encourage recent hires and training graduates to join and share first-hand experience. Stress the importance of broadband jobs and the broader impact it has on digital equity, telehealth, education, and state economic growth.
- **Offer work experience or pre-apprenticeship opportunities to high school students** to acquire direct insight into the industry, build relationships with local employers, and gain a valuable opportunity for developing workplace skills.
- **Conduct targeted recruitment and marketing efforts with outreach associations,** to promote fiber training opportunities to underrepresented groups including women, tribal communities, and veterans.

Marketing awareness activities should be supported by adoption strategies to maximize take-up and encourage program completion. To drive adoption, states will want to broaden the training program to appeal to a wider cohort of job seekers.

For high school students, states may wish to explore the inclusion of industry apprenticeships or placements in telecommunications-related 2-year Associates Degrees. Offering high school class credits for vocational training completed at local community college may also incentivize take-up.

States will also want to consider how workforce development initiatives can improve job retention within the industry to maintain the skilled labor pool. Given the effort required to build the workforce, thought should be given to how best to foster and retain this new talent. Here, mentoring and peer networks can help, particularly for those from underrepresented groups. Continuous learning also has a role to play, with service providers reporting retention benefits from cross-training employees.

FIBER BROADBAND ASSOCIATION

The Fiber Broadband Association (FBA) established their Women in Fiber Committee that seeks to educate women within fiber on career pathways, address challenges faced by women in the workforce and provide professional development opportunities.³⁵

ACTION ITEMS

- Create marketing push to promote training program via local and statewide campaigns, with support of employers, technical schools, and community partners
- Build outreach plan for increasing awareness of broadband industry at high schools and technical colleges
- Validate that plan includes targeted ways to build a more diverse fiber workforce

5.4 Tracking Progress and Success

Tracking and reporting progress assures success and is essential for transparency

To ensure deployed training initiatives are meeting state fiber workforce needs, it is important to define what success looks like and establish methods to track progress against these targets.

Tracking and reporting on subgrantee training programs is required for BEAD.³⁶ The process and output should seek to establish feedback loops enabling training programs to be routinely evaluated to identify any issues or improvements.

Best practices include defining and tracking success for each of the entities/phases involved (institutions/programs, graduates, and employers) as they relate to the strategy objectives and pillars. Example KPIs include looking at the increase in trainings offered, training program completion rate, percentage of students from underrepresented groups, recruiting costs, six-month and one-year employment rates, change in application volume, percentage of required skills present upon employment, reduction in time to competency, etc.

Together with tracking success, states should track progress against their strategic goals and action plans. Standing up a communication portal to provide publicly available progress updates creates transparency and keeps stakeholders informed. For example, California's Broadband for All initiative provides a publicly available tracker that shares progress against actions aligned to goals in the Broadband for All Action Plan.³⁷

By following guidance outlined above, states are provided with a robust delivery plan to address workforce needs and stand to be well prepared for when skilled labor demands increase once BEAD construction planning and deployment begins.

ACTION ITEMS

- Agree measures of success and key performance indicators
- Establish reporting cadence and feedback loop processes
- Verify project and subgrantee reporting outputs meet BEAD requirements



APPENDIX

I. Detailed Job Descriptions

JOB ROLE:

Fiber Optic Technician

SOC CODE: Telecommunications Equipment Installers and Repairers, Except Line Installers 49-2022

DESCRIPTION: Responsible for installing, maintaining, troubleshooting, and repairing fiber optic communication systems

EDUCATION REQUIREMENTS: High school diploma or equivalent

EXPERIENCE REQUIREMENTS: Prior experience or training certification (preferred)

OTHER REQUIREMENTS:

- ✓ Valid driver's license
 - Technicians will be expected to travel to remote work sites.
 - For certain roles, a Commercial Driver's License is required.
- ✓ Physical abilities
 - Must be comfortable working in confined spaces, outdoors, at heights, and lifting heavy equipment.
- ✓ Technical skills
 - Understanding of fiber optic technology and the ability to use tools and equipment is preferred.
- ✓ Soft skills
 - Fiber technicians often work as part of a team, so strong communication skills and the ability to collaborate effectively are important.
- ✓ Drug screen and background check (optional)
 - Employers may require employees to pass pre-employment drug tests and background security checks.

MEDIAN WAGES:

\$48,750 annually, \$23.44 hourly

RESPONSIBILITIES:

Installing fiber optic cables and connectors

Involves running fiber optic cables between buildings or locations, terminating the cables with connectors, and testing the cables to ensure they are working correctly.

Testing and troubleshooting

Operate specialized equipment to test fiber optic cables for signal loss and other issues. Troubleshoot any problems and make necessary repairs to maintain network performance.

Splicing and fusion

Operate specialized equipment to splice and fuse fiber optic cables for installation and repairs to restore connectivity.

Maintenance

Perform routine maintenance on fiber optic networks to prevent issues before they occur. This includes cleaning and inspecting fiber optic cables and connectors.

Documentation

Keep detailed records of installations, repairs, and maintenance activities for future reference.

Source: [Fiber Optic Technician Salary in USA - Average Salary \(talent.com\)](https://www.talent.com)

JOB ROLE:**Wireless Technician**

SOC CODE: Radio, Cellular, and Tower Equipment Installers and Repairers 49-2021

DESCRIPTION: Responsible for installing, configuring, troubleshooting, and maintaining wireless communication systems

EDUCATION REQUIREMENTS: High school diploma or equivalent

EXPERIENCE REQUIREMENTS: Prior experience or training certification (preferred)

OTHER REQUIREMENTS:

- ✓ Valid driver's license
 - Technicians will be expected to travel to remote work sites.
 - For certain roles, a Commercial Driver's License is required.
- ✓ Physical abilities
 - Must be comfortable working outdoors, at heights, and lifting heavy equipment.
- ✓ Technical skills
 - Understanding of wireless technology and the ability to use tools and equipment is preferred.
- ✓ Soft skills
 - Wireless Technicians often work as part of a team, so strong communication skills and the ability to collaborate effectively are important.
- ✓ Drug screen and background check (optional)
 - Employers may require employees to pass pre-employment drug tests and background security checks.

MEDIAN WAGES:

\$60,360 annually, \$29.02 hourly

RESPONSIBILITIES:**Installing wireless equipment**

Install and configure wireless access points, routers, and other network equipment, and ensure that they are operating correctly.

Configuring wireless networks

Configure wireless networks to optimize performance, security, and reliability.

Troubleshooting wireless networks

Diagnose and troubleshoot issues with wireless networks. This includes identifying and resolving signal interference, connectivity problems, and other network issues.

Performing maintenance and upgrades

Perform routine maintenance on wireless networks to ensure that they remain reliable and secure.

Source: [Radio, Cellular, and Tower Equipment Installers and Repairers \(bls.gov\)](https://www.bls.gov)

JOB ROLE:**General Laborer**

SOC CODE: Construction Laborers 47-2061

DESCRIPTION: Responsible for providing general support and performing manual labor tasks during the construction, installation, and maintenance of telecommunications infrastructure

EDUCATION REQUIREMENTS: High school diploma or equivalent (preferred)

EXPERIENCE REQUIREMENTS: Prior experience (preferred)

OTHER REQUIREMENTS:

- ✓ Valid driver's license and ability to obtain a Commercial Driving License
 - Laborers will be expected to travel to remote work sites.
 - Laborers may be required to drive commercial vehicles to construction sites.
- ✓ Physical abilities
 - Must be capable to conduct physically demanding tasks, lift heavy materials, operating heavy machinery, work at heights and outdoors.
- ✓ Technical skills
 - Understanding of construction, OSHA regulations and general safety standards.
- ✓ Soft skills
 - Laborers often work as part of a team, so strong communication skills and the ability to collaborate effectively are important.
- ✓ Drug screen and background check (optional)
 - Employers may require employees to pass pre-employment drug tests and background screening.

MEDIAN WAGES:

\$37,770 annually, \$18.16 hourly

RESPONSIBILITIES:**Assisting with equipment setup**

Help to set up and assemble equipment, such as cranes, scaffolds, and ladders, to support the construction or maintenance of telecommunication infrastructure.

Digging trenches and laying cables

Operating heavy machinery to dig trenches and lay cables or conduit for communication lines, fiber optic cables, or other telecommunication infrastructure.

Maintaining work site and equipment

Includes cleaning up debris, performing safety checks, and ensuring that the site is secure. Supports with equipment maintenance, such as cleaning and lubricating machinery or replacing parts.

Source: [Construction Laborers \(bls.gov\)](https://www.bls.gov)

JOB ROLE:**Maintenance Technician**

SOC CODE: First-Line Supervisors of Mechanics, Installers and Repairers 49-1011

DESCRIPTION: Responsible for maintaining and repairing telecommunications equipment and infrastructure

EDUCATION REQUIREMENTS: High school diploma or equivalent

EXPERIENCE REQUIREMENTS: Up to 5 years relevant industry or work experience

OTHER REQUIREMENTS:

- ✓ Valid driver's license
 - Technicians will be expected to travel to remote work sites.
 - For certain roles, a Commercial Driver's License is required.
- ✓ Physical abilities
 - Must be comfortable working in confined spaces, outdoors, at heights, and lifting heavy equipment.
- ✓ Technical skills
 - Understanding of telecommunications technology and the ability to use relevant tools and equipment.
 - Experience with testing and troubleshooting methods.
- ✓ Soft skills
 - Strong problem-solving skills and ability to make decisions quickly to minimize customer downtime.
 - Excellent communication skills to explain technical issues clearly and simply.
- ✓ Drug screen and background check (optional)
 - Employers may require employees to pass pre-employment drug tests and background security checks.

MEDIAN WAGES:

\$71,260 annually, \$34.26 hourly

RESPONSIBILITIES:**Maintain performance**

Perform regular maintenance on telecommunications equipment and infrastructure to ensure optimal performance and reliability.

Trouble-shooting and diagnostics

Trouble-shoot and diagnose problems with systems and equipment. Repairing and replacing faulty equipment when necessary.

Testing and verifying

Testing performance of systems and equipment.

Documentation

Document maintenance and repair activities in a maintenance management system.

Source: [First-Line Supervisors of Mechanics, Installers, and Repairers \(bls.gov\)](https://www.bls.gov)

II. Stakeholder Overview

Stakeholder Group	Overview	Expected Role in Workforce Development Strategy
State Broadband Office (or equivalent)	Responsible for administering BEAD and other state broadband funding programs. Point of contact between the state and NTIA for BEAD funding. Accountable for fulfilling state-level obligations in the BEAD NOFO and providing oversight of subgrantee compliance.	<ul style="list-style-type: none"> • Create workforce development strategy for 5-Year Action Plan • Engage widely with other stakeholders
Federal Program Officers	Assigned by NTIA to provide technical assistance to states during application and implementation processes. States to submit questions and materials to their Federal Program Officer.	<ul style="list-style-type: none"> • Provide technical assistance upon request
State & Local Workforce Development Offices	Responsible for implementing workforce development initiatives and administering WIOA funding. Programs may be split across several agencies or housed under multiple state departments (e.g., Department of Labor, Department of Education). Responsibilities for carrying out initiatives may primarily sit with the state office or local workforce development boards throughout the state.	<ul style="list-style-type: none"> • Input into 5-Year Action Plan • Support labor gap analysis • Identify existing workforce development initiatives and funding opportunities • Leverage existing connections with colleges, non-profits, etc.
Economic Development Agencies	Seek to fund, promote, and align state economic development efforts to create a favorable environment for business and job growth. May exist as a government office, a quasi-state agency or a non-profit organization.	<ul style="list-style-type: none"> • Input into 5-Year Action Plan • Provide guidance on funding opportunities or workforce training that supports business and job growth
Internet Service Providers (ISPs)	Provide internet connectivity to the state, either last-mile or middle-mile connectivity. May seek to bid for BEAD Program funding as a 'sub-grantee' to expand footprint.	<ul style="list-style-type: none"> • Insight into current workforce and future needs • Perspectives on hiring challenges and training needs

Stakeholder Group	Overview	Expected Role in Workforce Development Strategy
Co-operatives (incl. Utilities)	<p>Member-owned organizations that provide telecommunications services or utility services in select areas.</p> <p>Typically established by residents and are accountable to customers, rather than stakeholders.</p>	<ul style="list-style-type: none"> • Insight into current workforce and future needs • Perspectives on hiring challenges and training needs
Municipal Associations	<p>Municipality-owned organizations that provide telecommunications services or utility services in select areas.</p> <p>Typically established by groups of municipalities and are accountable to customers, rather than stakeholders.</p>	<ul style="list-style-type: none"> • Insight into current workforce and future needs • Perspectives on hiring challenges and training needs
Educational Institutions: Community & Technical Colleges, Trade Schools	<p>Host and facilitate broadband related courses or training programs. Typical post-secondary education destinations for broadband careers are Community & Technical Colleges and Trade Schools.</p> <p>Will offer two-year degrees, short-term certifications, or vocational training courses.</p>	<ul style="list-style-type: none"> • Details of existing facilities which could be used for fiber broadband training • Insight from similar programs on key factors for success
Construction & Contractors	<p>Provide construction services for broadband expansion.</p> <p>Typically, a vital labor source for ISPs including municipal and co-op entities.</p>	<ul style="list-style-type: none"> • Insight into current workforce and future needs • Perspectives on hiring challenges and training needs
Union and Worker Organizations *	<p>Represent workers of the telecom industry. Select members of telecom workforce may be members.</p>	<ul style="list-style-type: none"> • Perspectives from the point of view of existing workers • Insight into current workforce, skills development, and working practices
Industry Associations	<p>Member-led associations of industry allies seeking to advance collective interests, e.g., Fiber Broadband Association, Wireless Infrastructure Association.</p> <p>They may operate nationally, regionally, or locally.</p>	<ul style="list-style-type: none"> • Industry-level perspectives • Insight from other states • Network of employer contacts • Details of workforce training programs

Stakeholder Group	Overview	Expected Role in Workforce Development Strategy
Non-profit Organizations	Workforce-orientated non-profits supporting workforce development for underrepresented or disadvantaged populations. Seek to reduce barriers to employment such as financial aid or training.	<ul style="list-style-type: none"> • Perspectives from the communities they serve • Insights into barriers to accessing training and participating in the fiber broadband workforce
Tribal Entities / Associations*	Non-profit associations representing the interests and concerns of tribal communities.	<ul style="list-style-type: none"> • Input into 5-Year Action Plan • Connect employers to a wider labor pool • May provide workforce training

* Note: NOFO requires states to engage labor unions, worker organizations, and Tribal Entities when crafting Five-Year Action Plans.

ACKNOWLEDGMENTS

The authors would like to thank everyone that supported the development of the Guidebook. We are indebted to the state broadband officers, colleges, service providers, and many other stakeholders for sharing their insights on workforce development as they prepare for BEAD.

Copyright © 2023 The Fiber Broadband Association. All rights reserved.

This guidebook is intended to provide ideas and suggestions to readers as they consider how best to approach workforce development and should not be considered legal advice. It is not intended, nor should it be used, as a substitute for specific legal advice that would be provided by legal counsel regarding federal and state requirements with respect to creation and implementation of such programs. By virtue of providing this information, Cartesian and FBA are neither providing legal advice nor acting as counsel.

REFERENCES

- 1 [NTIA Workforce Planning Guide](#)
- 2 [FCC National Broadband Map \(June 2022 data, released in November 2022\)](#)
- 3 [NTIA fleshes out BEAD workforce requirements in new guide](#)
- 4 [Growing the Telecom Workforce with Proactive Partnerships](#)
- 5 [Bureau of Labor Statistics, Telecommunications Industry Report](#)
- 6 [Telecoms Interagency WG - Recommendations to Address WF Needs](#)
- 7 [Zippia.com](#)
- 8 [Bureau of Labor Statistics, Median Age of Labor Force](#)
- 9 [Bureau of Labor Statistics, Telecommunications Industry Report](#)
- 10 [GAO Telecommunications Workforce Report December 2022](#)
- 11 [VCBB Workforce Development Plan October 2022](#)
- 12 [NTIA Workforce Planning Guide](#)
- 13 [NTIA Workforce Planning Guide](#)
- 14 [NTIA Workforce Planning Guide](#)
- 15 [NTIA NOFO Section IV.C.1.f.i](#)
- 16 [NTIA Workforce Force Planning Guide](#)
- 17 [Applying BEAD Monies to Workforce Development](#)
- 18 [Actual Appropriation amount in FY2022 per Congress Research Service, Workforce Innovation and Opportunity Act 2022](#)
- 19 [Commerce chief: \\$65B in broadband funding will create 200,000 jobs](#)
- 20 [VCBB Workforce Development Plan October 2022](#)
- 21 [Maine Broadband Workforce Analysis & Strategy Executive Summary Feb 2023](#)
- 22 [BEAD Five-Year Action Plan-Digital Equity Plan Alignment Guide](#)
- 23 [NTIA NOFO Section IV.B.3.b.5](#)
- 24 [Brookings - How federal infrastructure investment can put America to work](#)
- 25 [NTIA NOFO Section IV.B.10.C.1.c](#)
- 26 [NTIA NOFO Section IV.B.3.b.2](#)
- 27 [VCBB Workforce Development Plan Final Draft 10.31.22](#)
- 28 [2021 Update to the Michigan Broadband Roadmap](#)
- 29 [NTIA Workforce Force Planning Guide](#)
- 30 [Strengthening Ohio's Broadband & 5G Workforce Report July 2021](#)
- 31 [How To Support Good Jobs and Workforce Equity on Federal Infrastructure Projects](#)
- 32 [What will BEAD mean for the poorest U.S. communities?](#)
- 33 [Tribal Broadband Bootcamps Announced for 2023](#)
- 34 [Telecoms Interagency WG - Recommendations to Address WF Needs](#)
- 35 [Fiber Broadband Association: Women in Fiber](#)
- 36 [NTIA NOFO Section VII.E.2.12.b.i](#)
- 37 [California's Broadband for All - Action plan progress tracker](#)



Established in 2001, and the only all-fiber trade association in the Americas, the Fiber Broadband Association (FBA) provides advocacy, education and resources to companies, organizations and communities who want to deploy the best networks through fiber to the home, fiber to the business and fiber everywhere. Our member-led association collaborates with industry allies to propel fiber deployment forward for a better broadband future here and around the world.

www.fiberbroadband.org



Cartesian is a specialist consulting firm focused on the global telecoms, media, and technology (TMT) industries. For over 30 years, we have helped clients build and execute strategies that transform their networks, products and services. Combining strategic thinking, robust analytics, and practical experience, Cartesian delivers superior results.

www.cartesian.com

The Fiber Broadband Association's mission is to accelerate the deployment of fiber broadband networks to ensure digital equity and enable every community to leverage economic and societal benefits that only fiber can deliver.

Modern American history is marked by inflection points that changed the course of how we live — from the electrification of rural America to the creation of a national highway system. Today, connecting every home and business across the US with fiber broadband will create that kind of seismic change.



The Fiber Broadband Association is the voice of fiber. As the premier association that focuses solely on fiber, we are relentless in our work to connect every American with fiber. Because only fiber can close the digital divide, and unleash economic development that will raise the quality of life for every single one of us — providing education and job opportunities; eliminating poverty; creating sustainability and enabling innovations we haven't even thought of yet. Fiber ensures no one gets left behind.

The moment is now for fiber. So we ask you to join us. This is our call to action. Because the future not only belongs to fiber; fiber will enable the future. Fiber Broadband Association. When fiber leads, the future follows.