



Labor and Workforce Development in the Rural Telecom Sector

SRC Issue Brief

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INTRODUCTION

The rural broadband industry faces a generational moment of promise and opportunity as national attention focuses on expanding network deployments. At the same time, the sector faces challenges attracting and retaining skilled workers as unemployment rates are close to 50-year lows. The impacts of these trends extend beyond the near term and can be anticipated to implicate long-term repercussions if labor shortages delay the development, deployment, and operation of advanced communications networks.

This Smart Rural Community^{SM1} Issue Brief follows the 2019 report “Rural Broadband and the Next Generation of American Jobs,”² which explored the growing role of technology in manufacturing and other industry sectors.³ This brief provides an analytical construct for industry, educational institutions, and government agencies that are interested in creating rural telecom workforce initiatives. Rather than a prescriptive blueprint, this report identifies issues for consideration and describes representative examples drawn from members of NTCA–The Rural Broadband Association (NTCA).⁴ Appendices to this report include common questions that rural telecom providers may explore when considering workforce

development efforts, and job category listings to assist parties to training initiatives.

The COVID-19 pandemic expanded and accelerated interest in broadband with particular attention to rural broadband deployments. Sharp increases in remote learning, telework, and telehealth occurred in both rural and urban areas. Interest in rural broadband deployment among many national policymakers manifested in legislative pathways toward greater broadband deployment for rural and Tribal regions. Several COVID relief acts included funding either dedicated to or eligible for broadband development. Most notably, the 2021 Infrastructure Investment and Jobs Act (IIJA) includes the \$42.5 billion for the Broadband Equity, Access, and Deployment (BEAD) Program. BEAD has several key elements, including priorities for scalable networks and funding priorities for unserved areas. BEAD is intended to complement existing Universal Service Fund (USF) programs that are administered by the Federal Communications Commission (FCC). Overall, Congress has appropriated more than \$60 billion for programs that will affect the broadband industry just through the IIJA, on top of prior appropriations that included funds many states have elected to use to stimulate broadband deployment.

¹ Smart Rural Community (SRC) is an initiative of NTCA–The Rural Broadband Association. SRC promotes collaboration among rural broadband providers and other local leaders to deploy broadband enabled solutions to improve quality of life in rural spaces.

² Seidemann, Joshua, “[Rural Broadband and the Next Generation of American Jobs](#),” Smart Rural Community, NTCA–The Rural Broadband Association (Arlington, VA) (2019).

³ Smart Rural Community acknowledges the support of its program sponsors CALIX; Mapcom Systems; NISC; and NRTC.

⁴ This paper reflects the participation of the NTCA Innovation and Business Opportunities Committee. The author acknowledges Troy Amick, Laramie Community College (Cheyenne, Wyo.) and Camilla Formica, NCTI (Centennial, Colo.) for their assistance.

While these funds will assist to deploy broadband deeper throughout the country, the availability of these resources coincides with significant labor shortages. The ratio of unemployed persons (*i.e.*, those actively seeking work) to job vacancies is at historic lows. Engineering, construction, and telecom firms face an imperative to strengthen existing pathways and to create new labor workforce development programs. Moreover, impending retirements of senior workers at many telecom providers will result in additional openings.

CREATING DEVELOPMENT OPPORTUNITIES

Identifying Sector Demands

Coordinated efforts among industry, educational institutions, and government partners will be necessary to promote effective training of new workers and retraining of current workforce participants for telecom industry positions. The telecom sector possesses insight into labor demands and trends and can identify disciplines in which near- and long-term workers will require training. These firms, in turn, can work with public and private educational institutions to develop curricula and training to meet those demands. Finally, government partners can assist with funding that supports educational programs (as well as participating students and workers), including apprenticeship and “learn and earn” programs.

In the first instance, it is useful to develop a representative list of jobs that are common to the telecommunications industry. Telecom sector training can be divided into three broad categories: technical; customer service; and leadership/management. These include not only positions relating to the deployment of last-mile networks and customer-location equipment, but general contracting and construction, as well as back-office positions essential to deliver the services that these networks enable. The broad range of opportunities within the rural telecom sector informs the value of highlighting these opportunities for students and current workers, and coordinating with local educational institutions including high schools, community colleges, and trade schools to ensure that adequate CTE (Career and Technical Education) training and guidance are available. Many of these positions represent increasing demand for middle-skills workers across an expanding band of industrial needs. For purposes of this discussion, “middle-skills” is defined as those

jobs requiring more than a high-school diploma or equivalent, but not necessarily requiring a four-year college degree. Candidates for middle-skill jobs may obtain training through associate degrees programs, apprenticeship and journeyman positions, and traditional trade school training.

Nex-Tech (Lenora, Kan.) worked with NCK Tech to reenergize a Telecommunications and Network Technology Program. The original program was at the main campus in the small town of Beloit, Kansas. The new program is now located at the secondary campus in Hays, Kansas, and will launch in Fall 2022. Fort Hays State University (FHSU), a four-year college located in Hays, has a gateway partnership program with NCK Tech, to enhance the success for students. NCK Tech students are provided with an FHSU Tiger ID Card which allows them access to activities, athletic events, student organizations, and other services offered on the FHSU campus. This allows students to experience a typical college environment. Funding for the program was provided by Nex-Tech, Golden Belt Telephone, TCT Communications and Nex-Tech Wireless, and provides financial support through scholarships to qualified students, including the full cost of tuition and books. The program also includes an internship at Nex-Tech. Upon successful completion of the program, students will be formally employed at Nex-Tech.

Coordination Among Telecom and Education Sectors

Numerous rural telecom providers, trade schools, and colleges have created job training and skills building programs. These programs offer useful examples that can serve as models for other organizations and communities. Communications providers and educational institutions are not necessarily advised to create exact copies of these efforts but to rather examine them and determine which elements may apply well in their own areas, and which may be adjusted to better suit local needs. These efforts can also be introduced to both secondary (high school) and post-secondary (college or trade) students, as well as active labor force participants who may be recruited into the telecom sector. It is particularly important that training is timely, reflecting current market trends and technology. At the

secondary school level, it is also important that introductory offerings are presented in a manner that is relevant to young students. This can be accomplished by emphasizing direct links between everyday technology and the skills necessary to support the networks and systems upon which that technology relies.

Polar Communications Mutual Aid

Cooperative (Park River, ND) created an opportunity that covered a portion of a student's educational expenses in return for a three-year agreement to work with the company. The arrangement included summer and holiday breaks that aligned to the school schedule. The arrangement provided on-the-job training that complemented classroom instruction.

A particular challenge at the secondary school level is to enable opportunities for students, while they are yet in high school, to evaluate careers that may not require a four-year college degree. It is not uncommon for post-secondary students to begin their four-year college experience without having declared a major. A prevailing perspective in those instances is that the student will, after a year or so of studies, identify the discipline that is most appealing and from that point onward focus studies toward a defined major. That so-called "transition" year can be enjoyed while the student is earning credits toward the degree in a four-year program. Students leaving high school and entering the trades or two-year college programs, however, may not be able to devote a year toward non-declared coursework. Accordingly, opportunities for high school students to learn about and explore telecom sector career paths can benefit both prospective workers and their employers.

Collaborations among schools and local industry can assist students by providing opportunities to learn about and experience career paths in the sector.⁵ The role of local industry in these efforts cannot be understated, particularly for communities that are committed to "growing our own." Local workforce needs can inform local

⁵ This overall construct may be applied to many industries, and the telecom industry and its educational partners may find efficiencies coordinating their joint efforts with utility and construction sectors.

educational and training offering by equipping students with classroom instruction and experiences that relate to local industrial needs. These can be aimed at ensuring the proper skills, competencies, and understanding to facilitate success in local opportunities. Communities are also encouraged to consider these initiatives on regional bases.⁶

In addition to crafting classroom curricula, partnerships between local schools and industries can develop workplace opportunities that build on students' classroom experiences. Internships and apprenticeship programs can provide experiential education that complements the conceptual learning of the classroom. The complete dynamic of educational and industrial expertise infusing these efforts will ensure that

Gila River Telecommunications, Inc. (Chandler, Ariz.)

is developing a future workforce with its newly formed subsidiary Digital Connect Initiative (DCI). DCI is a non-profit organization that aims to bridge the digital divide in Indian Country by enhancing digital literacy, advancing economic prosperity, and providing its community with access to cutting edge technology. DCI is creating a career pipeline from schools to telecommunications and other technology-related jobs by formulating community partnerships and acting as a convener between nearby schools, community colleges, universities, social institutions, and employers with high-tech staffing needs. DCI is anticipating the needs of Tribal communities by promoting STEM careers among youth and advocating for the future of broadband in Indian Country.

students and prospective workers are provided with the most effective manner of instruction; the most suitable instructors; a conducive learning environment; and access to proper "hands on" laboratory/field equipment and experiences. Additionally, local or state government education offices may be consulted to assist with certification or accreditation issues. Finally, private industry or philanthropic organizations may play a role supporting either educational

⁶ For a discussion examining the value of regional coordination, see, "[Steel Sharpens Steel: A Conversation About Regional Thinking for Rural America](#)," Smart Rural Community, NTCA-The Rural Broadband Association (J. Seidemann, Editor) (2017).

facilities or individual students through stipends or scholarships. These may be attractive to local organizations that are themselves committed to providing opportunities for local students to be trained for local jobs. Veterans organizations may also be consulted to assess interest for members separating from the armed forces.

Coordinated Remote Learning

Remote learning can offer an alternative to in-person learning experiences. These may include “all online” learning offered by education firms or online classes offered by local or regional educational institutions. In these instances, it will be necessary for students to obtain tactile, hands-on experience. This may be achieved in laboratory or similar classroom settings where tools and materials are provided, or by pairing remote learning with “in the field/on the truck” experiences. In the latter model, communications providers offer supervised work experience that is paired with student-employees’ online learning. Partnering with an online educational provider can also allow telecom provider access to a broad range of specialized courses. College credits may be available for online learning, either through online programs that themselves confer degrees or through institutions that align their coursework with college credentialing from another institution.

While remote learning offers important opportunities for working students, particularly those whose work or family schedules benefit greatly from the flexible nature of “on-demand” online learning, distance education may not be as attractive to students seeking a traditional “on-campus” college experience. However, the approaches discussed above offer examples of coordination between non-degree granting online providers and “brick and mortar” schools. College credit alignment with two- and four-year colleges can enable students to engage online learning with on-campus college experiences, leading ultimately to degree and/or certification.

GETTING STARTED

The following steps can serve as a guide to starting down this pathway. These are not provided as a “one size fits all” solution, but rather as a sample analytical construct from which individual communities can build their programs.

Identify Community Partners

Local industrial and educational representatives are recommended to identify their respective needs, tools, and strengths. This should provide an opportunity for various sectors to learn about the other, and to identify within their own respective operations resources that may fit or which could be tailored to advance their collective goals. A school superintendent armed with an expanded understanding of the rural telecom industry may identify existing academic resources and, alongside the broadband provider,

“Build it Right, Then Build it to Run Hard”

Laramie County Community College (LCCC), a two-year post-secondary institution in Cheyenne, Wyoming, offers an Information Technology pathway. Enrolled students include a substantial proportion (about 50%) of “non-traditional” students, including those seeking a career change either by enrolling full-time or as part-time working students. The program has strong representation of industry professionals, rather than professional educators, as instructors. These faculty members are able to explain to students how various technology and techniques are used in the field for real-world applications. The program works with industry to develop curricula and with different organizations to develop innovative approaches to enable students to remain in the workforce while learning. These include stipends and tuition reimbursement, including programs in which a firm hires an employee at a lower rate with an understanding that a promotion and higher wages will be offered upon completion. Industry leaders participate in advisory councils; members meet both individually and as a group with LCCC directors to develop programming. Program leaders also advise students that the impact of school/work demands on family and social life should be measured against the longer-term benefits of career advancement and earnings. Troy Amick, program director, explains that the collaboration among industry and schools must be a partnership, with student outcomes as the priority. “Don’t pigeonhole students into a single role; that just floods the market with similarly skilled workers. Instead, make sure that the curriculum is for the students’ future, then figure out how you can use it to meet your needs.” Students emerging with sound training and skills will necessarily be equipped to help employers realize their corporate goals.

develop curricula to prepare students for careers in that industry. At the same time, the local broadband provider and its industry peers may identify ways to share information about career opportunities with students. Partners may also include philanthropic organizations, whether local or national, whose interests in community development, rural issues, or education and training may be solicited to support efforts where costs may exceed the capabilities of first-tier partners.

Establish Short- and Long-Term Goals

Current educational curricula reflect evolutions that arose out of the Industrial Revolution. We tend to take for granted the role of service providers and professionals whose skills sets reflect the needs that arise in typical daily lives. As consumer goods and services rely increasingly on technology inputs, including broadband-enabled IoT, the skills of those who sell, use and service these goods will correspondingly demand more sophisticated levels of training and education. It is important, however, to attach to these efforts the recognition that the impact of near-term efforts may not be readily apparent until the mid- or long-term. Accordingly, community partners are advised to define short- and long-term goals, and to form a defined strategic plan with a commitment for periodic review and refinement. These can include focusing on both broadband network infrastructure deployment; programming and system management; network maintenance; cybersecurity; and IoT and other technology supporting other industrial sectors.

Define Roles and Responsibilities

As each party brings its expertise “to the table,” it is likewise useful to define the roles and responsibilities of each party. This can play to each party’s respective strengths by establishing leads or “captains” for various branches of these

efforts. Parties are advised that the memorialization of mutual obligations and commitments may implicate the need to craft appropriate contracts, especially where parties commit funding or other resources. However, this degree of formality should not be viewed as a disincentive to pursuing work together, but rather (and on advice of counsel) may be represented in a traditional Memorandum of Agreement.

As a complement to educational initiatives, “learn and work” programming can offer both industry and students opportunities to explore career pathways in rural telecom. These can take several forms, including internships, both paid and unpaid; apprenticeships; externships in conjunction with colleges, trade schools, and other institutions; and work opportunities that offer tuition and other support for employees.

CONCLUSION

It is anticipated that in just one year, 92% of the U.S. population will be Internet users. These will include not only traditional communications devices such as smartphones or computers, but also the ever-expanding range of devices to support consumer and industrial IoT at a predicted per capita rate of more than 13 connected devices per person. Current data indicates that median U.S. broadband speeds exceeded 140 Mbps download/20 Mbps upload as of January 2022. These trends in increasing broadband demand coincide with measures directing historic levels of resources toward broadband deployment. Combined, these factors create demand for a skilled telecom and technology labor workforce. The rural broadband industry can play a unique role partnering with educational and other entities to facilitate workforce development.

Scalable Training and Education

“Strengthening Ohio’s Broadband & 5G Workforce” is a state initiative undertaken by the Governor’s Office of Workforce Transformation. A series of stakeholder meetings set the foundation for industry/education collaboration. A primary finding was a lack of awareness among students and workers of career opportunities in the broadband industry. Stakeholders identified the need to introduce middle school and high school students to these fields, leveraging existing STEM (science, technology, engineering, and math) programs. This includes electives and AP (advanced placement) courses. The program combines state and Federal funding to support its initiatives, including reimbursements for employers who assist workers with upskilling or reskilling. The initiative also supports educational opportunities for low-income, partially employed, and unemployed students.

APPENDIX A: EXPLORATORY ISSUES

The following are some exploratory questions that telecom industry and educational professionals may consider when exploring training and labor development.

1. *Do the available positions require an industry credential? Can that credential be obtained through a college, trade school, or other organization?*
2. *Who is the target audience for recruitment – high school graduates (or those soon-to-graduate) or current workers recruited from other industries?*
3. *Do the skills require access to laboratory or “real world” working conditions for hands-on training?*
4. *Does the provider have access to or an existing relationship with a local training or educational institution?*
5. *How will instructors be recruited? Can rural ISP staff fill instructor roles? Is there a need to “train the trainers”?*
6. *What type of opportunities exist to forge relationships with state or local workforce development offices or non-government organizations? Can those relationships provide a basis to develop funding to support tuition relief or stipends for students training for telecom industry jobs? Is it necessary to supplement apprenticeship compensation with additional support?*
7. *Does the term of an anticipated apprenticeship program balance appropriate time for training with transition toward regular employment?*
8. *How are phases of classroom instruction and hands-on work to be sequenced?*
9. *Can telecom-specific training be attached to existing educational programming in other trades? What needs will other trades encounter? What type of partnerships might exist among power, construction, and telecom industries to combine on common coursework?*
10. *Do local or regional technical schools offer training and education for telecom professionals, either for new employees or continuing education for existing workers?*
11. *Do local telecom providers work together to recruit and train employees?*
12. *Are apprenticeship opportunities available for workers?*
13. *Are internship opportunities available for students?*
14. *Have regional market participants evaluated current labor market conditions and, where necessary, core causes of workforce shortages and needs?*
15. *Are there opportunities to recruit retired or soon-to-be-retired workers to mentor and train onboarding employees? Can rural providers create a “regional resource bank” that would facilitate training interactions between seasoned and new employees?*

APPENDIX B: LEADING JOB CATEGORIES

As described above, the rural broadband industry comprises many job positions relating to construction, deployment, maintenance, cybersecurity, and end-user-oriented positions. The following is a representative list of trades and skills needed by the rural telecommunications industry. Certain of these job categories may demand skills that can be applied to several types of careers. This list may be useful as rural broadband providers partner to craft educational training and curricula, or for interactions with students and prospective workers at schools and/or job fairs.

Telecom equipment install and repair

Line installer

Sales rep and services

Construction labor

Customer service rep

Electrical power line installer

Business operation specialist

First line supervisor for mechanics, installers, repairers

Electronics engineers

Computer specialists

Cybersecurity specialists

1. Construction:
 - i. General laborers (shovel)
 - ii. Machine operators (various – backhoe, bore machine, plow, dozer). Each one of these requires specialized training.
 - iii. Splicers
 - iv. Locators
 - v. Truck Drivers (for transporting heavy equipment site to job sites)
 - vi. Foreman
 - vii. Superintendent
 - viii. Surveyors
2. Vendors
 - i. Factory workers (product of fiber and other network assets)
 - ii. Truck Drivers
3. Engineering Firms
 - i. Field Technicians – including stake, permit, inspections
 - ii. CAD Technicians – including drawings for construction, permits, record keeping

About NTCA–The Rural Broadband Association:

NTCA–The Rural Broadband Association represents approximately 850 independent, community-based telecommunications companies that lead innovation in rural America. NTCA advocates on behalf of its members; provides training and development; produces publications and industry events; and offers an array of employee benefit programs. In an era of exploding technology, deregulation, and marketplace competition, NTCA’s members are leading the IP evolution for rural consumers, delivering technologies that make rural communities vibrant places in which to live and do business. Because of their efforts, rural America is fertile ground for innovation in agriculture, economic development, education, health care, public safety, and other services. Visit us at www.ntca.org.

About Smart Rural Community:

Smart Rural CommunitySM is an initiative of NTCA–The Rural Broadband Association, promoting rural broadband networks and applications to foster innovative agricultural, economic development, education, health care, other vital services. Smart Rural Community administers award, best practices, and educational programming. For more information, please visit www.smartruralcommunity.org.



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