

# ON-RAMPS TO CONSTRUCTION CAREERS IN APPALACHIA

FEDERAL FUNDING PROVIDES AN OPPORTUNITY  
TO GROW APPRENTICESHIPS AND CREATE  
PATHWAYS TO QUALITY JOBS



**BY:**

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&  
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KEYSTONE  
RESEARCH  
CENTER



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## Federal Funding Provides an Opportunity to Grow Apprenticeships and Create Pathways to Quality Jobs

*By Diana Polson, PhD, Senior Policy Analyst, Keystone Research Center and Stephen Herzenberg, PhD, Executive Director, Keystone Research Center*

*Authors' note: The body of this report is primarily focused on Pennsylvania. See the appendix for shorter overviews of construction apprenticeship in Ohio, Kentucky, and West Virginia.*

### Executive Summary

Over the past half-century, the coal country Appalachian region of Pennsylvania has experienced a devastating loss of good manufacturing and extraction jobs. The economic impact and human cost of this restructuring can be seen in declining and stagnant wages and collapsing labor force participation rates, as workers become discouraged and drop out of the job market.<sup>1</sup> Black workers have experienced the biggest drops in wages and employment, while women's wages remain lower than men's. These employment trends have contributed to—and been exacerbated by—the opioid crisis and “deaths of despair.”

Today, however, we have an unprecedented opportunity to create more good jobs for Pennsylvania workers of every race/ethnicity, gender, and background. Massive federal investments in climate infrastructure will create a boom in construction, land restoration, and agroforestry jobs, one that coincides with the retirement of the youngest post-World War II baby boomers. Moreover, by linking training pipelines into these opportunities through joint labor-management apprenticeship and apprenticeship prep programs connected to unionized construction firms, these jobs can be pathways to high-paying careers, including for low-income rural workers, people of color, women, and returning citizens. The income earned in these careers and the dignity that comes from making a vital contribution to society – as an essential worker of climate response – can help revitalize and restore hope to communities across the coal-country region of Appalachia.

This report highlights both the need for and potential to create these career opportunities in Pennsylvania. We first document the stagnant and declining wages in manufacturing, construction, and trucking since 1979 – the core of the middle-class in the post-World War II decades – the declining wages of Black workers relative to white ones; and the still-low wages of women relative to men. We also highlight that many of the fastest-growing occupations today are in low-wage service jobs.

The core of the report profiles the potential to create high-paying union careers for people of all races, ethnicities, and genders by linking new opportunities on federally funded climate and infrastructure projects to paid on-the-job training opportunities via unionized apprenticeship and pre-apprenticeship programs. Apprenticeship in the United States has often been called “a best-kept secret” even in the

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<sup>1</sup> For detailed and localized data on the low employment rates in Pennsylvania, Ohio, Kentucky, and West Virginia, see Claire Kovach, Stephen Herzenberg, Amanda Woodrum, and Ted Boettner, “Targeted Employment: Reconnecting Appalachia’s Disconnected Workforce,” Reimagine Appalachia, Keystone Research Center, Ohio River Valley Institute, July 2023; [https://reimagineappalachia.org/wp-content/uploads/2023/07/Repot\\_Targeted-Employment\\_FINAL.pdf](https://reimagineappalachia.org/wp-content/uploads/2023/07/Repot_Targeted-Employment_FINAL.pdf)

construction industry in which our nation and state deploy this centuries-old learning model widely. Employers, workers, and the broader community all benefit from the expansion of apprenticeship and the creation of new, family-sustaining careers. In the United States, for every dollar invested, apprenticeships return \$35 to the government in higher tax collections or reduced expenditures on public assistance and unemployment compensation over the career of an apprentice.<sup>2</sup>

We shine a light on this powerful learning model in Pennsylvania construction occupations, showing that, from 2000 to 2021:

- An estimated 22% of the 345 active construction apprenticeship programs in Pennsylvania are governed jointly by labor and management. Those joint programs, however, are the largest and most robust in the state, training 85% of Pennsylvania construction apprentices.
- 28,455 workers completed Pennsylvania joint labor-management apprenticeships, enjoying a median exit wage of \$35.57 an hour. This is 61% higher than the 2022 median wage for all workers in Pennsylvania (\$22.02 per hour). The apprenticeship exit wage is even slightly higher than the \$35 per hour 2022 median wage of workers with a four-year college degree or higher in Pennsylvania.<sup>3</sup> Moreover, construction apprentices “earn while they learn,” typically enjoy generous health care and pension benefits, and complete their apprenticeship without taking on any college debt.
- 7,284 non-white or Hispanic males and 1,624 women registered in a Pennsylvania union apprenticeship in these two decades. While there is much room for improvement here, the shares of union construction apprentices who are women and non-white or Hispanic males are higher than those shares in nonunion programs.
- Black construction apprentices completing joint programs earned \$36.59 upon completion, nearly twice the 2022 median wage for all Black workers in PA (\$19.00 per hour). Similarly, Hispanic apprentices earned \$34.48 per hour upon completing their apprenticeship, higher than the \$18.25 per hour median wage for all PA Hispanic workers (2022). The wages of male, female, and white workers completed joint construction apprenticeships also substantially exceed the median wage for all Pennsylvania workers in those demographic groups, although the difference was not as dramatic as for Black and Hispanic workers.

The third section of this report briefly outlines the need for new construction workers over the next decade due to the retirement of the last baby boomers during a period of massive federal investment in climate infrastructure programs. This moment provides us an opportunity to grow family-sustaining union construction jobs and to diversify the workforce while we are doing so.

Biden Administration policy encourages and, in some cases, *requires* federally funded infrastructure and climate projects to include “community benefit plans” that incorporate wage standards, “local hire” provisions, on-the-job training opportunities, and linkages to apprenticeship-readiness programs targeting groups left out of construction opportunities in the past – people of color, women, and low-income workers – and displaced coal workers. Biden’s “Good Jobs Initiative,” overseen by the U.S. Department of Labor, seeks to embed these job quality and equity incentives into federal funding

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<sup>2</sup> Keystone Research Center, “Ten Ways to Make Apprenticeship Central to Learning and Careers in 21<sup>st</sup> Century Pennsylvania: Policy Options to Double Apprenticeship by 2025,” A Report to the Pennsylvania Apprenticeship and Training Office (ATO), July 2019; <https://krc-pbpc.org/wp-content/uploads/KRC-Policy-Report-Final-10-18-19.pdf>.

<sup>3</sup> Bureau of Labor Statistics, “May 2022 State Occupational Employment and Wage Estimates: Pennsylvania.” Online at: [https://www.bls.gov/oes/current/oes\\_pa.htm#00-0000](https://www.bls.gov/oes/current/oes_pa.htm#00-0000).

opportunities. While the details may differ across agencies, the intended result is the same – promoting the growth of good union construction jobs, apprenticeship opportunities, and pre-apprenticeship programming for disadvantaged communities, while also respecting workers’ right to organize on permanent jobs (e.g., in sustainable manufacturing plants subsidized by federal tax credits or grants).<sup>4</sup>

To help increase access to union apprenticeship opportunities and construction careers for women, Black workers, and others, this report profiles some successful targeted “apprenticeship readiness” programs in coal country, including the “Intro to the Trades” program operated out of the Western Pennsylvania Builders Guild (a labor-management nonprofit), and the Breaking the Chains of Poverty pre-apprenticeship. We end with recommendations to maximize the creation of good union construction jobs and expand apprenticeships and apprenticeship readiness programs that ensure “opportunity for all” on federally funded climate and infrastructure projects.

In its entirety, this report “connects the dots” and lifts up jobs and apprenticeship in construction and other outdoor work as a huge opportunity for Pennsylvania to build the workforce of the future in infrastructure and the new energy economy. Construction jobs, on their own, are not sufficient to restore broad-based opportunity to all of Pennsylvania including rural areas and coal country. But they can make a major contribution as well as provide a model of how the power of unionism and great joint training and apprenticeship programs could also expand opportunities in other sectors.

## Introduction

Union construction apprenticeships are a tried-and-true workforce development and training method that leads to good-paying careers. Apprenticeships benefit employers and workers and offer a debt-free alternative to college. Given the massive federal infrastructure and climate funding packages Congress passed in the last few years, the need for skilled construction workers in Pennsylvania will skyrocket. Joint labor-management apprenticeship programs are well-prepared to train the construction workers of the future. The growing number of apprenticeship prep programs, with strong links to union apprenticeship, can help make sure these opportunities reach communities and individuals who have historically been left behind.

## Data and Methodology

Data used in this report come primarily from official government sources.

- Most of the data used in this report are from the Registered Apprenticeship Partners Information Data System (RAPIDS) maintained by U.S. Department of Labor. RAPIDS contains the most comprehensive data on registered apprenticeships in most states, including Pennsylvania and Ohio, West Virginia, and Kentucky. The database contains both information on apprentices (their demographic characteristics, education level, enrollment status, industry, occupation, and wages at intake and graduation from apprenticeship) and on each registered apprenticeship program (whether it is a joint or employer-only program plus the characteristics of all the apprentices associated with that program, including whether they graduate).

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<sup>4</sup> U.S. Department of Labor, “About the Good Jobs Initiative.” Online at: <https://www.dol.gov/general/good-jobs/about-us>.



- We used U.S. Census Bureau Current Population Survey (CPS) data provided by the Economic Policy Institute (EPI) for data on median wages, employment within the construction industry, the aging of the workforce, and percent covered by union contracts.
- Projected job openings come from the Pennsylvania Department of Labor and Industry, Center for Workforce Information and Analysis.
- To profile model apprenticeship programs and apprenticeship readiness programs, we conducted interviews as well as drew on earlier Keystone Research Center reports.

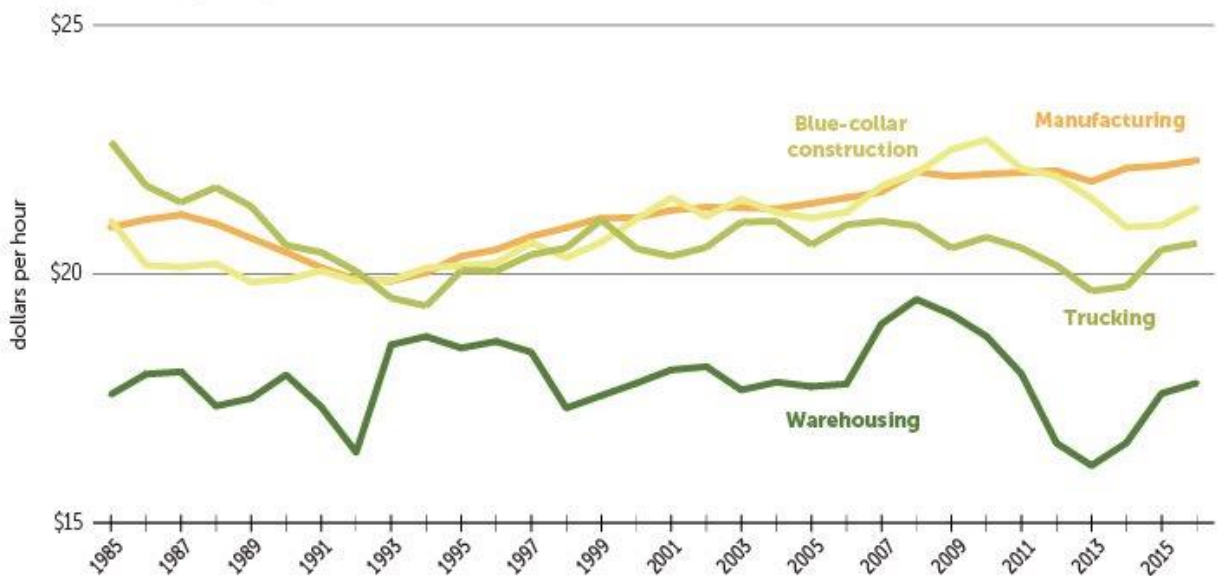
## Declining Wages and the Growth of the Low-Wage Service Economy Have Devastated the Region

Blue-collar wages in Pennsylvania have stagnated over the last 40 years. The figure below shows the flat (inflation-adjusted) wages in four key industries—warehousing, trucking, construction, and manufacturing—since the mid-1980s. (If we had data going back to the late 1970s, the wages in manufacturing would also likely be lower today than at the beginning of the period.) These occupations were the core of the middle-class in the post-World War II era.

Figure 1

### Blue-Collar Pennsylvania Wages Have Stagnated for Almost 40 Years

Five-year moving average shown in 2021 dollars, 1983-2016



Note: Trucking wages shown are for truck drivers within the truck transportation industry. Warehouse wages shown are for workers in the warehousing and storage industry. Manufacturing wages reflect all workers in nondurable and durable goods industries. Blue-collar Construction wages reflect construction trades and helpers. A five-year moving average pools data over five years to increase the reliability of estimates and smooth the distribution so that it is easier to see trends. We label each five-year average with the middle year of the five years, so 1985 is the five-year average for 1983-1987. 1986 reflects the five-year average for 1984-1988, etc.

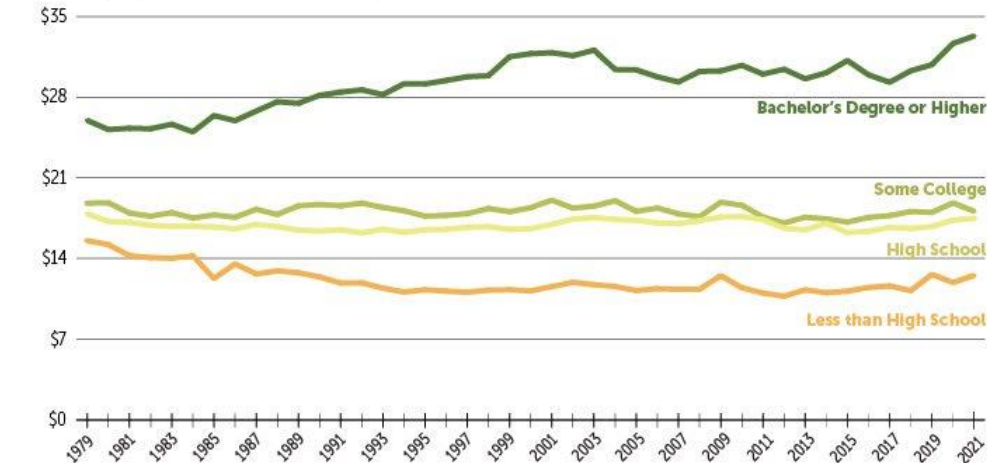
Source: Keystone Research Center based on Current Population Survey microdata accessed through the Economic Policy Institute Data Library, <https://swx.epi.org/>.

Next, we look at median hourly wages from the mid-1970s until now by educational attainment. While there has been a slight increase in the median wage of those with a bachelor's degree or higher since the late 70s, wages for Pennsylvania workers with less than a bachelor's degree have stagnated or declined.

Figure 2

### Wages for Pennsylvania Workers with Less Than a Bachelor's Degree Have Stagnated or Dropped Since 1979

Median wage by education level in Pennsylvania, 1979 to 2021, in real 2021 dollars



Source: Keystone Research Center based on Current Population Survey microdata accessed through the Economic Policy Institute Data Library, <https://swi.epi.org/>.

Figures 3 and 4 show median wages over time by sex and race/ethnicity in Pennsylvania. Figure 3 shows that women's median wages have not caught up with men's median wages. In 2021, women in Pennsylvania earned 79% of the median wage of men, below the national level of 86%. While the gender wage gaps narrowed in the United States and Pennsylvania until the early 2000s, they narrowed little or, in Pennsylvania, not at all since then. In 2002, Pennsylvania women earned 79% of what men earned, exactly the same level as in 2021.

Figure 3

### Pennsylvania Women's Median Wage Was 79% of Men's Median Wage in 2021

Pennsylvania and United States Female Median Wage as a Percent of Male Median Wage, 1979-2021

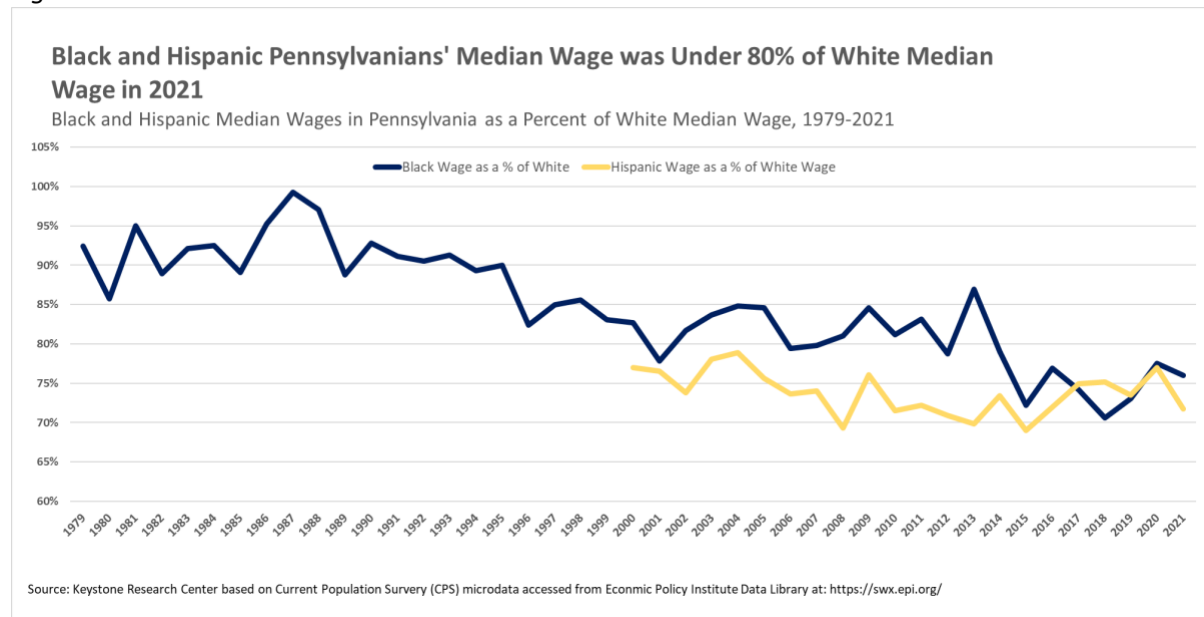


Source: Keystone Research Center based on Current Population Survey microdata accessed through the Economic Policy Institute Data Library, <https://swi.epi.org/>.

As figure 4 shows, Black median wages as a percent of white median wages have seen a decline in Pennsylvania. In the 1980s and early '90s, the Black median wage hovered around 90% of the white median wage. But in the mid-1990s that began to decrease, hovering around 80-85% in the late 1990s

through 2014. In recent years, the Black median wage decreased even further, to around 75% of the white median. In 2021, the Black median wage was 76% of the white median wage—a significant decrease from 92% in 1979. Hispanic wages have seen a modest decrease since 2000—from 77% in 2000 to 72% in 2021. In sum, racial wage gaps have grown over time.

Figure 4



Today, too many Pennsylvanians work in jobs that don't pay enough to make ends meet. As table 1 shows, eight out of 10 of the largest occupations in Pennsylvania (those highlighted in dark and light yellow)—occupations with the largest number of workers in them—pay less than \$20 an hour. These eight occupations employ 1.08 million workers in the state. Four out of these 10 jobs pay less than \$15 an hour (dark yellow)—including home health and personal care aids (earning a median of \$13.35 an hour), fast food and counter workers (\$12.15), retail salespersons (\$13.97) and cashiers (\$11.77).

Table 1

**Eight out of the 10 most common jobs in Pennsylvania--employing 1.08 million people--pay less than \$20 an hour (Four jobs pay less than \$15 an hour)**

	Total Employment	Hourly median wage
Home Health and Personal Care Aides	193,930	\$13.35
Laborers and Freight, Stock, and Material Movers, Hand	143,690	\$17.79
Registered Nurses	137,970	\$37.86
General and Operations Managers	134,990	\$47.35
Fast Food and Counter Workers	134,040	\$12.15
Retail Salespersons	129,790	\$13.97
Office Clerks, General	125,920	\$18.54
Cashiers	121,220	\$11.77
Customer Service Representatives	119,300	\$18.12
Stockers and Order Fillers	115,370	\$16.16
Total employed in top 10 jobs	1,356,220	
Total employed in jobs paying less than \$20/hour	1,083,260	

Source: Data from BLS Occupational Employment and Wage Statistics Survey

Summing work, Pennsylvania workers generally, including blue-collar, non-college, Black, brown, and women workers, have shared little in Pennsylvania prosperity over the past four-plus decades. Union construction apprenticeship, especially given the influx of federal funds for infrastructure improvements and climate projects over the next decade, can contribute to changing that reality. It can help create opportunities for Pennsylvanians that will result in family-sustaining careers while training the next generation of construction workers and the first generation of climate response workers.

## Apprenticeship Has Many Benefits for the Appalachian Region

Apprenticeship is a tried-and-true workforce training and learning model that leads to good jobs, and the model should be utilized and expanded in Pennsylvania to begin to address stagnant wages and a growing racial wage gap. The U.S. Department of Labor defines apprenticeship as the combination of “paid on-the-job training with classroom instruction to prepare workers for highly-skilled careers.”<sup>5</sup> This training model has been around for centuries and remains one of the most effective mechanisms to train workers, combining classroom training and learning-by-doing and mentoring from experienced workers in an actual paid job. This learning strategy contrasts with the way we typically structure learning and workforce development in the United States, which divorces classroom learning from on-the-job training, leaving workers on their own after their classes to find a job and figure out how to apply what they learned. Apprenticeship is more prevalent in European countries where the model has been integrated into the educational systems and employers across industries rely on it to build and maintain a solid, skilled, and loyal workforce. In the United States, however, apprenticeship is less prevalent with one notable exception – apprenticeship in the construction industry is widely used and embraced as the gold standard for training workers in “skilled crafts” also known as the trades.

Apprenticeship delivers big benefits for employers, workers, and the larger community. For employers, apprenticeship develops loyal workers trained in the exact skills that employers want and need. It boosts productivity and results in fewer employee mistakes and turnover. Apprenticeship has great benefits for workers as well. Apprentices earn more than their comparable peers – with an average starting salary of

<sup>5</sup> U.S. Department of Labor website, “Apprenticeship.” Online at: <https://www.dol.gov/general/topic/training/apprenticeship>.



\$50,000 per year and estimated earnings of \$300,000 over the course of a lifetime that exceed those of comparable workers not participating in apprenticeship. Apprenticeship also offers workers a chance to “learn and earn” and, in many cases, to gain college credit or even an associate’s degree while making money rather than going into debt to attend college. This is especially significant in Pennsylvania where college is expensive and students tend to graduate with high levels of student debt compared to other states. Apprenticeships also benefit the larger community. As more individuals have access to stable family-sustaining jobs, families, communities, and schools will benefit. In Pennsylvania, for every dollar invested, apprenticeships return \$35 to the government in higher tax collections or reduced expenditures on public assistance and unemployment compensation over the career of an apprentice.<sup>6</sup>

The United States has been increasing investments in apprenticeships in recent years, with initial interest and investments made by former President Obama, former President Trump, and now President Biden. Pennsylvania’s previous Governor, Tom Wolf, also made investments in apprenticeship a priority. In the Spring of 2016, he established the Apprenticeship and Training Office (ATO) within the Pennsylvania Department of Labor and Industry. This office is responsible for guiding and promoting the expansion of apprenticeship programs across the state, including overseeing the development, approval, and registration of new and existing programs that support and grow apprenticeship and pre-apprenticeship across the Commonwealth.<sup>7</sup> In 2018 Governor Wolf created a new goal to double the number of registered apprentices in Pennsylvania by 2025.<sup>8</sup> In construction, as elaborated in the policy section of this report, Pennsylvania’s increased support for apprenticeship and pre-apprenticeship could be particularly important to expanding pathways into good paying construction careers for the diverse workers needed to staff infrastructure and climate projects supported by three federal bills passed in 2021 and 2022: the bipartisan infrastructure law, the Inflation Reduction Act, and CHIPS+.

## Unionized Construction Apprenticeships Train Skilled Workers and Create Family-Sustaining Jobs

The construction industry, and particularly unionized construction, has historically trained the largest number of apprentices in the United States. Joint labor-management apprenticeship programs address a fundamental challenge related to workforce training in the construction industry. Some construction workers change employer many times in a career due to the time-limited project-based nature of construction work: once a big bridge project or utility scale solar project is finished, the painters and electricians on those projects may be laid off by their current contractor. Knowing that their trades employees may soon work for another contractor, even a competitor, could make companies hesitate to invest in training those employees. This is what economists call a “free-rider” problem; companies have a disincentive to train workers and would rather try to poach workers trained by a competitor. If all contractors fail to invest at all, or enough, in training, the industry as a whole can face chronic skills shortages. Among unionized contractors, unions help solve this problem by negotiating in collective

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<sup>6</sup> Keystone Research Center, “Ten Ways to Make Apprenticeship Central to Learning and Careers in 21<sup>st</sup> Century Pennsylvania: Policy Options to Double Apprenticeship by 2025,” A Report to the Pennsylvania Apprenticeship and Training Office (ATO), July 2019; <https://krc-pbpc.org/wp-content/uploads/KRC-Policy-Report-Final-10-18-19.pdf>.

<sup>7</sup> For more information, see here: <https://www.dli.pa.gov/Individuals/Workforce-Development/apprenticeship/Pages/Services.aspx>.

<sup>8</sup> Stephen Herzenberg, Diana Polson, Mark Price, “Construction Apprenticeship and Training in Pennsylvania,” Keystone Research Center, 2018; [https://krc-pbpc.org/wp-content/uploads/20180530\\_CALMReport\\_Final.pdf](https://krc-pbpc.org/wp-content/uploads/20180530_CALMReport_Final.pdf).

bargaining at the regional level the shared funding (e.g., \$1 dollar per hour worked) by employers and workers of a joint apprenticeship and training fund.

Joint apprenticeship is also made more affordable because apprentices earn less than experienced journeypersons until they complete apprenticeship. Typically, a first-year apprentice may earn 50% or 60% of the journeyperson rate, in line with their lower skill and productivity levels, pay increasing each year until it reaches 100% upon graduation from apprenticeship.

Complementing their joint governance of apprenticeship and training, building trades unions also help workers when they shift employers and help employers when they need to staff up new projects – through the operation of referral services or “hiring halls.” Workers put themselves on a “list” so that they get placed on a new project when work becomes available and contractors count on the referral services getting them the requisite number of pipefitters, laborers, roofers, or other trades when needed.

Lacking a mechanism for shared funding of training, the non-union construction sector struggles when the construction labor market is tight to train or find enough skilled trades workers. As we will see, fewer apprentices are trained in the nonunion sector and questions remain about the quality of that training compared to unionized construction apprenticeships.<sup>9</sup> While unionized journeypersons take much of the responsibility for ensuring quality training and mentoring in coordination with training directors hired by the joint fund, experienced workers in nonunion programs may not see any benefit to helping new workers, since they have little or no role in governing the apprenticeship program.<sup>10</sup>

As we will show in subsequent sections of this report, investing in and expanding apprenticeship in response to increasing demand is done most effectively by the unionized construction sector – in Pennsylvania, and in Ohio, Kentucky, and West Virginia. programs, which tend to have better outcomes. Union-trained apprentices tend to have better outcomes in terms of apprenticeship completion rates and higher wages upon completion than nonunion apprentices. Unionized apprenticeships also train more non-white and Hispanic workers and women than nonunion apprenticeships do.

In the table below, we share the size of employment and unionization rates in private construction in four Appalachian states. Of the four coal-country Appalachian states, Kentucky, Ohio, West Virginia and Pennsylvania, Pennsylvania has the largest construction workforce, as well as the highest union density in the industry: there are close to 300,000 workers within the private construction industry, of which 28% are represented by a union. For two reasons, the union densities in table 2 underestimate the union density of trades workers in non-residential construction at least a factor of two. First, these union density estimates include residential construction, which has virtually no unionized workers. Second, the table includes construction workers in all occupations (i.e., managers, professionals, clerical, and sales workers) not just in the trades.<sup>11</sup> This implies that union density among trades in non-residential construction in

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<sup>9</sup> David H. Bradley, Stephen A. Herzenberg, “Construction Apprenticeship and Training in Pennsylvania,” Keystone Research Center, 2002; [https://krc-pbpc.org/wp-content/uploads/krc\\_const\\_apprent.pdf](https://krc-pbpc.org/wp-content/uploads/krc_const_apprent.pdf).

<sup>10</sup> Stephen Herzenberg, Diana Polson, Mark Price, “Construction Apprenticeship and Training in Pennsylvania,” Keystone Research Center, 2018; [https://krc-pbpc.org/wp-content/uploads/20180530\\_CALMReport\\_Final.pdf](https://krc-pbpc.org/wp-content/uploads/20180530_CALMReport_Final.pdf).

<sup>11</sup> If we assume that one third of construction employment is residential construction but that union density is zero in residential construction, then Pennsylvania’s 28% union density overall translates into 42% among all employees in construction. If one then assumes that trades account for two thirds of total employment in construction and non-trades occupations have a 0% union density, then union density among Pennsylvania trades in non-residential construction would be 63%. (BLS reports trades employment at about 60% of total sectoral employment but this share could be higher in non-residential construction; see <https://www.bls.gov/spotlight/2022/the-construction-industry-labor-force-2003-to-2020/home.htm>.)

Pennsylvania is about 60% and union density among trades in non-residential construction in the other three states is about 30%.

Table 2

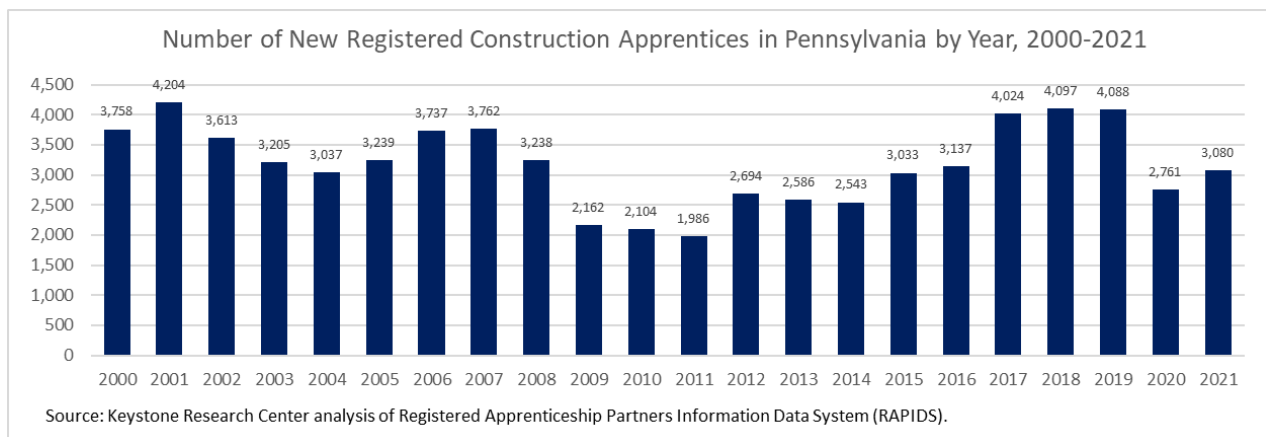
<b>Employment in and unionization in private construction by state, 2021</b>			
	Employment in Private Construction	Represented by a Union	% Represented by a Union
Kentucky	61,703	9,496	15.4
Ohio	244,511	36,618	15.0
Pennsylvania	291,020	81,312	27.9
West Virginia	29,356	4,172	14.2

NOTE: Union density is even higher among blue-collar trades.  
Source: Data from unionstats.com and come from Current Population Survey (CPS) Outgoing Rotation Group (ORG) Earning Files, 2021.

## A Profile of Construction Apprenticeship in Pennsylvania

Employment and apprenticeship registrations in construction are driven by the business cycle. When employment opportunities are limited, there is less need to bring on and train new workers. Recessions – and the slow recovery of construction demand after recessions – result in a decrease in apprenticeship registrations, as figure 5 shows. After the 2001 recession, apprenticeship registrations decreased by 28% by 2004. The 2008 recession resulted in a sharp decrease in construction apprenticeship registrations as well, 47% between 2007 and 2011. Apprenticeship registrations dipped even more quickly – in line with employment levels – in the COVID-19 pandemic, 32% between 2019 and 2020. In figure 5 below, you can see the ebb and flow of the number of new registered apprentices.

Figure 5



Although there are more nonunion programs in Pennsylvania, as figure 6 shows, joint apprenticeships enroll most construction apprentices (figure 7). In fact, union apprentices accounted for 85% of construction apprentices in Pennsylvania between 2000 and 2022. There are fewer union apprenticeship programs, but they consistently train more workers and tend to be more well-established than nonunion programs.

Figure 6

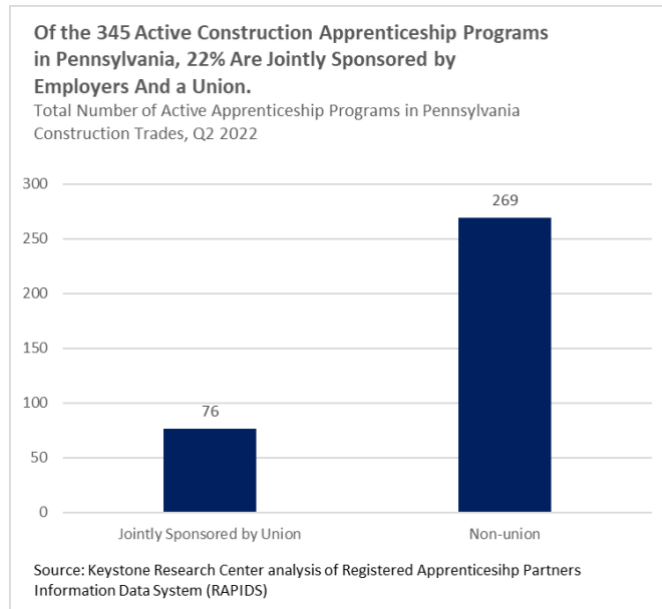
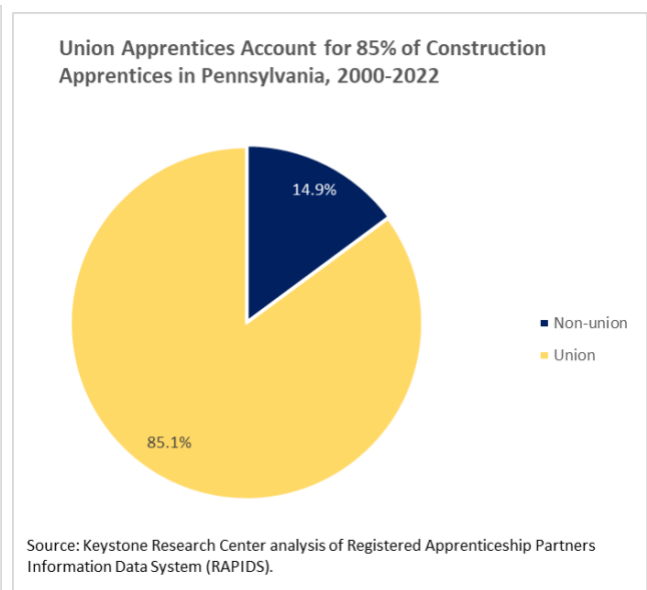


Figure 7



## Unionized apprenticeship programs train a more diverse workforce than nonunion programs

There are many more female and minority apprentices in the union sector than the nonunion sector in Pennsylvania. From 2000 to 2022, 1,624 women and 7,284 male minorities (nonwhite or Hispanic) registered in union apprenticeship programs compared to just 146 women and 954 male minorities in nonunion programs. Moreover, while there is room for improvement to increase the number of female and minority construction apprentices in both sectors, union programs serve a greater percentage of women and male minorities than nonunion programs do—13.5% compared to 7.6% (see figures 8 and 9).

Figure 8

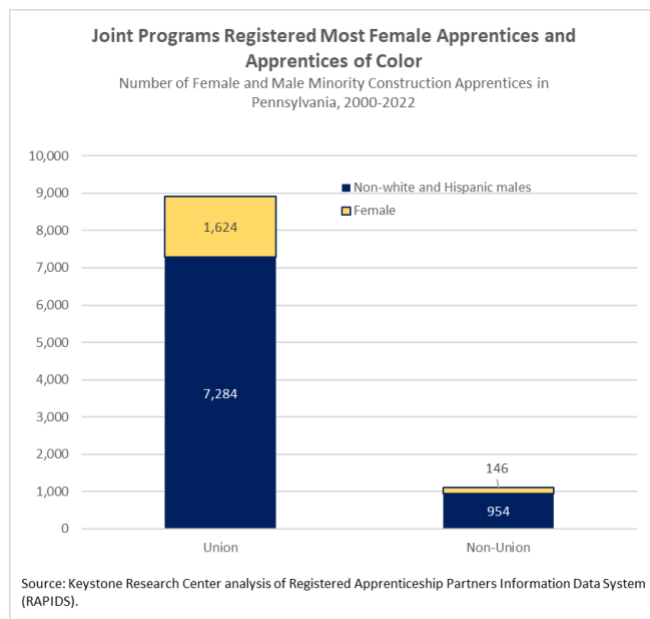
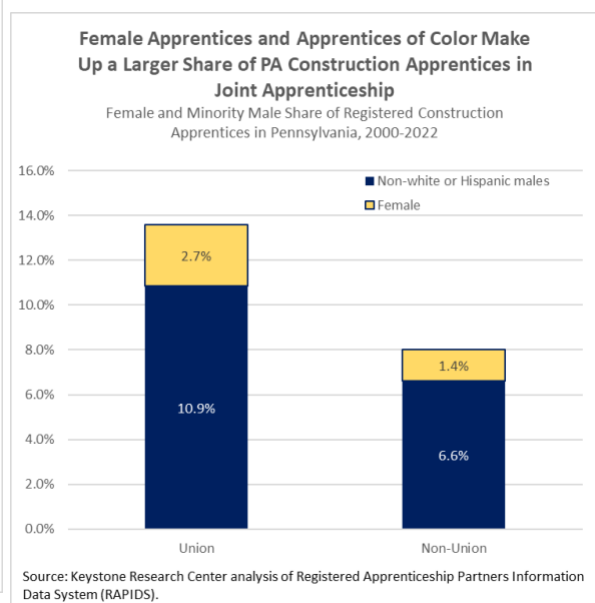


Figure 9



Union apprenticeship programs in Pennsylvania also train a significantly greater number of veterans than nonunion programs. Between 2000 and 2022, union apprenticeships successfully trained 1,563 veterans, compared to nonunion programs which trained 190 during the same period.

*Figure 10*

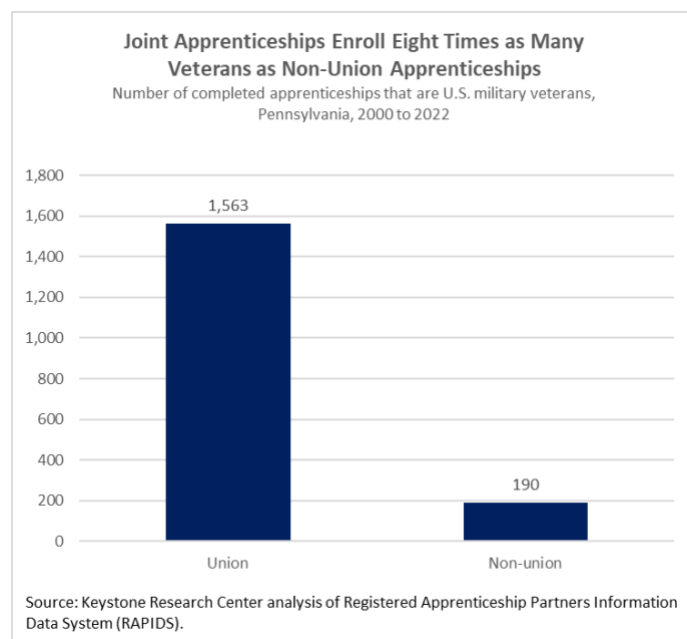
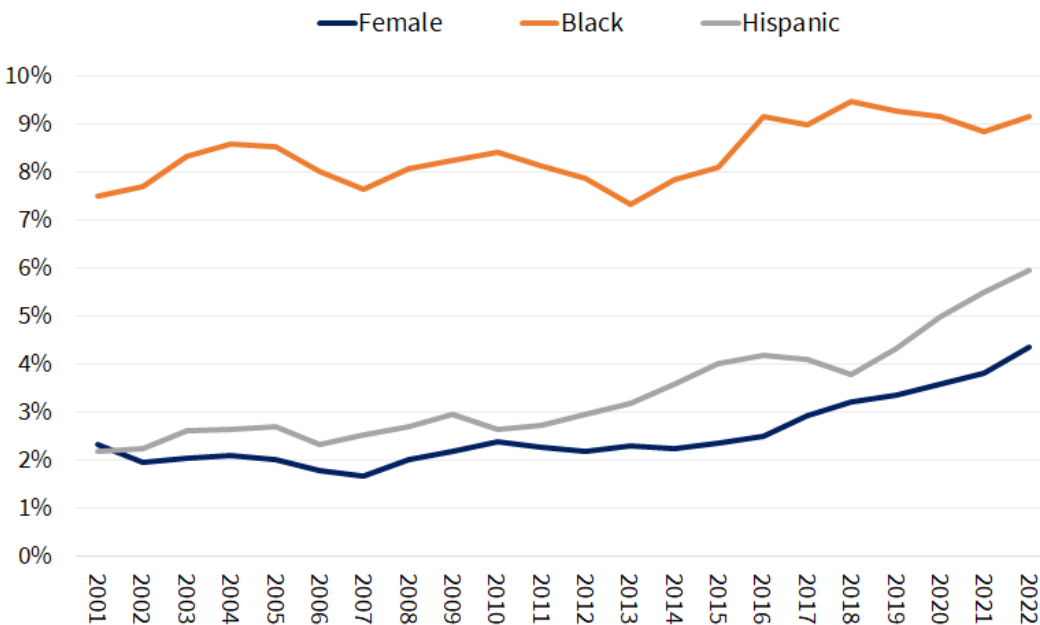


Figure 10A shows the increasing diversity of Pennsylvania construction apprentices over time. (While it shows both apprentices in joint labor-management programs and non-union ones, since the union programs account for most apprentices, the chart is dominated by trends within joint apprenticeship.) Over the past two decades, the Black share of construction apprentices has risen from about 7.5% to 9%, the Hispanic share from 2% to 6% and the female share from 2% to over 4%. Clearly, a need exists to make further progress so that women, in particular, and people of color have equitable access to high-paid, high-skilled construction careers. But most of the increases in Hispanic, female, and Black construction apprenticeship share have occurred in the six to ten years, reflecting generational changes within leadership of the building trades and apprenticeship programs and reflecting also the impact of growing apprenticeship readiness programs like the two profiled below (Intro to the Trades and Breaking the Chains of Poverty in Pittsburgh). The chart underscores that Pennsylvania is well positioned for a big increase in construction apprentice diversity in the next decade. With the right state and local policies to complement federal policies, our state can create thousands of good new construction careers for every race/ethnicity and gender.



## Percent of Newly Registered Construction Apprentices in PA Programs who are Female, Black, or Hispanic

Three Year Average

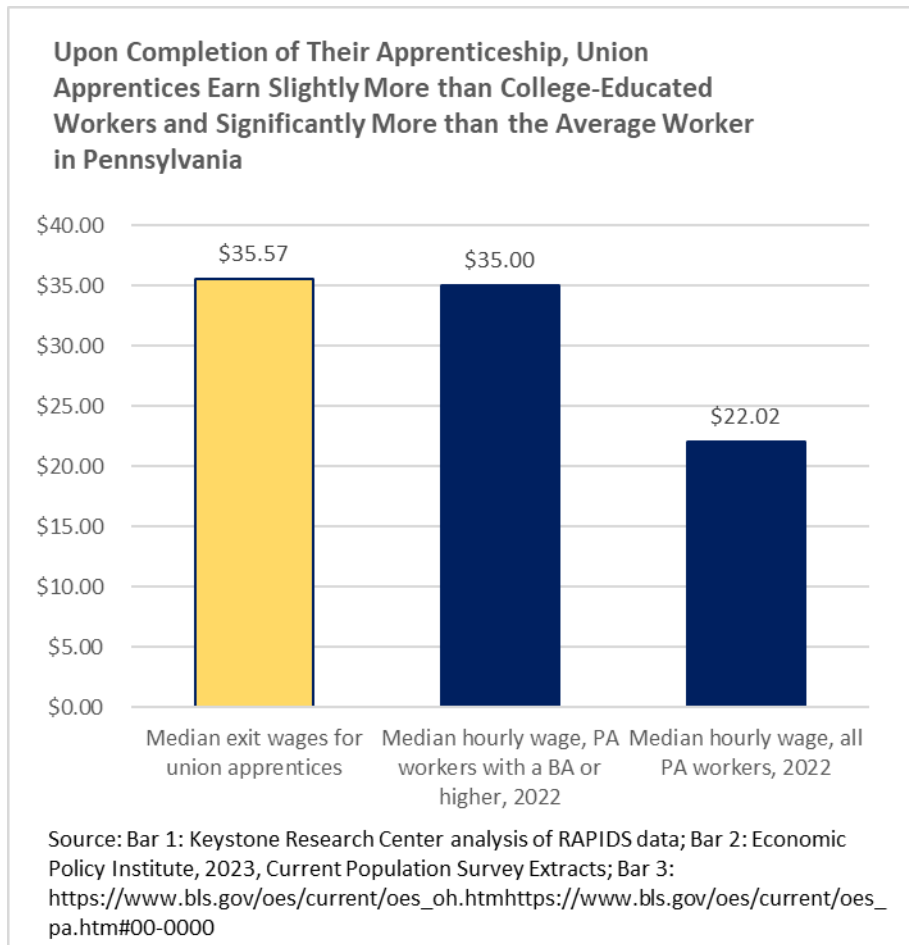


Source: Keystone Research Center analysis of data from the Registered Apprenticeship Partners Information Database System (RAPIDS)

## Union apprenticeships pay good wages upon completion of the program

Union construction apprentices earn high wages by the time they graduate. Union construction apprentices who completed their apprenticeship in Pennsylvania over the last two decades received a median exit wage of about \$36 an hour (in 2021 dollars). As figure 11 shows, this is slightly above the 2022 median hourly wage for Pennsylvanians with a college degree or higher (\$35). Apprentices exit wage also exceeds Pennsylvania's 2022 median wage of \$22 per hour by more than 60%.

Figure 11



Within each demographic group, median hourly wages for exiting construction apprentices are higher than the overall median hourly wage for the same demographic group—this is true for men, women, white, Black, and Hispanic workers in Pennsylvania (figure 12). Black and Hispanic construction apprentices in Pennsylvania receive exit wages much higher than the median wage for all PA Black and Hispanic workers. For example, the Black median wage in Pennsylvania equals just \$19 an hour. Black construction apprentices earn a median hourly wage upon program completion nearly twice as high – \$36.59.

Figure 12

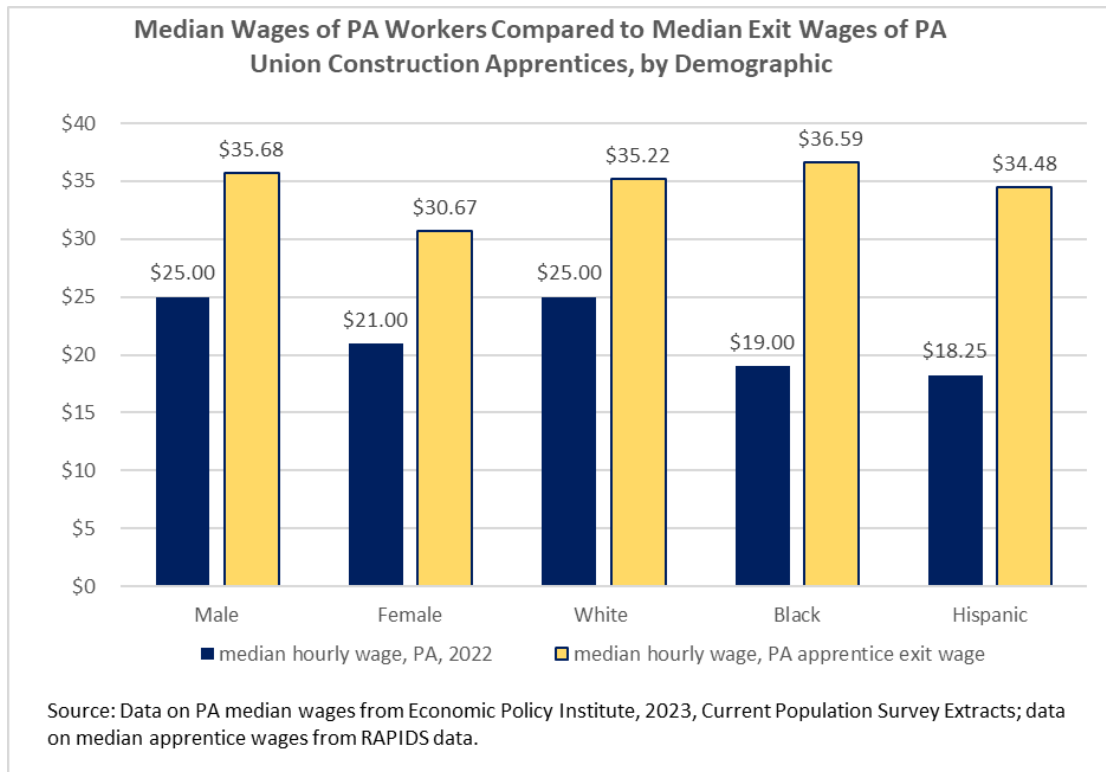


Table 3 shows the starting and exit wages for joint construction apprenticeship completers in the 20 trades occupations with the largest number of apprentices. Overall, union apprentices saw an 82% increase in their wages over the course of the apprenticeship, from \$19.64 an hour to \$35.68 an hour.

Table 3

Pennsylvania Union Construction Apprenticeship Completers and Their Starting and Exit Wages (2021\$), the Largest 20 Occupations, 2000 to 2022						
	Number of completers	Share of total	Cumulative total	Starting wage	Exit wage	Percent change
Carpenter	5,302	18.6%	18.6%	\$17.59	\$32.20	83.0%
Electrician	4,420	15.5%	34.2%	\$15.22	\$36.35	138.8%
Line Erector (Power-Line)	2,917	10.3%	44.4%	\$27.25	\$43.16	58.4%
Pipe Fitter	1,614	5.7%	50.1%	\$21.54	\$43.49	101.9%
Plumber	1,485	5.2%	55.3%	\$19.26	\$37.82	96.4%
Sheet Metal Worker	1,462	5.1%	60.4%	\$18.62	\$36.85	97.9%
Structural Steel Worker	1,369	4.8%	65.3%	\$22.59	\$34.29	51.8%
Operating Engineer	1,164	4.1%	69.3%	\$20.76	\$29.31	41.2%
Boilermaker I	1,125	4.0%	73.3%	\$27.82	\$41.33	48.6%
Bricklayer	1,027	3.6%	76.9%	\$19.13	\$25.12	31.3%
Roofer	656	2.3%	79.2%	\$17.44	\$31.20	78.8%
Glazier	589	2.1%	81.3%	\$20.45	\$36.00	76.1%
Refrigeration Mechanic	576	2.0%	83.3%	\$20.14	\$36.52	81.3%
Painter	481	1.7%	85.0%	\$17.63	\$27.88	58.2%
Construction Craft Laborer	434	1.5%	86.5%	\$14.20	\$21.51	51.5%
Millwright	410	1.4%	88.0%	\$21.74	\$36.45	67.7%
Composite Plastic Fabricator	394	1.4%	89.3%	\$21.57	\$41.18	90.9%
Cement Mason	335	1.2%	90.5%	\$19.66	\$29.39	49.5%
Floor Layer	311	1.1%	91.6%	\$19.67	\$36.23	84.2%
Pipe Coverer & Insulator	307	1.1%	92.7%	\$19.83	\$39.00	96.7%
<b>Total</b>	<b>28,455</b>			<b>\$19.64</b>	<b>\$35.68</b>	<b>81.7%</b>

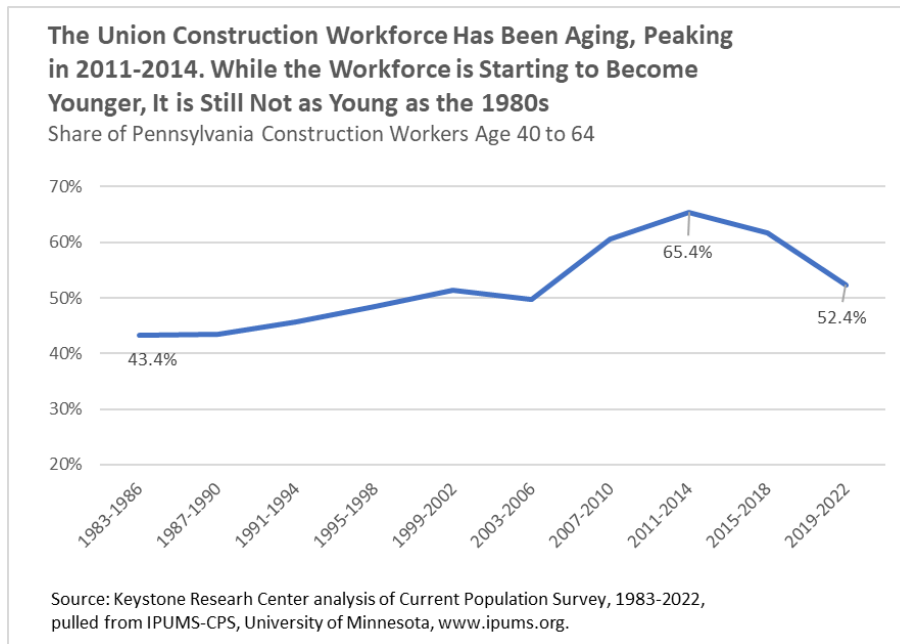
Source: Keystone Research Center analysis of Registered Apprenticeship Partners Information Data System (RAPIDS).

## Federal Investments Create an Opportunity to Grow Construction Apprenticeship

Three factors create the critical need to grow construction apprenticeships over the next decade. First, the overall labor market and construction industry currently have low unemployment rates and high demand for workers. Second, huge federal investments in infrastructure, the environment, and good jobs via the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA) will increase demand for skilled construction workers. Infrastructure improvements and repairs, abandoned mine land reclamation, repurposing shuttered coal plants, grid modernization, renewable energy growth, and other federal investments will all require skilled trades workers and create an opportunity to grow joint construction apprenticeship in Pennsylvania. Third, high rates of retirement will create a need to replace a large number of the current, experienced construction workforce.

*The Aging of the Workforce:* The unionized construction workforce has aged steadily over the past 35 years, until recently (figure 13). From the mid-1980s until 2011-14, the share of the construction workforce aged 40 and over rose from well under half (43%) to nearly two thirds. Over the last eight years many baby boomers have retired and younger workers have come into the industry. Even so, well over half of the workforce today remains over 40 years of age. Continuing high retirement rates and anticipated growth of construction jobs (see below) because of federal climate and infrastructure investments will create more opportunities for a younger, and more diverse, next generation of construction workers in the next decade.

Figure 13



**Construction Job Projections:** Table 4 below includes 10-year (2020 to 2030) occupational projections and estimated annual demands in Pennsylvania for construction trades workers. The number of construction trades workers is projected to increase by 6.1% between 2020 and 2030. In addition, the total annual number of job openings will be 19,062 in Pennsylvania.<sup>12</sup> These projections were made prior to the federal infrastructure and climate bills passed and underestimate construction job growth as a result. Investments in transportation infrastructure alone—for Pennsylvania’s roads, bridges, and public transit systems—include \$16 billion in federal funding via the Infrastructure Investment and Jobs Act (IIJA) on top of \$21 billion already planned in state expenditures. These transportation infrastructure investments will create an estimated 46,000 jobs annually over the next five years, a large share of them trades jobs.<sup>13</sup>

Table 4

<sup>12</sup> Total annual demand includes annual demand due to growth (the yearly volume change in employment), exits (number of workers leaving an occupation and exiting the workforce entirely), and transfers (workers leaving an occupation and transferring to a different occupation).

<sup>13</sup> Stephen Herzenberg, Lonnie Golden, Frank Manzo IV, Andrew Wilson. “Hiring Local on Transportation Infrastructure Projects in Pennsylvania: Employment, Economic, Fiscal, and Training Impacts,” Keystone Research Center and Illinois Economic Policy Institute, February 16, 2023; <https://krc-pbpc.org/wp-content/uploads/KRC-PSA-ILEPI-Pennsylvania-Local-Hire-FINAL.pdf>



### **Pennsylvania Long-Term Occupational Projections, Construction Trades Workers, 2020 to 2030**

Estimated number of Construction Trades Workers 2020	180,720
Projected number of Construction Trades Workers 2030	191,760
Percent change 2020-2030	6.1%
Annual demand due to growth	1,104
Annual demand due to exits	5,462
Annual demand due to transfers	12,496
Total Annual Demand	19,062

Source: Long-term occupational projects can be found on the PA Center for Workforce Information and Analysis webpage, here:  
<https://www.workstats.dli.pa.gov/Products/employment-projections/Pages/default.aspx>

In addition, the Inflation Reduction Act (IRA) is projected to create 212,400 Pennsylvania jobs over the next 10 years (21,240 annually) to repair the damage of abandoned land mines, modernize the grid, expand manufacturing and make it more energy efficient, build a more sustainable transportation system, and more.<sup>14</sup> As with the IJA, a disproportionate share of these jobs will be in the trades.

*Federal Funding Encourages Use of Apprenticeship:* Biden Administration policy encourages and, in some cases, requires federally funded infrastructure and climate projects to include “community benefit plans” that incorporate wage standards, “local hire” provisions, on-the-job training opportunities, and linkages to apprenticeship readiness programs targeting displaced coal workers and others left out of opportunity in the past – people of color, women, and low-income workers. Biden’s “Good Jobs Initiative,” overseen by the U.S. Department of Labor, embeds these job quality and equity incentives into federal funding opportunities. While the details differ across agencies, the intended result is the same—growing union jobs, apprenticeship opportunities, pre-apprenticeships that help targeted groups of access union apprenticeship and construction careers, and respecting workers’ right to organize on permanent jobs (e.g., in sustainable manufacturing).<sup>15</sup>

Regional and local policies in Pennsylvania are also aligning increasingly with federal policy aimed at growing good union construction jobs and ensuring access for diverse workers to union construction careers. For example, the U.S. Department of Labor recently designated the city of Pittsburgh one of five cities that will act as a “Workforce Hub” that models equitable career pathways in the following sectors: broadband, infrastructure, advanced and bio-manufacturing, and clean energy. Following this designation, the city of Pittsburgh and the metro area developed the “Pittsburgh Good Jobs Principles” which endorse strong labor standards (e.g., project labor agreements (PLAs)) and community benefits agreements (CBAs) and local hire provisions to increase the diversity of new apprentices and other workers hired on climate and infrastructure projects in the region. As of early November, 41 businesses

<sup>14</sup> Robert Pollin, Shouvik Chakraborty, Chirag Lala, Gregor Semieniuk, “Job Creation Estimates for Pennsylvania Through Inflation Reduction Act: Modeling State-Level Impacts of Climate, Energy, and Environmental Provisions of the Bill,” Political Economy Research Institute (PERI), University of Massachusetts Amherst, October 2022. Online at <https://peri.umass.edu/images/InflationReductionBill-PA-10-11-22.pdf>.

<sup>15</sup> U.S. Department of Labor webpage, “About the Good Jobs Initiative.” Online at: <https://www.dol.gov/general/good-jobs/about-us>.

and organizations, seven unions, three elected officials, and two authorities have signed onto and committed to abide by these principles.<sup>16</sup>

Two pieces of federal legislation—the Inflation Reduction Act (IRA) and the Infrastructure Investment and Jobs Act (IIJA)—both have specific provisions that require or encourage the use of apprenticeship. The aim of the Inflation Reduction Act is to address the climate crisis and invest in clean energy.<sup>17</sup> The IIJA will expand access to high-speed internet and improve public transit and other infrastructure, including roads, bridges, and waterways. There are multiple opportunities to use IIJA funds for workforce development. New in the legislation is allowing states to invest a small portion of funds from surface transportation programs in workforce development, including registered apprenticeship and pre-apprenticeship programs.<sup>18</sup> The majority of the bipartisan infrastructure funding (\$665 billion) is made available via the Department of Transportation which will grow the number of jobs available in construction, management, logistics, operations, and more. For all IIJA competitive grants, DOT has added workforce development as a critical criterion on which they judge qualified applicants, to make sure applicants are thinking through how they will ensure a skilled workforce and quality jobs, including the use of registered apprenticeship, investments in supportive services, and changes in hiring policies that aim to bring in a more diverse workforce. These competitive federal funds, as well as formula funding for roads and bridges, can be used on workforce development and registered apprenticeship to train and prepare workers for project jobs.<sup>19</sup> One example of formula funding apprenticeship requirements is the National Electric Vehicle Infrastructure Program (NEVI). The IIJA includes a \$5 billion formula grant signed to create a national network of charging stations for electric vehicles. Final NEVI rules require all technicians on NEVI projects to undergo a 20-hour training program or be a current or former registered apprentice. Also, all charging station projects with more than one electrician must have an apprentice staffed on the project. The IIJA also encourages states to develop five-year Human Capital Plans to flesh out how they will meet immediate and long-term workforce needs on infrastructure projects.<sup>20,21</sup>

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<sup>16</sup> For more information on Pittsburgh's Good Jobs Principles, see <https://engage.pittsburghpa.gov/white-house-workforce-talent-hub> and <https://pittsburghpa.gov/press-releases/press-releases/6266>.

<sup>18</sup> The surface transportation programs include: the National Highway Performance Program, the Surface Transportation Block Grant Program, the Highway Safety Improvement Program, and the Congestion Mitigation and Air Quality Improvement Program. For more information, see <https://www.nga.org/publications/workforce-development-in-the-iija-chips-and-ira/>.

<sup>18</sup> The surface transportation programs include: the National Highway Performance Program, the Surface Transportation Block Grant Program, the Highway Safety Improvement Program, and the Congestion Mitigation and Air Quality Improvement Program. For more information, see <https://www.nga.org/publications/workforce-development-in-the-iija-chips-and-ira/>.

<sup>19</sup> For more information, see the webinar found here: <https://www.workforcegps.org/events/2022/05/27/12/23/Registered-Apprenticeship-and-Opportunities-to-Leverage-Infrastructure-Investment-Job-Act-Funding>.

<sup>20</sup> National Governors Association, "Workforce Development in the IIJA, CHIPS and IRA," February 8, 2023; <https://www.nga.org/publications/workforce-development-in-the-iija-chips-and-ira/>. Note: This source includes a list of several IIJA formula and competitive grant programs that states can use to develop their infrastructure workforce.

<sup>22</sup> For more information see: Keystone Research Center, "From the White House: The Inflation Reduction Act Delivers Affordable Clean Energy for Pennsylvania," Blog, August, 17, 2022; [https://krc-pbpc.org/research\\_publication/the-inflation-reduction-act-delivers-affordable-clean-energy-for-pennsylvania/](https://krc-pbpc.org/research_publication/the-inflation-reduction-act-delivers-affordable-clean-energy-for-pennsylvania/).

The Inflation Reduction Act, crafted to address the climate crisis and boost investment in clean energy, also encourages the use of apprenticeship.<sup>22</sup> The U.S Department of Treasury released new proposed rules in August 2023 around apprenticeship and prevailing wage connected to clean energy tax credits in the IRA.<sup>23</sup> These rules provide a five-fold increase in tax credit or deduction amounts if employers abide by prevailing wage and registered apprenticeship requirements on qualifying energy projects.<sup>24</sup> The three apprenticeship requirements are as follows. 1) Labor hours requirement – depending on when construction began, 12.5% or 15% of total labor hours performed in the construction, alteration, or repair of facility are performed by qualified apprentices. 2) Ratio requirement – there must be an applicable ratio of apprentices to journeypersons on the facility each day. 3) Participation requirement – any taxpayer that employs four or more laborers or mechanics on a project must also hire at least one apprentice.<sup>25</sup>

Governor Shapiro has also taken leadership at the state level to expand apprenticeship and pre-apprenticeship. In July of this year, Governor Shapiro signed an executive order creating the Commonwealth Workforce Transformation Program, which will use 3% of IIJA and IRA money that come through the state to fund workforce development and on-the-job training.<sup>26</sup> The state expects to amass \$400 million investment over the next five years and to use those funds to help create 10,000 new jobs in Pennsylvania. Contractors or unions who are working on a federally funded project can get reimbursed for wages or other training costs (including apprenticeship or pre-apprenticeship) from the state for up to \$40,000 for each new worker hired and trained (and meeting certain criteria). Critical to ensuring those with barriers to employment have access, this funding can also be used for reimbursement of costs related to supportive services for trainees, including housing, child and dependent care, work-related tools, transportation, and more.<sup>27</sup>

## Apprenticeship and Pre-Apprenticeship Programs in Pennsylvania

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<sup>22</sup> For more information see: Keystone Research Center, “From the White House: The Inflation Reduction Act Delivers Affordable Clean Energy for Pennsylvania,” Blog, August, 17, 2022; [https://krc-pbpc.org/research\\_publication/the-inflation-reduction-act-delivers-affordable-clean-energy-for-pennsylvania/](https://krc-pbpc.org/research_publication/the-inflation-reduction-act-delivers-affordable-clean-energy-for-pennsylvania/).

<sup>23</sup> Department of Revenue, Internal Revenue Service, “Increased Credit or Deduction Amounts for Satisfying Certain Prevailing Wage and Registered Apprenticeship Requirements,” August 30, 2023; <https://public-inspection.federalregister.gov/2023-18514.pdf>.

<sup>24</sup> For apprenticeship this applies to the following credits and deductions: alternative fuel vehicle refueling property credit, renewable electricity production credit, credit for carbon oxide sequestration, credit for production of clean hydrogen, clean electricity production credit, clean fuel production credit, energy credit, qualifying advanced energy project credit, clean electricity investment credit, energy efficient commercial buildings deductions. For more information see: <https://www.irs.gov/credits-deductions/frequently-asked-questions-about-the-prevailing-wage-and-apprenticeship-under-the-inflation-reduction-act>.

<sup>25</sup> IRS webpage, “Frequently asked questions about the prevailing wage and apprenticeship under the Inflation Reduction Act.” Online at: <https://www.irs.gov/credits-deductions/frequently-asked-questions-about-the-prevailing-wage-and-apprenticeship-under-the-inflation-reduction-act>.

<sup>26</sup> “Executive Order 2023-17 – Commonwealth Workforce Transformation Program (CWTP),” July 31, 2023; <https://www.oa.pa.gov/Policies/eo/Documents/2023-17.pdf>.

<sup>27</sup> “Governor Shapiro Signs Executive Order Creating New, First-in-the -Nation Workforce Training Program to Take Advantage of Historic Federal Infrastructure Funding,” July 31, 2023; <https://www.governor.pa.gov/newsroom/governor-shapiro-signs-executive-order-creating-new-first-in-the-nation-workforce-training-program-to-take-advantage-of-historic-federal-infrastructure-funding/>. Also see <https://www.pa.gov/newjobs/>.

This section shifts from an overview of construction apprenticeship, and an analysis of the forces driving an increase in construction demand and need to expand apprenticeship intake to meet that demand, to a more granular profile of Pennsylvania construction apprenticeship and pre-apprenticeship. We start with a map showing the location of construction apprenticeship programs in Pennsylvania and follow that with profiles of two pre-apprenticeship programs and one apprenticeship program.

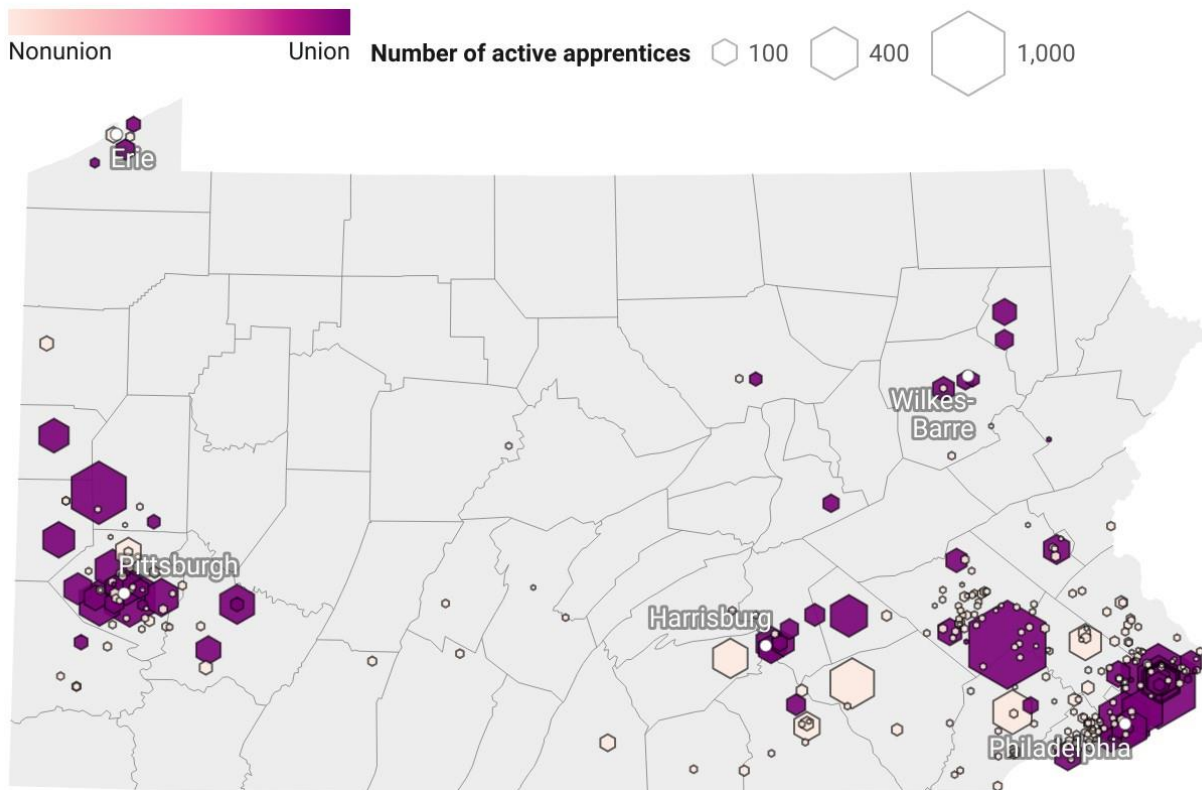
### ***Map of Construction Apprenticeships in Pennsylvania***

The map below shows the location of registered construction apprentice and training programs in Pennsylvania. The purple hexagons represent union programs and the peach ones denote nonunion programs. The size of the hexagons represents the number of active apprentices in the program. As you can see, while there are lots of small peach hexagons scattered especially in southeast Pennsylvania and the southwest, the programs tend to be smaller. There are fewer union (purple) programs, but they train more apprentices. (For more details on the map, including the ability to hover over a program and see program details, go to [https://www.datawrapper.de/\\_/3lloi/](https://www.datawrapper.de/_/3lloi/).) The map also illustrates the concentration of apprenticeship programs in the Philadelphia and Pittsburgh areas, with some programs also in South Central Pennsylvania. There are a few training locations in the remaining, more rural parts of the state although they only train a few people. The map suggests that there may be a need to increase the number of satellite training locations in more rural parts of the state – although the combination of virtual classes and weekend or summer visits by apprentices to the Philadelphia and Pittsburgh may reduce the need for new bricks-and-mortar training locations in rural Pennsylvania. Some trades are already establishing new training centers in rural Pennsylvania. For example, IBEW Local 126 which represents Line Workers in the telecommunications industry in the southern half of Pennsylvania, is establishing a training center in Cambria County.

Figure 14

## Registered Construction Apprentice Programs in Pennsylvania

Hexagon size corresponds to number of active apprentices in 2023. Purple hexagons denote union programs, peach denote nonunion. Programs with zero active apprentices are labeled as .05



Keystone Research Center analysis of Registered Apprenticeship Partners Information Database System data  
Created with Datawrapper

### Profiles of Apprenticeship and Pre-Apprenticeship Programs in Pennsylvania

In an earlier Keystone Research Center (KRC) report on apprenticeship, we profiled four different construction apprenticeship programs in different parts of Pennsylvania.<sup>28</sup> Here, we reproduce a shorter version of one of those profiles and follow that with profiles of two SW Pennsylvania apprenticeship readiness programs that help targeted groups qualify for apprenticeship and/or gain direct placement into union construction jobs. In an ongoing project, KRC and the Pennsylvania Building and Construction Trades Council are researching apprenticeship readiness programs across Pennsylvania – a growing number of such programs exist in the state, including programs successfully placing women in union construction careers.

<sup>28</sup> Stephen Herzenberg, Diana Polson, Mark Price, “Construction Apprenticeship and Training in Pennsylvania,” Keystone Research Center, 2018; [https://krc-pbpc.org/wp-content/uploads/20180530\\_CALMReport\\_Final.pdf](https://krc-pbpc.org/wp-content/uploads/20180530_CALMReport_Final.pdf).



### *Steamfitters Local 449*

Steamfitters fabricate, install, and service piping systems in a variety of locations – high-rise apartment buildings, office buildings of all sizes, factories, public buildings, health care facilities, food warehousing and processing plants, power plants, natural coal fired plants, and more. Pittsburgh-based Steamfitters Local 449 was chartered in 1913 and is affiliated with the United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry of the United States and Canada.

The local union has two apprenticeship programs – the mechanical equipment service program and the building trades program. Workers train on a wide range of piping systems, including heating and air conditioning, steam, refrigeration, boilers, hydraulics, welding, medical gas, pipe fabrication, energy management, and drafting. In these five-year programs, apprentices work 10,000 hours in the field and learn from seasoned journey-workers during their training.

In January 2017, the Steamfitters 449 opened a new state-of-the-art 75,000-square-foot training facility in Harmony, Pennsylvania about half an hour north of Pittsburgh. Apprentices work on-the-job most days and come in for a daylong training at the Harmony site once every two weeks. At the site, apprentices get detailed training needed on-the-job, in math, science, drafting, blueprint reading, project management, brazing, soldering, welding, and other skills.

Local 449's active members work across 15 counties in Western Pennsylvania, from Erie to Greene County and as far east as Armstrong and Clarion Counties. Apprentices can choose their career path within the industry – concentrating in detailing in a planning department, becoming a project manager, foreman, certified welder, certified rigger, certified Medical Gas Installer, even starting their own mechanical contractor business. Local 449 currently has about 400 active apprentices and admits 60 to 80 apprentices in most years. New apprentices average about 25 years old but include some recent high school graduates and some mid-career dislocated workers. The local union also sees a lot of applicants who come out of vocational high schools and colleges, or who have a background in heating and cooling or mechanical courses of some kind.

Recruitment of young people is a critical piece of the future of the apprenticeship, especially considering 50% of the membership will retire in the next 10 years. Local 449's recruiter goes to colleges, vocational programs and career fairs across the western part of the state each week. Recruitment also happens over social media.

The Steamfitters prioritize outreach to minorities. For example, it partners with "Intro to the Trade" (profiled below) a pre-apprenticeship program operated out of the Builders Guild of Western Pennsylvania. Intro to the Trades brings each cohort of its pre-apprentices to Local 449's Harmony site to do a day-long class on basic welding skills. The Director of Training says, "We make a real effort to reach out and work with programs aimed at getting minorities into the apprenticeship program. There are certain barriers – like a lack of strong math skills and no driver's license that can be overcome. Partnering with community organizations and trying to get more minorities into the program is just the right thing to do. We can really have an impact on people's lives."

What makes this 100-year organization and its apprenticeship so successful? The Director of Training says "the one aspect that makes our program heads and shoulders above vo-tech and vocational colleges is the fact that all of our instructors are members of our organization and have gone through the exact training that they are now teaching. They value providing the next generation with the information and

training they need to keep the union and its apprenticeship strong.” He also said the integrity and caring of the instructors rubs off on the students and keeps them engaged. And the benefits of the apprenticeship are vast. Once apprentices complete their program, they never again have to look for a job. Being part of Local 449 provides each member an in-house employment agency, with the union matching members with jobs over the course of their work lives.

### *The Pittsburgh Construction Partnerships and “Intro to the Trades”*

The Pittsburgh Construction Industry Partnership (CIP) brings together large, unionized construction companies in Pittsburgh and Allegheny County and is co-convened by the joint Pittsburgh/Allegheny County local workforce development board, Partner4Work (P4W), and the Builders Guild of Western PA (Builders Guild), a labor-management partnership for the area’s construction industry. These partners bring together three key elements that, in combination, give a growing number of minorities in Pittsburgh access to good-paying trade careers in Pittsburgh’s unionized construction industry.

1. The operation by the Builders Guild of a pre-apprenticeship or “apprenticeship readiness” program called “Intro to the Trades,” which delivers about six weeks of pre-employment training adapted from an apprenticeship readiness curriculum developed by the national building trades, the Multi-Craft Core Curriculum (“MC3”).
2. Recruitment of candidates for Intro to the Trades by providers of training and other workforce services and careful screening to ensure participants have a good chance for success in the training, on their first job, in an apprenticeship that lasts up to five years, and in a career in unionized construction.
3. Commitment of unionized contractors and joint apprenticeship programs to, at minimum, interview successful graduates of the Introduction to the Construction Trades program.

Introduction to the construction trades has achieved success overall and with Black participants. As of late 2021, 12 cohorts and 162 participants had been through training, 80 percent identified as African American/Black, 44 percent under 26, 48 percent with a HS diploma or GED; and 76 percent placed in unsubsidized employment.

### *Breaking the Chains of Poverty*

Breaking the Chains of Poverty is a registered pre-apprenticeship program run by the Pittsburgh Chapter of the A. Philip Randolph Institute. The mission of the organization is to “provide social and economic progress for minorities, the poor, and working people. In partnerships with the labor movement and other allies, we provide community-based training programs to individuals to educate, to improve their economic opportunities, and to secure good union jobs that make family-sustaining wages.”<sup>29</sup> This pre-apprenticeship program trains individuals in skills needed to get a job in the construction trades, manufacturing, and energy sector. The program itself has strict rules and entry requirements, but the results are impressive. The program trains 120 participants a year, with an 80% success rate.

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<sup>29</sup> From program pamphlet.

Entry requirements are similar to those for “Intro to the Trades” and reflect a commitment to enrolling people who have a real chance to qualify for union construction apprenticeships and jobs. Entrants must have a high school diploma or GED, be 18 years or older, pass a drug test, and demonstrate 10<sup>th</sup> grade competency on a TABE Level A test. A driver’s license is preferred and the applicant must be or become a registered voter – a symptom of A. Philip Randolph’s association with the Civil Rights movement and the fight for voting rights for Black Americans. These entry requirements mean that many members of targeted groups cannot get into the “Breaking the Chains” program immediately. Breaking the Chains, however, assists interested individuals access services that help them later meet the program’s entry requirements. For example, Breaking the Chains helps people access education programs from Literacy Pittsburgh to improve their math skills.

Applicants must also complete and pass a panel interview for entry into the program. Once admitted into the program, if you are late by more than hour one time, you are kicked out. The program has strong relationships with the trades, including the Carpenters, Steamfitters, IBEW, Sheet Metal, and more. These partners know that once a person graduates from Breaking the Chains pre-apprenticeship, they are employable and will be a strong candidate. Participants leave the 8-week program with multiple certificates (including OSHA 30-hour health and safety, PennDOT traffic control, hazmat and emergency response, and more) and guaranteed interviews with several union apprenticeship programs. The training program specializes in environmentally sustainable practices, which gives participants a competitive advantage. A stipend is offered to offset the cost of transportation and food. The program partners with community organizations to assist participants with specific barriers.<sup>30</sup>

DeWitt Walton, founder of Breaking the Chains, says that the program requirements aren’t barriers to participation if individuals accept them and use them as motivation for accessing support and doing whatever it takes to meet the requirements: “If you can envision it, it can be... We don’t care where you’ve been, we care about where you are going.”

## Conclusions and Recommendations

This report shows that joint labor-management construction apprenticeships in Pennsylvania are a hidden gem. They enable workers to access good-paying careers that pay above wages for most college graduates. They also serve a growing, albeit still-too-small, number of women and people of color. Massive federal investments in climate action and infrastructure represent an unprecedented opportunity to grow high-quality construction apprenticeships in Pennsylvania and to create opportunities for more Pennsylvanians of every race and gender.

Fully capitalizing on the opportunity to create more on ramps to good-paying construction careers for diverse workers requires state and local policies that align with Biden administration policies promoting strong labor standards and community benefits from federal climate infrastructure projects, including via local hiring of diverse workers and investment in quality apprenticeship and pre-apprenticeship.

**Maintain and Strengthen Labor Standards, Including on Expanding Energy and Climate Projects.** As well as improving job quality, strong labor standards in the construction industry help ensure that contractors who participate in robust apprenticeship programs and invest significant private funds in those

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<sup>30</sup> Ibid.

apprenticeships are not undercut by low-ball contractors with weak or no apprenticeship programs.<sup>31</sup> Labor standards in Pennsylvania's construction sector should include the state's current prevailing wage law and enactment of a state legislative proposal to apply prevailing wage and benefit standards to renewable energy and other industries related to reducing carbon emissions such as electric vehicle infrastructure and weatherization.<sup>32</sup> On projects subsidized by state or federal subsidies including tax credits, Pennsylvania should also adopt the policy guidance of the Department of the Interior that accompanied the distribution of the first \$725 million in Abandoned Mine Land (AML) reclamation funds from the Bipartisan Infrastructure Law. This guidance specifies that "... for projects or aggregated projects in excess of \$1 million, States or Tribes should require that contractors...provide: 1) a certification that the project uses a unionized project workforce; 2) a certification that the project includes a project labor agreement; or 3) a project workforce continuity plan, detailing..." how the project will achieve the benefits of a unionized workforce or PLA, such as access to adequate supplies of experienced and well-trained labor.<sup>33</sup>

**Enact Local and a State Responsible Contractor Law.** Responsible contractor ordinances (RCOs) are being utilized by more and more communities across the nation, from California to Florida and Illinois to Alabama.<sup>34</sup> Bucks, Lehigh, and Northampton Counties, and now Centre County, all have RCOs in Pennsylvania.<sup>35</sup> RCOs establish objective criteria and verifiable standards for contractors bidding on public construction projects. These provisions typically require proof of participation in apprenticeship training programs and certificates of insurance, prequalification surveys, and compliance with all local, state, and federal laws. As a result, RCOs benefit project owners, ensuring that projects are built by professional, competent contractors with proven track records. Case studies from across the country have found that RCOs promote higher quality and more reliable services and reduced back-end costs (because of poor

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<sup>31</sup> For a concrete illustration of the reduction in apprenticeship and training investment that can result from allowing contracting to low-wage, out-of-state subcontractors on a state-funded construction project, see Stephen Herzenberg et al., "Hiring Local on Transportation Infrastructure Projects in Pennsylvania: Employment, Economic, Fiscal, and Training Impacts," KRC and Illinois EPI.

<sup>32</sup> The legislative proposal is Pennsylvania House Bill 949, sponsored by Representative Elizabeth Fiedler, which has 25 co-sponsors;

<https://www.legis.state.pa.us/CFDOCS/billInfo/billInfo.cfm?year=2023&sInd=0&body=H&type=B&bn=949>.

<sup>33</sup> For the announcement of the final guidance, see US Department of the Interior, "Biden-Harris Administration Releases Final Guidance on Bipartisan Infrastructure Law Abandoned Mine Land Grant Program," July 21, 2022;

<https://www.doi.gov/pressreleases/biden-harris-administration-releases-final-guidance-bipartisan-infrastructure-law>. For the guidance itself, see Office of Surface Mining Reclamation and Enforcement, "Guidance on the Bipartisan Infrastructure Law Abandoned Mine Land Grant Implementation,"

[https://www.osmre.gov/sites/default/files/inline-files/BIL\\_AML\\_Guidance\\_7-19-22.pdf](https://www.osmre.gov/sites/default/files/inline-files/BIL_AML_Guidance_7-19-22.pdf).

<sup>34</sup> Karla Walter, "Proven State and Local Strategies to Create Good Jobs with IIJA Infrastructure Funds. Center for American Progress, 2022; <https://www.americanprogress.org/article/proven-state-and-local-strategies-to-create-good-jobs-with-iija-infrastructure-funds/>.

<sup>35</sup> The Centre County RCO passed 6-27-23: see

<https://centrecountypa.gov/DocumentCenter/View/25256/Ordinance-1-of-2023-Responsible-Contractor-Ordinance>. Northampton County enacted an RCO October 5, 2018:

<https://www.northamptoncounty.org/COUNCIL/Documents/Ordinance%20Adoption/2018/Ord648-2018%20-%20Repeal%20639-2018%20Procedures%20for%20Solicitation%20and%20Award%20of%20Contracts.pdf>. Lehigh County enacted an RCO on April 7, 2020:

[https://go.boarddocs.com/pa/lehc/Board.nsf/files/BQ3QP36802B6/\\$file/2020-106-ORD.pdf](https://go.boarddocs.com/pa/lehc/Board.nsf/files/BQ3QP36802B6/$file/2020-106-ORD.pdf). Bucks enacted an RCO May 4, 2020: <https://www.buckscounty.gov/DocumentCenter/View/1710/Ordinance-No-162-PDF#:~:text=The%20County%20recognizes%20there%20is,in%20a%20timely%2C%20reliable%20>.

work the first time).<sup>36</sup> At the state level in Pennsylvania, a responsible contractor law (House Bill 1449) passed the Pennsylvania House with a large bipartisan majority (134-69) October 18.<sup>37</sup> This bill includes a requirement that responsible contractors “Participate in an apprenticeship program for each specific trade or classification employed by the contractor on the project.” Enacting this bill would thus encourage the further expansion of high-quality apprenticeships with pathways into high-paying construction careers for diverse workers.

**Give Priority to Contractors With High-quality Apprenticeship Programs in Distributing CWTP Funds.** As noted, on July 31, 2023, Governor Shapiro unveiled Executive Order 2023-17, the Commonwealth Workforce Transformation Program (CWTP). Over five years, the CWTP will distribute up to \$400 million in federal funding to pay for up to \$40,000 per each new employee hired on federally subsidized infrastructure and climate projects. For apprentices, employed pre-apprentices, and other new employees, these funds may reimburse the payment of wages, on-the-job training in the first six months, other training costs, supportive services, and direct cash assistance to overcome barriers to employment. The Commonwealth should give priority in distributing these funds to responsible contractors with robust apprenticeship programs and apprenticeship readiness programs, track records of recent increases in diversity (as demonstrated by RAPIDS data), and commitments to further increase diversity.

**Create a Statewide Learning Network to Diversify the Pipeline to Union Construction Careers and Maximize Drawdown of Federal Climate and Infrastructure Funds.** The Commonwealth should partner with Pennsylvania localities, and with construction unions, contractors, and community organizations, to create a learning network that makes local hiring and community benefit plans – good union careers for diverse local workers – a standard component of all federally and publicly funded projects in the state. A natural first step for such a learning network would be to develop a model local hire/community benefits plan.<sup>38</sup> This model plan could also be used on collective procurement by local municipalities (e.g., of renewable energy through a Power Purchase Agreement) as well as individual projects receiving federal funds. This learning network and the wide diffusion of a model community benefits/local hire agreement will deliver multiple benefits to the industry, its workers, and the state: it will provide the workforce that contractors need, ensure high quality and safety on construction projects, and increase the share of federal climate and infrastructure funds that come to Pennsylvania. This initiative could build on an existing grant from the Department of Labor and Industry to the Pennsylvania Building and Construction Trades Council that is documenting best pre-apprenticeship and local hiring practices across the state. It could also build on the recently announced “Pittsburgh Good Jobs Principles” and a Good Jobs Challenge

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<sup>36</sup> Paul Sonn and Tsedeye Gebreselassie, “The Road to Responsible Contracting: Lessons from States and Cities for Ensuring That Federal Contracting Delivers Good Jobs and Quality Services,” 2010; *Berkeley Journal of Employment and Labor Law*, 31(2), pp. 459–487;

<https://www.jstor.org/stable/43551794?refreqid=excelsior%3A9002edec6fa411956fdbfcd4631f8c44andseq=1>.

<sup>37</sup> Pennsylvania House Bill 1449 can be found at

<https://www.legis.state.pa.us/cfdocs/billinfo/billinfo.cfm?syear=2023&sInd=0&body=H&type=B&bn=1449>.

<sup>38</sup> One possible element of a model local hire/community benefit plan would be require 20% of work hours be completed by apprentices in registered apprenticeships or pre-apprenticeships, with at least half of those work hours to be completed by workers from targeted hiring programs. Another element could encourage on ramps into apprenticeship for returning citizens. See Amanda K. Woodrum, Kathleen Mulligan-Hansel, Stephen Herzenberg, Anna McLean, “Maximizing Value: Ensuring Community Benefits,” Reimagine Appalachia; [https://reimagineappalachia.org/wp-content/uploads/2021/05/Community-Benefits\\_Whitepaper.pdf](https://reimagineappalachia.org/wp-content/uploads/2021/05/Community-Benefits_Whitepaper.pdf).



grant to Philadelphia Works that includes a major effort to expand diverse local hiring into infrastructure jobs.<sup>39</sup>

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<sup>39</sup> For the proposal narrative of the Philadelphia Good Jobs Challenge grant, see <https://www.eda.gov/sites/default/files/2022-08/Philadelphia-Works-Inc-Project-Narrative.pdf>.

## List of Current Union Apprenticeships in Pennsylvania, 2023

Union apprenticeships in Pennsylvania, 2023		
Program Name	City and State	Training for what occupation?
(Pitts)Asbestos Workers L.U. #2 J.A.T.C.	Aliquippa, PA	Pipe Coverer & Insulator
Allentown Electricians J.A.T.C. Local 375	Allentown, PA	Electrician (Alternate Title: Interior Electrician)
Chester Electricians J.A.C. (I.B.E.W. 654) (Comm/Ind)	Boothwyn, PA	Electrician (Alternate Title: Interior Electrician)
Hubbell Lighting, Inc./ Columbia Lighting	Bristol, PA	Tool And Die Maker
Pa Heavy And Highway Contractors Bargaining Asso.	Canonsburg, PA	Carpenter
Finishing Trades Institute Of Western Pa (Dc 57) J	Carnegie, PA	Painter (Const)
Atei Zone 2	Collegeville, PA	Electrician (Alternate Title: Interior Electrician)
(Pittsburgh) Plumbers Local 27 J.A.T.C.	Coraopolis, PA	Plumber
Neat	Douglasville, PA	Line Erector (Power-Line Distribution Erector)
Electricians I.B.E.W. Local 56 J.A.T.C.	Erie, PA	Electrician (Alternate Title: Interior Electrician)
(Erie) Roofers Local 210 J.A.T.C.	Erie, PA	Roofer
(Phl) Laborers Dc J.A.T.C.	Exton, PA	Construction Craft Laborer
Thayer Power And Communication Line Construction Company	Fairview, PA	Teledata Journeyman Lineman
Ft. Washington Operating Engineers	Fort Washington, PA	Operating Engineer (Alternate Title: Heavy Construction Equipment Mechanic)
Heat & Frost Insulators & Allied Workers	Grantville, PA	Composite Plastic Fabricator (Existing Title: Insulation Worker)
Sheet Metal Workers Of Central Pa J.A.T.C. L.U. 19	Hamburg, PA	Sheet Metal Worker
Allegheny County J.A.T.C. Of The Heating, Piping And Air Conditioning	Harmony, PA	Refrigeration Mechanic (Any Ind)
Harrisburg Electricians J.A.T.C.	Harrisburg, PA	Electrician (Alternate Title: Interior Electrician)
Laborers District Council Of Eastern Pennsylv J.A.T.C.	Harrisburg, PA	Construction Craft Laborer
Harrisburg Plumbers	Harrisburg, PA	Plumber
Harrisburg Bricklayers & Allied Craftworkers L.U.	Harrisburg, PA	Tile Finisher
Ironworkers Local 404 J.A.T.C.	Harrisburg, PA	Structural Steel Worker (Alternate Titles: Ironworker Or Structural Ironworker)
Carpenters J.A.T.C. Of Greater Pa-Lebanon Center	Lebanon, PA	Carpenter
(Phl) Boilermaker J.A.C. 13	Levittown, PA	Boilermaker I
Williamsport Electricians J.A.T.C. Local 812	Montoursville, PA	Electrician (Alternate Title: Interior Electrician)
Plasterers Local 31 J.A.T.C.	Munhall, PA	Plasterer
Wilkes Barre Electricians	Nanticoke, PA	Electrician (Alternate Title: Interior Electrician)
(Pitts) Western Pa Operating Engineers Mechanics	New Alexandria, PA	Construction Equipment Mechanic
(Pitts) Western Pa Operating Engineers	New Alexandria, PA	Operating Engineer (Alternate Title: Heavy Construction Equipment Mechanic)
Western Central Pennsylvania Electricians ' Joint Apprenticeship And Training Committee	New Castle, PA	Electrician (Alternate Title: Interior Electrician)
(Phl) Carpenters	Philadelphia, PA	Carpenter
Glaziers & Glass Workers	Philadelphia, PA	Glazier
(Phl) Ironworkers Jatc (L.U. 401)	Philadelphia, PA	Structural Steel Worker (Alternate Titles: Ironworker Or Structural Ironworker)
Sheet Metal Wrkrs J.A.T.F. L.U. 19 Of Phl & Vicinity	Philadelphia, PA	Sheet Metal Worker
Local 194 Sheet Metal Workers Inter. Assoc.	Philadelphia, PA	Sign Erector I
Phl. Sprinkler Industry	Philadelphia, PA	Pipe Fitter (Construction)
Steamfitters Local Union 420 - J.C.B.	Philadelphia, PA	Refrigeration Mechanic (Any Ind)
Steamfitters Local Union 420 - J.P.A.T.C.	Philadelphia, PA	Pipe Fitter (Construction)
(Phl) Philadelphia Electric (I.B.E.W. 98)	Philadelphia, PA	Electrician (Alternate Title: Interior Electrician)
(Phl) Insulation Workers I.A.H.F.I.A.W. J.A.C. (L.U. 14)	Philadelphia, PA	Pipe Coverer & Insulator
The Finishing Trades Institute - Mid Atlantic Region	Philadelphia, PA	Painter-Decorator (Painter Const)
(Phl) Reinforced Ironworkers & Riggers J.A.C. (L.U. 405)	Philadelphia, PA	Reinforcing Metal Worker (Alternate Title: Ironworker Reinforcing Concrete)
(Phl) Bricklayers & Allied Crafts J.A.C. (L.U.1)	Philadelphia, PA	Bricklayer (Construction)
(Phl) Roofers J.A.C. (L.U. 30)	Philadelphia, PA	Roofer
(Phl) Plumbers	Philadelphia, PA	Plumber
Plasterers & Cem.Mason--L.U. # 8	Philadelphia, PA	Plasterer
Cement Masons L.U. 592	Philadelphia, PA	Cement Mason
Lima Company	Philadelphia, PA	Plumber
Bricklayers Local 9 J.A.T.C.	Pittsburgh, PA	Tile Finisher
(Pittsburgh) Sheet Metal Works	Pittsburgh, PA	Sheet Metal Worker
Western Pa Boilermakers	Pittsburgh, PA	Boilermaker I
(Pitts) Roofers Local 37 J.A.T.C.	Pittsburgh, PA	Roofer
(Pitts) Iron Workers Local 3 J.A.T.C.	Pittsburgh, PA	Structural Steel Worker (Alternate Titles: Ironworker Or Structural Ironworker)
(Pittsburgh) Cement Masons Local 526 J.A.T.C.	Pittsburgh, PA	Cement Mason
(Pitts) Electricians Local 5 J.A.T.C.	Pittsburgh, PA	Electrician (Alternate Title: Interior Electrician)
Mechanical Operations Company Inc.	Pittsburgh, PA	Stationary Engineer
(Pittsburgh) Heavy Highway Carpenters J.A.T.C.	Pittsburgh, PA	Carpenter
Kml Carpenters' Apprenticeship & Training Fund	Pittsburgh, PA	Carpenter
(Pittsburgh) Sprinkler Fitters Local 542 J.A.T.C.	Pittsburgh, PA	Pipe Fitter (Construction)
Reading Electricians J.A.T.C. Local 743	Reading, PA	Electrician (Alternate Title: Interior Electrician)
Western Pa Laborers J.A.T.C.	Saxonburg, PA	Construction Craft Laborer
Ne Pa Pipefitters J.A.T.C.	Scranton, PA	Pipe Fitter (Construction)
Shamokin Electricians I.B.E.W. L.U. 607	Shamokin, PA	Electrician (Alternate Title: Interior Electrician)
Scranton Electricians	South Abington Townshi	Electrician (Alternate Title: Interior Electrician)
Ne Pa Sheet Metal Workers J.A.T.C. L.U.44	Wilkes-Barre, PA	Sheet Metal Worker
N.E. Pa Asbestos Workers J.A.T.C.	Wilkes-Barre, PA	Composite Plastic Fabricator (Existing Title: Insulation Worker)
(Scranton) Ironworkers J.A.C.	Yatesville, PA	Structural Steel Worker (Alternate Titles: Ironworker Or Structural Ironworker)
York Electrical Institute	York, PA	Electrician (Alternate Title: Interior Electrician)
Latrobe & Vicinity Plumbers/Pipefitters Local 354	Youngwood, PA	Plumber

Source: Keystone Research Center analysis of RAPIDS data.

## **Appendix**

# On-Ramps to Construction Careers in Ohio

## Federal Funding Provides an Opportunity to Grow Apprenticeships and Create Pathways to Quality Jobs

Over the past half-century, the Appalachian region has experienced a devastating loss of manufacturing and extraction jobs. The economic impact and human costs of this restructuring can be seen in declining and stagnant wages and collapsing labor force participation rates, as workers become discouraged from participating in the job market.<sup>40</sup> These employment trends have both contributed to, and been exacerbated by, the opioid crisis and “deaths of despair.” One study found that in Ohio, between 2001 and 2019, 77 out of 88 counties experienced a decline in middle-paying jobs. Appalachian counties in Ohio experienced higher rates of this “hollowing out” of middle-paying jobs due to declines in manufacturing and mining jobs.<sup>41</sup>

Today, however, we have an unprecedented opportunity to create more good jobs for Ohio workers of every race/ethnicity, gender, and background. Massive federal investments in climate infrastructure will create a boom in construction, land restoration, and agroforestry jobs, one that coincides with the retirement of the youngest post-World War II baby boomers. Moreover, joint labor-management apprenticeship and apprenticeship prep programs connected to unionized construction firms can provide pathways to these high-paying careers, including for low-income rural workers, people of color, women, and returning citizens. The income earned in these careers and the dignity that comes from making a vital contribution to society – as an essential worker of climate response – can help revitalize and restore hope to communities across the coal-country region of Appalachia.

### Benefits of Apprenticeship for the Appalachian region

Unionized construction, in particular, is good at training skilled workers and creating family-sustaining jobs. Of the four states we examined, Ohio has the second largest employment in private construction, behind only Pennsylvania. About 15% of Ohio construction workers are members of a labor union (although, as explained in the Pennsylvania report, union density within trades in non-residential construction may be more like 30%).

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<sup>40</sup> Claire Kovach, Stephen Herzenberg, Amanda Woodrum, and Ted Boettner, “Targeted Employment: Reconnecting Appalachia’s Disconnected Workforce,” Reimagine Appalachia, Keystone Research Center, Ohio River Valley Institute, July 2023; [https://reimagineappalachia.org/wp-content/uploads/2023/07/Repot\\_Targeted-Employment\\_FINAL.pdf](https://reimagineappalachia.org/wp-content/uploads/2023/07/Repot_Targeted-Employment_FINAL.pdf).

<sup>41</sup> Tuyem Pham, “Hollowing out of middle-pay jobs in Ohio: An exploratory analysis,” *The American Journal of Economics and Sociology*, October 23, 2023; <https://onlinelibrary.wiley.com/doi/10.1111/ajes.12552>.

Table 1

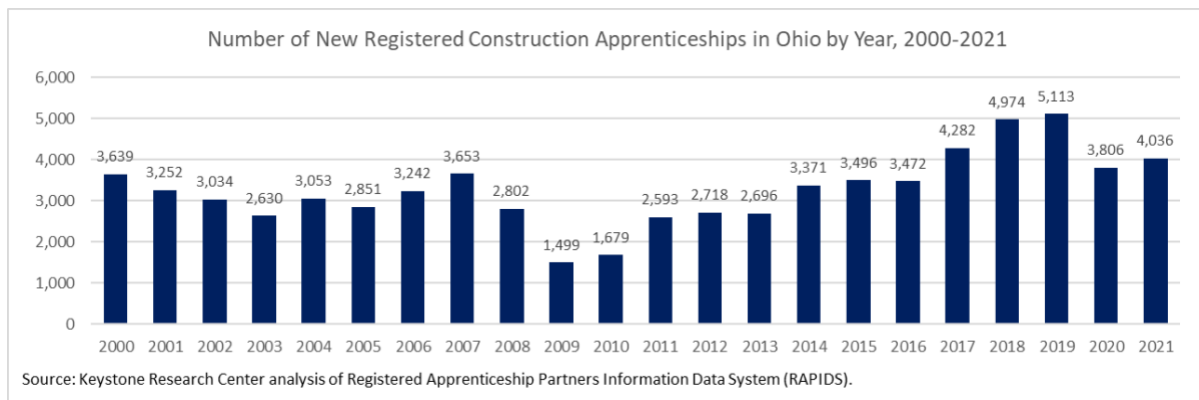
Employment in and unionization in private construction by state, 2021			
	Employment in Private Construction	Represented by a Union	% Represented by a Union
Kentucky	61,703	9,496	15.4
Ohio	244,511	36,618	15.0
Pennsylvania	291,020	81,312	27.9
West Virginia	29,356	4,172	14.2

NOTE: Union density is even higher among blue-collar trades.  
Source: Data from unionstats.com and come from Current Population Survey (CPS) Outgoing Rotation Group (ORG) Earning Files, 2021.

## A Profile of Construction Apprenticeship in Ohio

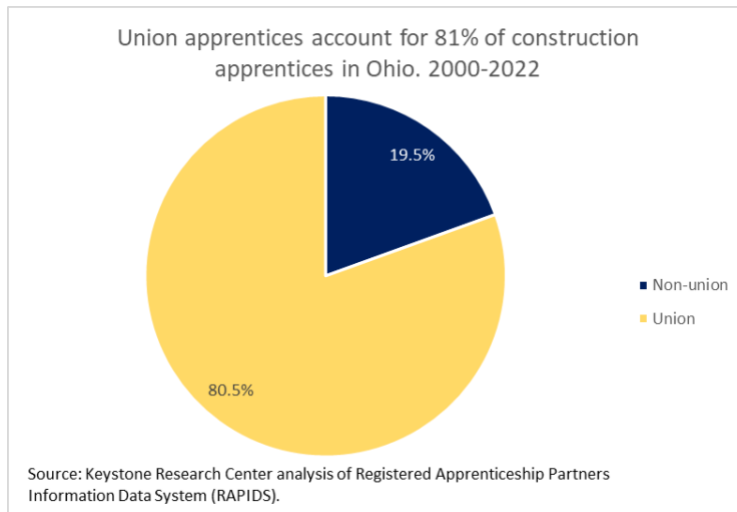
Employment and apprenticeship registrations in construction are driven by the business cycle. When employment opportunities are limited, there is less need to bring on and train new workers. For this reason, recessions and their aftermath (when growth is still sluggish) result in a decrease in apprenticeship registrations, as figure 1 shows. After the 2001 and 2008 recessions, apprenticeship registrations decreased. Apprenticeship registrations also dipped in the COVID-19 pandemic.

Figure 1



The vast majority of construction apprentices (80.5%) in Ohio over the past two decades have been trained in a union apprenticeship program.

Figure 2



Union apprenticeships tend to train more minority, women, and veteran construction workers in Ohio and have better completion rates and wages than nonunion programs, although there is still much room for improvement. For every female and minority male nonunion apprentice, there are six female and minority male union apprentices. For every veteran who completes a nonunion program in Ohio, five veterans complete a union program.

Figure 3

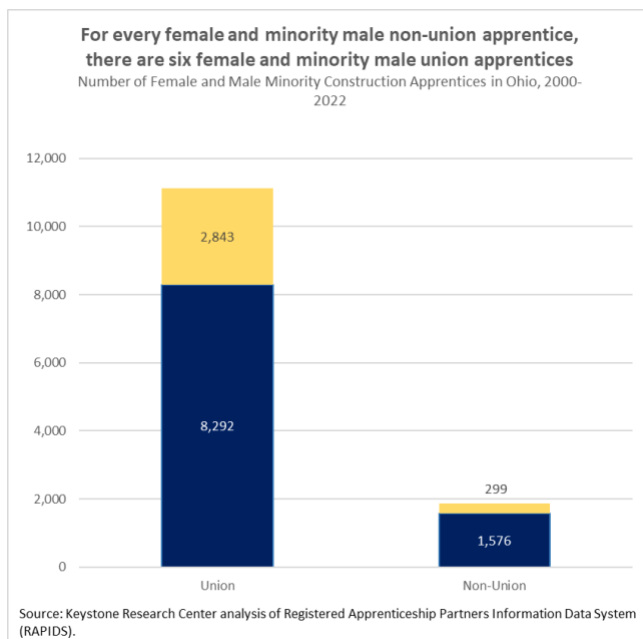
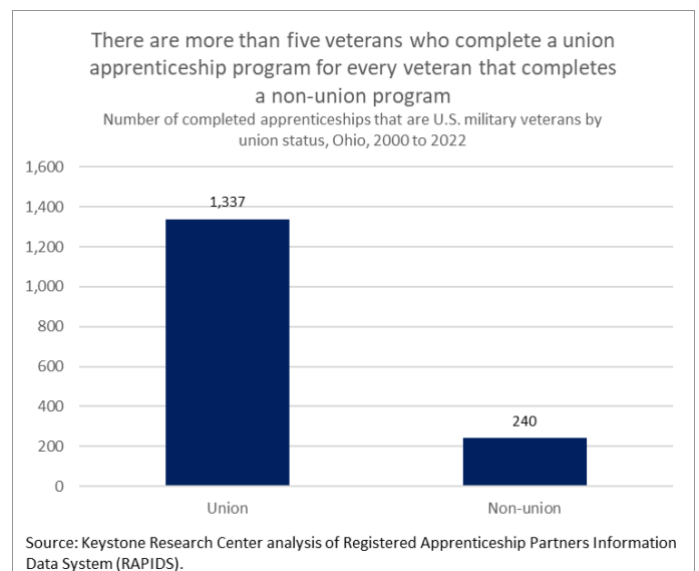


Figure 4



Union apprenticeships in Ohio also have higher completion rates than nonunion programs—46% compared to 37% respectively.

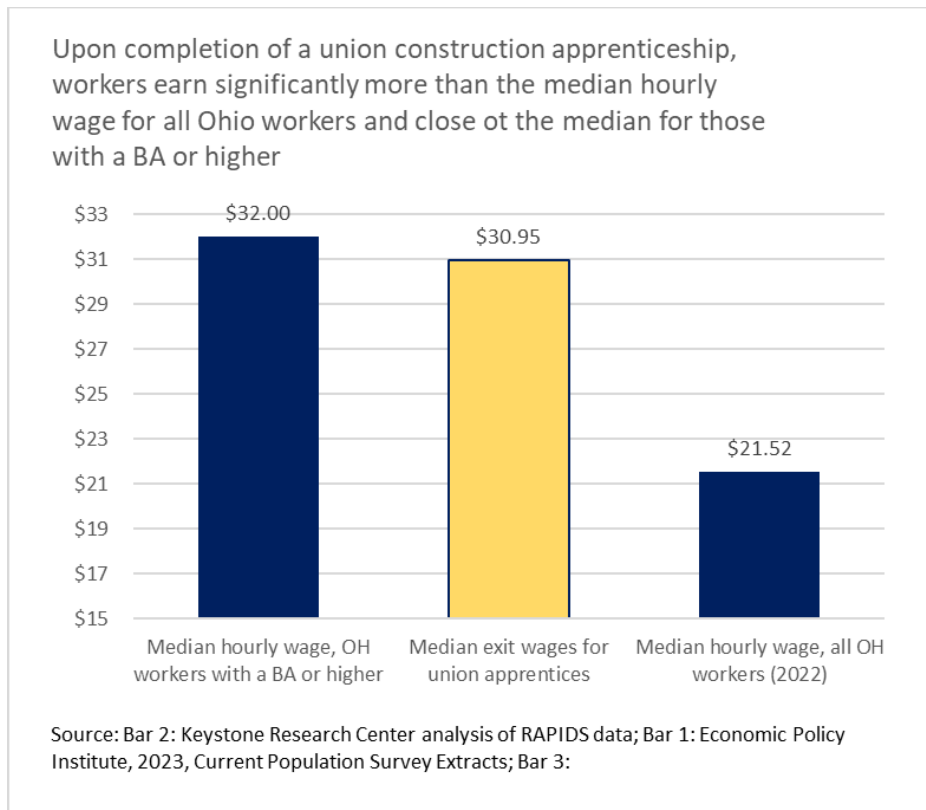


Table 2

Ohio Construction Apprenticeship Completions by Registration Year and Union Status, 2000-2021						
Year	Union			Non-union		
	Completed	Total	Percent Complete	Completed	Total	Percent Complete
2000	1,515	2,873	53%	334	766	44%
2001	1,307	2,500	52%	298	753	40%
2002	1,242	2,406	52%	244	628	39%
2003	1,049	2,114	50%	230	516	45%
2004	1,039	2,378	44%	223	675	33%
2005	1,119	2,314	48%	220	537	41%
2006	1,363	2,699	51%	223	543	41%
2007	1,428	2,930	49%	188	723	26%
2008	1,175	2,324	51%	147	478	31%
2009	536	1,170	46%	117	329	36%
2010	633	1,235	51%	167	444	38%
2011	1,050	2,145	49%	144	448	32%
2012	1,014	2,251	45%	171	467	37%
2013	1,023	2,236	46%	179	460	39%
2014	1,269	2,837	45%	218	534	41%
2015	1,289	2,926	44%	204	570	36%
2016	1,091	2,807	39%	266	665	40%
2017	817	3,518	23%	237	764	31%
2018	439	4,163	11%	71	811	9%
2019	120	4,121	3%	45	992	5%
2020	29	2,860	1%	16	946	2%
2021	2	3,073	0%	6	965	1%
<b>2000-2017</b>	<b>19,959</b>	<b>43,663</b>	<b>46%</b>	<b>3,810</b>	<b>10,300</b>	<b>37%</b>
* Graduation rates fall from 2017 to the present as not enough time has passed for all apprentices registered in those years to graduate. Therefore, we did not include them in the total years assessed.						
Source: Keystone Research Center analysis of Registered Apprenticeship Partners Information Data System (RAPIDS).						

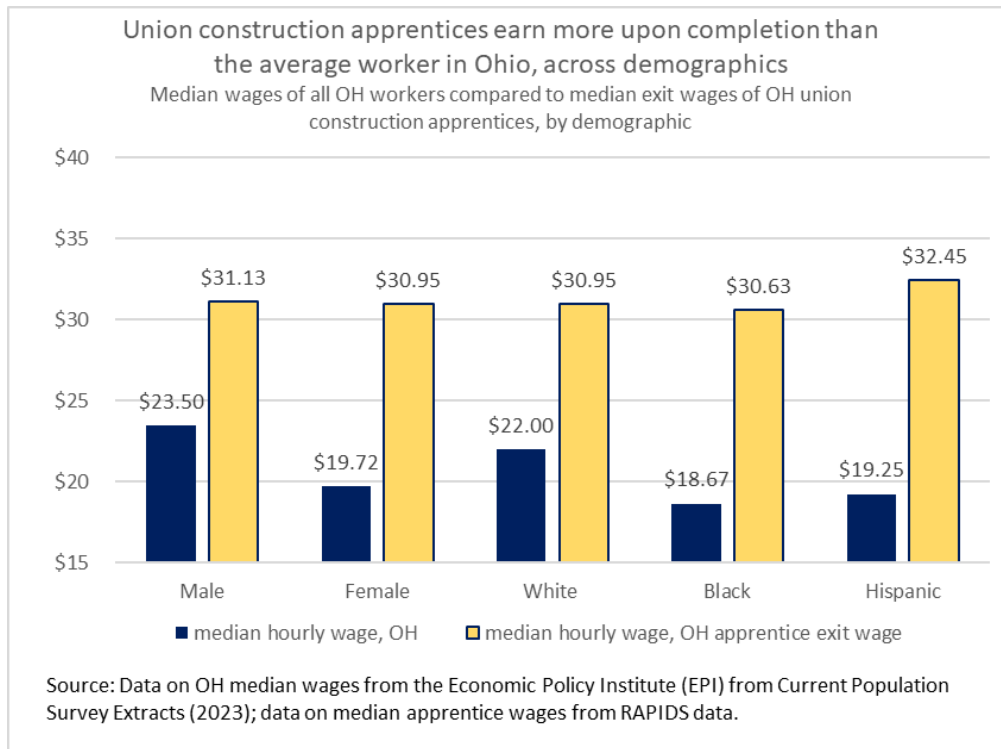
Union construction apprentices earn a good wage upon completion of their program. Union apprentices earn \$30.95 per hour upon completion. This is significantly higher than the median wage for all Ohio workers (\$21.52 per hour) and close to what those with a BA or higher earn in Ohio (\$32.00).

Figure 5



Median hourly wages for construction apprentices completing their programs are higher than the overall median hourly wage for men, women, white, Black, and Hispanic workers in Ohio. As figure 6 below shows, exit hourly wages are significantly higher for each demographic category of apprentice when compared to the median wage of the equivalent group of workers in Ohio. For example, while the median wage for Black workers in Ohio is \$18.67 per hour, Black apprentices earn \$30.63 upon exiting apprenticeship. The wage differences are also large in other demographic groups, especially for women and Hispanic workers.

Figure 6



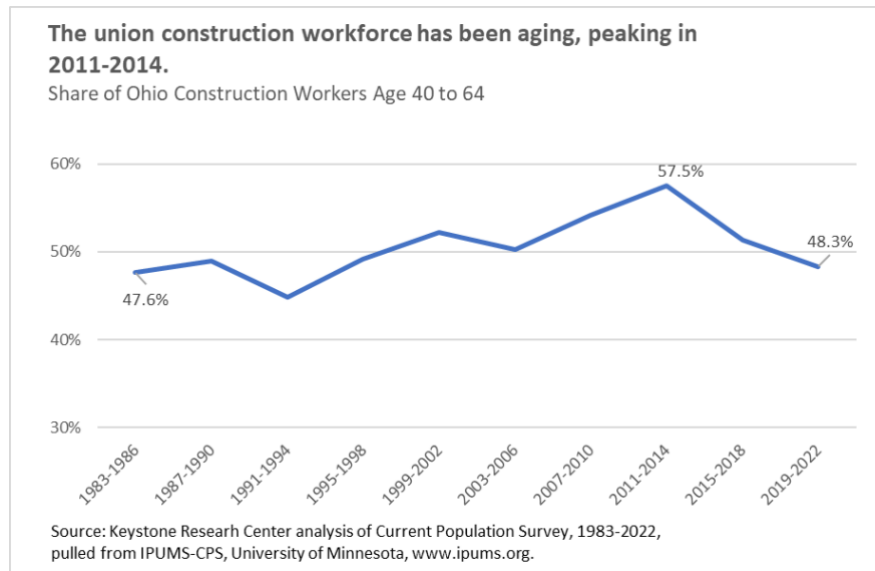
For the 20 Ohio trades with the largest number of apprentices, Table 3 below shows starting wages at the beginning of apprenticeships and exit wages at the completion of apprenticeships. Overall, union apprentices saw an 83.5% increase in their wages over the course of the apprenticeship, from \$16.87 an hour to \$30.95 an hour.

Table 3

Ohio Union Construction Apprenticeship Completers and Their Starting and Exit Wages (2021\$), the Largest 20 Occupations, 2000 to 2022						
	Number of completers	Share of total	Cumulative total	Starting wage	Exit wage	Percent change
ELECTRICIAN (Alternate Title: Interio..	4,591	22.3%	22.3%	\$14.79	\$31.52	113.1%
CARPENTER	3,031	14.8%	37.1%	\$17.10	\$29.61	73.2%
PIPE FITTER (Construction)	1,704	8.3%	45.4%	\$16.75	\$35.01	109.0%
STRUCTURAL STEEL WORKER (Alternate	1,678	8.2%	53.6%	\$19.30	\$30.86	59.9%
OPERATING ENGINEER (Alternate Title:..	1,335	6.5%	60.1%	\$18.62	\$35.02	88.1%
CONSTRUCTION CRAFT LABORER	1,212	5.9%	66.0%	\$19.30	\$32.62	69.0%
PLUMBER	1,183	5.8%	71.7%	\$15.14	\$31.91	110.8%
SHEET METAL WORKER	705	3.4%	75.1%	\$15.48	\$34.24	121.1%
MILLWRIGHT	650	3.2%	78.3%	\$19.45	\$33.22	70.8%
BRICKLAYER	487	2.4%	80.7%	\$18.08	\$30.27	67.4%
ROOFER	448	2.2%	82.9%	\$15.46	\$25.94	67.7%
CEMENT MASON	442	2.2%	85.0%	\$19.76	\$27.98	41.6%
COMPOSITE PLASTIC FABRICATOR	382	1.9%	86.9%	\$17.03	\$33.08	94.2%
HEATING & AIR-CONDITIONER INSTALL/	347	1.7%	88.6%	\$15.90	\$25.39	59.8%
PAINTER (Const)	295	1.4%	90.0%	\$15.51	\$27.10	74.8%
TELECOMMUNICATIONS TECHNICIAN	272	1.3%	91.3%	\$15.43	\$26.80	73.7%
FLOOR LAYER	265	1.3%	92.6%	\$14.82	\$31.01	109.3%
TELECOMMUNICATIONS TECHNICIAN	265	1.3%	93.9%	\$15.76	\$18.62	69.2%
RESIDENTIAL WIREMAN	225	1.1%	95.0%	\$12.34	\$20.88	91.7%
GLAZIER	216	1.1%	96.0%	\$15.38	\$29.49	83.5%
<b>Total</b>	<b>20,547</b>			<b>\$16.87</b>	<b>\$30.95</b>	<b>83.5%</b>
Source: Keystone Research Center analysis of Registered Apprenticeship Partners Information Data System (RAPIDS).						

The unionized construction workforce has aged steadily over the past 35 years, up until recently, as shown below in figure 7. This share of the workforce 40 to 64 peaked in 2011-2014. In more recent years (2015-2022), the workforce has gotten a bit younger as the oldest baby boomers have now retired and younger workers have come into the industry. The workforce remains slightly older than in the 1980s and early 1990s. The combination of a continuing high retirement rate AND the anticipated growth in the industry will create more opportunities for a younger, and more diverse, next generation of construction workers. Investment in quality apprenticeship programs is critical right now as huge federal investments will increase demand for skilled tradespeople.

Figure 7



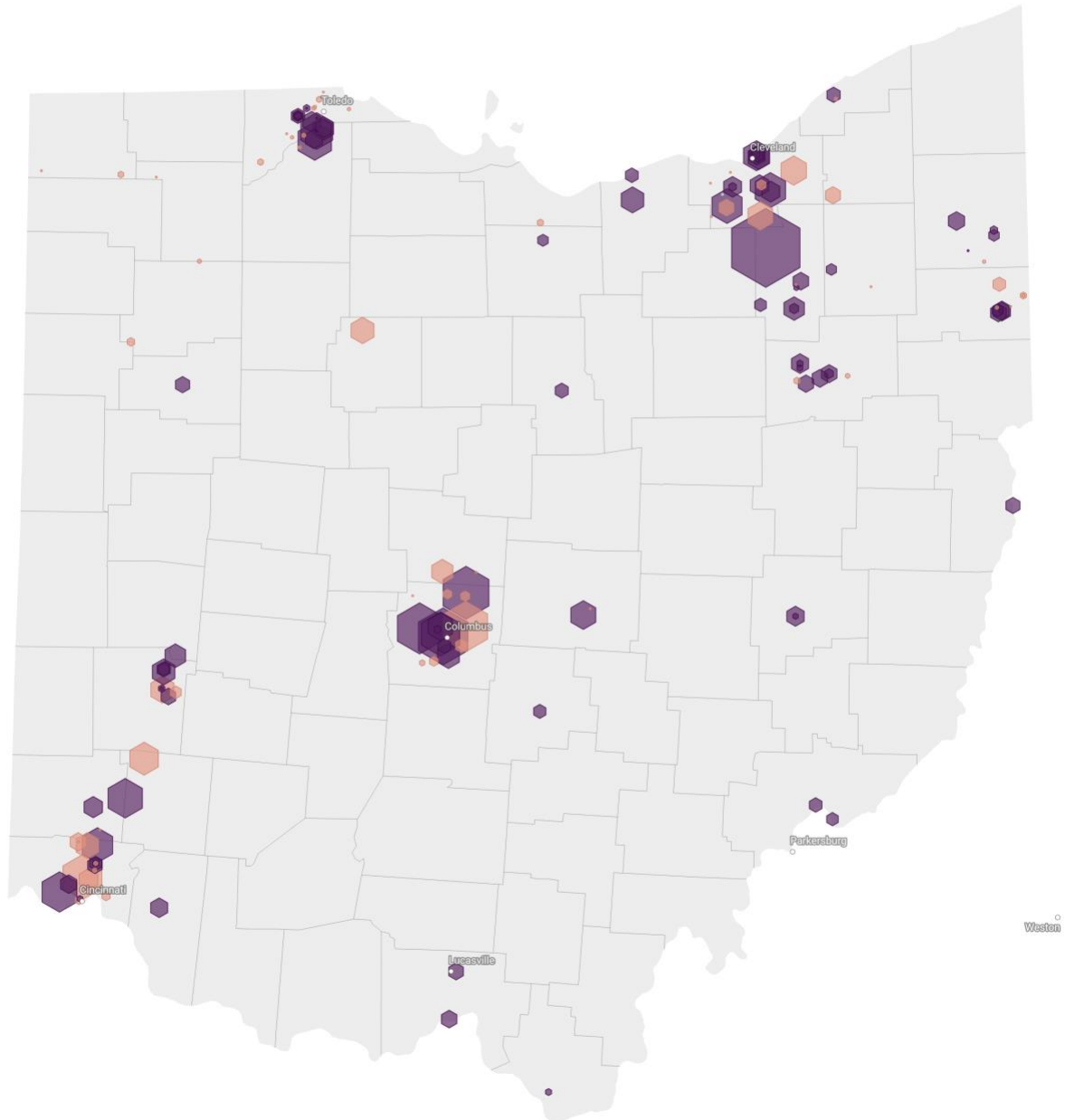
### **Map of Construction Apprenticeships in Ohio**

The map below shows the location of registered construction apprentice and training programs in Ohio. The purple hexagons represent union programs and the peach ones denote nonunion programs. The size of the hexagons represents the number of active apprentices in the program. Both union and non-union programs cluster mostly near Cleveland, Columbus, and Cincinnati, although there are some union (purple) programs in other parts of the state. The union hexagons are larger in most cases because the joint programs train more apprentices. (For more details on the map, including the ability to hover over a program and see program details, go to: [https://www.datawrapper.de/\\_/VgIYJ/](https://www.datawrapper.de/_/VgIYJ/)) The map suggests that there may be a need to increase the number of satellite training locations in more rural parts of the state – although the combination of virtual classes and weekend or summer visits by apprentices to the state’s three largest metropolitan areas may reduce the need for new bricks-and-mortar training locations in rural areas.

Figure 8

**Registered Construction Apprentice Programs in Ohio**

Hexagon size corresponds to number of active apprentices in 2023. Purple hexagons denote union programs, peach denote nonunion. Programs with zero active apprentices are labeled as .05



Keystone Research Center analysis of Registered Apprenticeship Partners Information Database System data  
Created with Datawrapper



### ***Building Futures: A Columbus Pathway Into Construction Careers***

As in Pennsylvania, Ohio has established new pathways into apprenticeship for diverse workers in recent years. One example is Building Futures, a pre-apprenticeship program run as a partnership between Franklin County, Ohio, the Columbus/Central Ohio Building and Construction Trades Council, and the Columbus Urban League.<sup>42</sup> The program runs for 12 weeks and helps individuals from low-income backgrounds overcome barriers of access to achieving middle-class careers in construction. The program recruits, screens, and pre-tests women, minorities, and other targeted disadvantaged populations. It includes credit and non-credit classroom programming that includes basic skills, life skills, and employability skills, as well as supplemental services such as access to transportation, childcare, emergency housing, and work clothing or uniforms. The program delivers trade-specific paid internships. Upon completion of the program, participants can join an affiliated trade, which includes bricklaying, carpentry, cement masonry, drywall finishing, electricians, glaziers, and others.

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<sup>42</sup> This example is based on Amanda K. Woodrum et al., “Maximizing Value: Ensuring Community Benefits,” Reimagine Appalachia. And Stephen Herzenberg et al., “Hiring Local on Transportation Infrastructure Projects in Pennsylvania: Employment, Economic, Fiscal, and Training Impacts,” KRC and Illinois EPI.

Union apprenticeships in Ohio, 2023		
Program Name	City and State	Training for what occupation?
The University Of Akron	Akron, OH	Maintenance Repairer, Industrial
Electricians J.A.T.C., Akron	Akron, OH	Electrician (Alternate Title: Interior Electrician)
Electricians - Residential Wireman J.A.T.C., Akron	Akron, OH	Residential Wireman
Plumbers, Steamfitters & Mes J.A.T.C., Akron	Akron, OH	Heating & Air-Conditioner Install/Ser
Northern Ohio Admin District Co Of Bricklayers	Amherst, OH	Tuckpointer, Cleaner, Caulker
S Ohio & Kentucky Bricklayers & Allied Craftworker	Batavia, OH	Tuckpointer, Cleaner, Caulker
Sheet Metal Workers J.A.T.C., Youngstown	Boardman, OH	Sheet Metal Worker
Plumbers & Pipefitters Mes J.A.T.C., Cambridge	Cambridge, OH	Heating & Air-Conditioner Install/Ser
Plumbers & Pipefitters J.A.T.C., Cambridge	Cambridge, OH	Pipe Fitter (Construction)
Plumbers & Pipefitters J.A.T.C., Canton Area	Canton, OH	Heating & Air-Conditioner Install/Ser
Roofers J.A.T.C., Akron-Canton	Canton, OH	Roofer
Ironworkers J.A.C., Canton Area Lu 550	Canton, OH	Structural Steel Worker (Alternate Titles: Ironworker Or Structural Ironworker)
Plumbers, Fitters & Mes J.A.T.C., L.U. 392	Cincinnati, OH	Plumber
Insulators J.A.C., Cincinnati Area L.U. 8	Cincinnati, OH	Insulation Worker
Composition Roofers J.A.C., Cincinnati	Cincinnati, OH	Roofer
Cincinnati Cement Masons	Cincinnati, OH	Cement Mason
Stationary Engineers J.A.C., Cincinnati	Cincinnati, OH	Stationary Engineer
Iuec, Local 11, J.A.T.C.	Cincinnati, OH	Elevator Constructor (Alternate Title: Elevator Constructor Mechanic)
Electricians J.A.T.C., Cincinnati Area	Cincinnati, OH	Electrician (Alternate Title: Interior Electrician)
Cement Masons J.A.T.C., Cleveland L.U. 404	Cleveland, OH	Cement Mason
Ironworkers J.A.T.C., Cleveland Area L.U. 17	Cleveland, OH	Structural Steel Worker (Alternate Titles: Ironworker Or Structural Ironworker)
Insulation Workers J.A.T.C., Cleveland L.U. 3	Cleveland, OH	Composite Plastic Fabricator (Existing Title: Insulation Worker)
Roofers & Waterproofers J.A.T.C., Cleveland L.U. 44	Cleveland, OH	Roofer
Plasterers Jatc, Cleveland L.U. 80	Cleveland, OH	Plasterer
Laborers Jatc, Cleveland L.U. 310	Cleveland, OH	Construction Craft Laborer
Pipefitters Jatc, Cleveland L.U. 120	Cleveland, OH	Pipe Fitter (Construction)
Plumbers Jatc, Cleveland L.U. 55	Cleveland, OH	Plumber
Operating Engineers J.A.T.C., Ohio	Columbus, OH	Operating Engineer (Alternate Title: Heavy Construction Equipment Mechanic)
Plumbers & Fitters J.A.C., Columbus	Columbus, OH	Pipe Fitter (Construction)
Plasterers J.A.T.C., Columbus	Columbus, OH	Plasterer
Roofers & Waterproofers J.A.T.C., Columbus L.U. 86	Columbus, OH	Roofer
Carpenters J.A.T.C., South Central Ohio District	Columbus, OH	Carpenter
Ironworkers J.A.T.C., Columbus L.U. 172	Columbus, OH	Structural Steel Worker (Alternate Titles: Ironworker Or Structural Ironworker)
Bricklayers J.A.T.C., Columbus L.U. 55	Columbus, OH	Bricklayer (Construction)
The Electrical Trades Center	Columbus, OH	Electrician (Alternate Title: Interior Electrician)
Plumbers & Pipefitters J.A.T.C., Dayton	Dayton, OH	Pipe Fitter (Construction)
Cement Masons J.A.T.C., Dayton	Dayton, OH	Cement Mason
Electricians J.A.T.C., Dayton	Dayton, OH	Electrician (Alternate Title: Interior Electrician)
Contractors Association Of Heat And Frost Insulators J.A.T.C. Local 50 Columbus/Dayton Ohio	Dayton, OH	Pipe Coverer & Insulator
Roofers Local 75 J.A.T.C. Apprentice Program	Dayton, OH	Roofer
Butler County Electrical J.A.T.C.	Hamilton, OH	Electrician (Alternate Title: Interior Electrician)
Cement Masons J.A.T.C., Portsmouth Area	Ironton, OH	Cement Mason
Insulators J.A.T.C., Kent L.U. 84	Kent, OH	Insulation Worker
Cement Masons J.A.T.C., Columbus	Lancaster, OH	Cement Mason
Electricians J.A.T.C., Lima Area L.U. 32	Lima, OH	Electrician (Alternate Title: Interior Electrician)
Electricians J.A.T.C., Lorain County	Lorain, OH	Electrician (Alternate Title: Interior Electrician)
Electricians J.A.T.C., Portsmouth	Lucasville, OH	Electrician (Alternate Title: Interior Electrician)
Electricians J.A.T.C., Mansfield	Mansfield, OH	Electrician (Alternate Title: Interior Electrician)
Plumbers & Pipefitters J.A.T.C., Marietta	Marietta, OH	Pipe Fitter (Construction)
Electricians J.A.T.C., Marietta	Marietta, OH	Electrician (Alternate Title: Interior Electrician)
Sheet Metal Workers J.A.T.C., Akron L.U. 33	Massillon, OH	Sheet Metal Worker
Canton Electrical Telecommunications J.A.T.C.	Massillon, OH	Telecommunications Technician (Alternate Title: Broadband Technician)
Electricians J.A.T.C., Canton	Massillon, OH	Electrician (Alternate Title: Interior Electrician)
Electricians - Residential Wireman J.A.T.C., Canton	Massillon, OH	Residential Wireman
Electricians J.A.T.C., Lake/Ashtabula/Geauga	Mentor, OH	Electrician (Alternate Title: Interior Electrician)
Carpenters J.A.T.C., Southwest Ohio	Monroe, OH	Carpenter
Electricians J.A.T.C., Newark	Nashport, OH	Electrician (Alternate Title: Interior Electrician)
Toledo Area Heating & Air Conditioning Mechanical Equipment	Northwood, OH	Heating & Air-Conditioner Install/Ser
Piping Industry Training Center	Northwood, OH	Pipe Fitter (Construction)
Plasterers & Cement Masons J.A.T.C., Akron Lu 109	Norton, OH	Cement Mason
Plumbers & Steamfitters J.A.C., Norwalk Area	Norwalk, OH	Plumber
Sheet Metal Workers J.A.T.C., Vermilion Lu 33	Parma, OH	Sheet Metal Worker
Sheet Metal Workers J.A.T.C., Cleveland Lu 33	Parma, OH	Sheet Metal Worker
Plumbers & Pipefitters J.A.T.C., Portsmouth	Portsmouth, OH	Pipe Fitter (Construction)
Carpenters J.A.T.C., Northeast Ohio	Richfield, OH	Carpenter
Sheet Metal Workers J.A.T.C., Toledo Area	Rossford, OH	Sheet Metal Worker
Electricians J.A.T.C., Toledo	Rossford, OH	Electrician (Alternate Title: Interior Electrician)
Carpenters J.A.T.C., Northwest Ohio	Rossford, OH	Carpenter
Electricians J.A.T.C., Steubenville	Steubenville, OH	Electrician (Alternate Title: Interior Electrician)
Finishing Trades Institute Of The Ohio Region	Strongsville, OH	Drywall Finisher (Existing Title: Taper)
Ironworkers J.A.C., Dayton	Tipp City, OH	Structural Steel Worker (Alternate Titles: Ironworker Or Structural Ironworker)
Ironworkers J.A.T.C., Toledo Area	Toledo, OH	Structural Steel Worker (Alternate Titles: Ironworker Or Structural Ironworker)
Insulators J.A.C., Toledo Area L.U. 45	Toledo, OH	Composite Plastic Fabricator (Existing Title: Insulation Worker)
Roofers J.A.C., Toledo Area	Toledo, OH	Roofer
Cement Masons & Plasterers J.A.C., Toledo Area	Toledo, OH	Cement Mason
Bricklayers & Tile Setters J.A.C., Toledo Area	Toledo, OH	Bricklayer (Construction)
Electricians J.A.T.C., Cleveland	Valley View, OH	Electrician (Alternate Title: Interior Electrician)
Cement Masons J.A.T.C., Mahoning, Columbiana, & Trumbull	Vienna, OH	Cement Mason
Roofers & Waterproofers J.A.C., Youngstown Area	Vienna, OH	Roofer
Electrical J.A.T.C., Warren	Warren, OH	Electrician (Alternate Title: Interior Electrician)
Construction Craft Laborers Heavy Highway / Building	Westerville, OH	Construction Craft Laborer
Electricians J.A.T.C., Youngstown Area	Youngstown, OH	Electrician (Alternate Title: Interior Electrician)
Plumbers & Pipefitters J.A.T.C., Mahoning Valley	Youngstown, OH	Pipe Fitter (Construction)
Plumbers & Pipefitters J.A.T.C., Mahoning Valley	Youngstown, OH	Plumber
Ironworkers J.A.T.C., Mahoning Valley	Youngstown, OH	Structural Steel Worker (Alternate Titles: Ironworker Or Structural Ironworker)

Source: Keystone Research Center analysis of RAPIDS data.

# On-Ramps to Construction Careers in Kentucky

## Federal Funding Provides an Opportunity to Grow Apprenticeships and Create Pathways to Quality Jobs

Over the past half century, the Appalachian region, or coal country, has experienced a devastating loss of good manufacturing and extraction jobs. The economic impact and human costs of this restructuring can be seen in declining and stagnant wages and collapsing labor force participation rates, as workers become discouraged from participating in the job market.<sup>43</sup>

Today, however, we have an unprecedented opportunity to create more good jobs for Kentucky workers of every gender, race/ethnicity, and background. Massive federal investments in climate infrastructure will create a boom in construction, land restoration, and agroforestry jobs, one that coincides with the retirement of the youngest post-World War II baby boomers. Moreover, by linking joint labor-management apprenticeship and apprenticeship prep programs to unionized construction, we can create pathways to high-paying careers, including for low-income rural workers, people of color, women, and returning citizens. The income earned in these careers and the dignity that comes from making a vital contribution to society – as an essential worker of climate response – can help revitalize and restore hope to communities across Appalachia coal country.

### Apprenticeship has many benefits for the Appalachian region

Unionized construction, in particular, is good at training skilled workers and creating family-sustaining jobs. Of the four states we examined, Kentucky has the third largest employment in private construction—significantly smaller than Pennsylvania and Ohio, but larger than West Virginia. About 15% of these workers are members of a labor union. For reasons explained in the Pennsylvania brief, however, union density blue-collar trades in non-residential construction is likely more like 30%.

Table 1

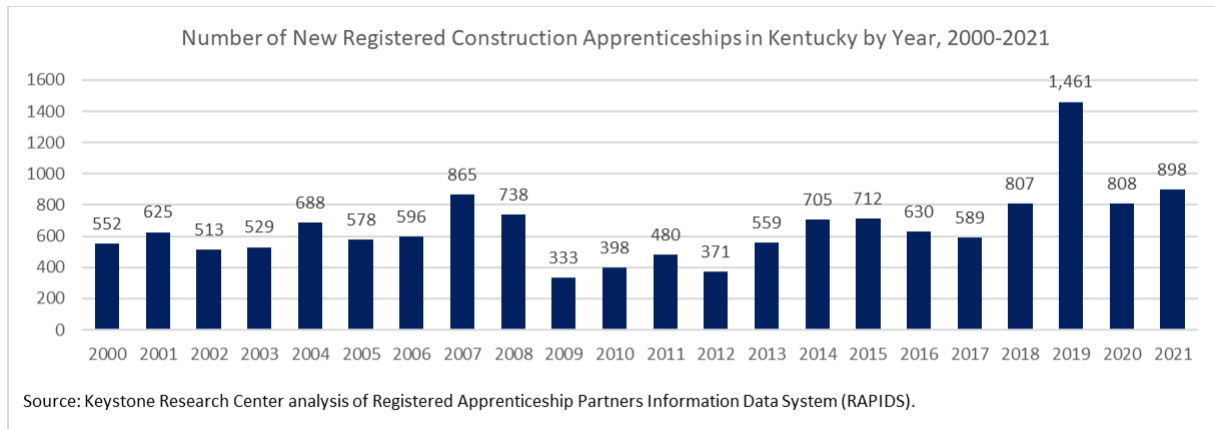
Employment in and unionization in private construction by state, 2021			
	Employment in Private Construction	Represented by a Union	% Represented by a Union
Kentucky	61,703	9,496	15.4
Ohio	244,511	36,618	15.0
Pennsylvania	291,020	81,312	27.9
West Virginia	29,356	4,172	14.2
NOTE: Union density is even higher among blue-collar trades.			
Source: Data from unionstats.com and come from Current Population Survey (CPS) Outgoing Rotation Group (ORG) Earning Files, 2021.			

<sup>43</sup> Claire Kovach, Stephen Herzenberg, Amanda Woodrum, Ted Boettner, “Targeted Employment: Reconnecting Appalachia’s Disconnected Workforce,” Reimagine Appalachia, Keystone Research Center, Ohio River Valley Institute, July 2023; [https://reimagineappalachia.org/wp-content/uploads/2023/07/Repot\\_Targeted-Employment\\_FINAL.pdf](https://reimagineappalachia.org/wp-content/uploads/2023/07/Repot_Targeted-Employment_FINAL.pdf).

## A Profile of Construction Apprenticeship in Kentucky

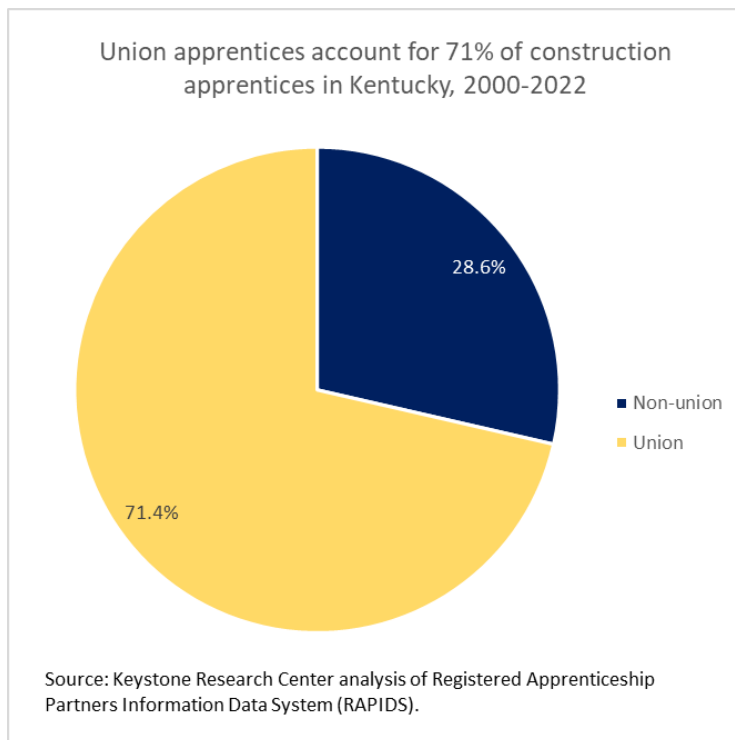
Employment and apprenticeship registrations in construction are driven by the business cycle. When employment opportunities are limited, there will naturally be less need to bring on and train new workers. Recessions and slow recoveries from recession result in a decrease in apprenticeship registrations, as figure 1 shows. The Kentucky apprenticeship numbers show a minor dip in new apprentices after the 2001 recession, a more significant dip after the 2008 recession and then a large decrease once the pandemic hit in 2020.

Figure 1



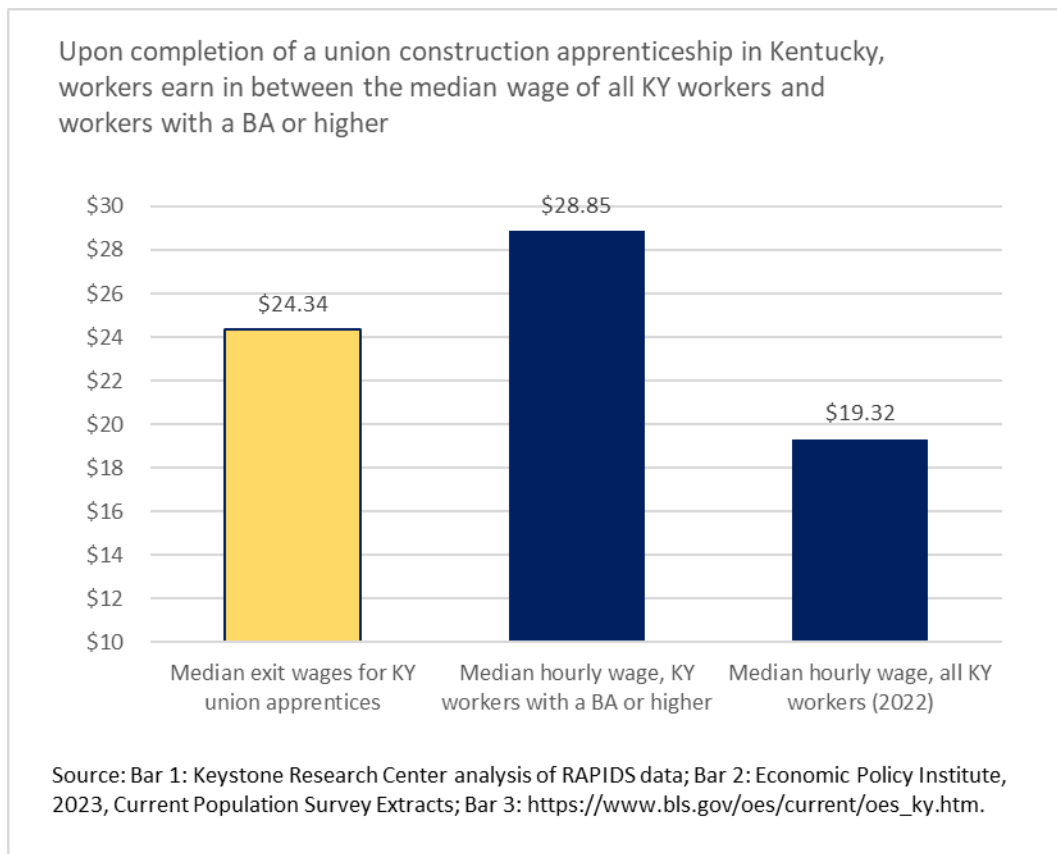
In Kentucky, most construction apprentices (71%) in the past two decades were trained in union apprenticeships.

Figure 2



Union construction apprentices earn a good wage upon completion of their program, earning a median of \$24.34 per hour. The median wage of apprentices in Kentucky is in between the median wage for all Kentucky workers (\$19.32 per hour) and those with a BA or higher (\$28.85).

Figure 3



Median hourly wages for construction apprentices completing their programs exceed the overall median hourly wage for men, women, white, and Hispanic workers in Kentucky by \$3 to \$4 per hour (figure 4). For Black workers, apprenticeship completers earn \$5.54 more per hour than Black workers in the workforce as a whole.

Figure 4

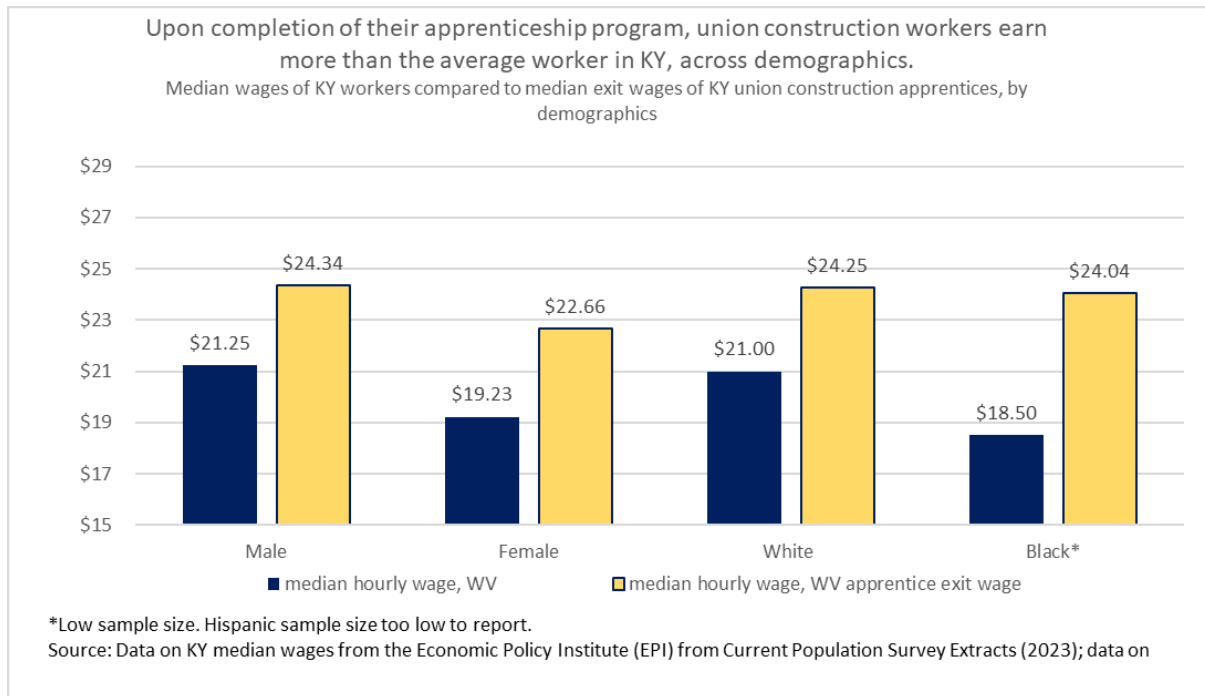


Table 2 below shows starting wages at the beginning of apprenticeship and exit wages at the completion of apprenticeship in the 20 construction occupations with the most apprentices. Overall, in the past two decades, union construction apprentices saw a 75% increase in their wages over the course of their apprenticeship, from \$16.50 an hour to \$28.83 an hour.



Table 2

<b>Kentucky Union Construction Apprenticeship Completers and Their Starting* and Exit Wages* (2021\$), 2000 to 2022</b>						
	Number of completers	Share of total	Cumulative total	Starting wage*	Exit wage*	Percent change
ELECTRICIAN (Alternate Title: Interio..	1,126	29.3%	29.3%	\$15.41	\$24.15	56.7%
PIPE FITTER (Construction)	721	18.8%	48.1%	\$17.47	\$34.37	96.7%
PLUMBER	530	13.8%	61.9%	\$19.10	\$33.45	75.1%
STRUCTURAL STEEL WORKER (Alternate 1	350	9.1%	71.0%	\$20.56	\$33.91	64.9%
CONSTRUCTION CRAFT LABORER	265	6.9%	77.9%	\$15.84	\$19.47	22.9%
SHEET METAL WORKER	185	4.8%	82.7%	\$16.31	\$33.06	102.7%
OPERATING ENGINEER (Alternate Title:.	182	4.7%	87.4%	\$19.57	\$32.08	63.9%
COMPOSITE PLASTIC FABRICATOR (Existi	96	2.5%	89.9%	\$14.92	\$19.00	27.3%
MILLWRIGHT	58	1.5%	91.4%	\$29.24	\$36.35	24.3%
CARPENTER	36	0.9%	92.3%	\$24.72	\$30.52	23.4%
ELEVATOR CONSTRUCTOR (Alternate Titl	33	0.9%	93.2%	\$23.87	\$44.33	85.7%
WELDER-FITTER	27	0.7%	93.9%	\$16.47	\$34.37	108.7%
PAINTER (Const)	24	0.6%	94.5%	\$13.12	\$13.55	3.2%
ENVIRONMENTAL CONTROL SYST. INSTA	22	0.6%	95.1%	\$16.26	\$34.78	113.9%
PIPEFITTING	8	0.2%	95.3%	\$21.21	\$35.24	66.2%
ROOFER	8	0.2%	95.5%	\$16.26	\$25.82	58.8%
<b>TOTAL*</b>	<b>3,843</b>			<b>\$16.50</b>	<b>\$28.83</b>	<b>74.7%</b>
*Median starting and exit wages were just pulled for 2011 to 2021 because prior to that, Kentucky was not consistently recording the starting wages. Number of completers includes all completers going back to 2000. Source: Keystone Research Center analysis of Registered Apprenticeship Partners Information Data System (RAPIDS).						

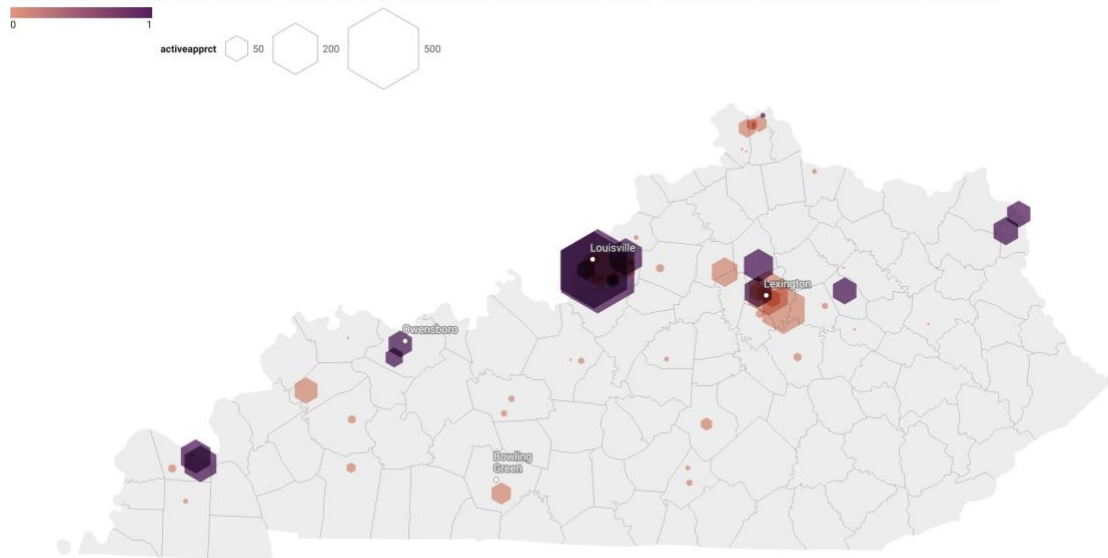
### **Map of Construction Apprenticeships in Kentucky**

The map below shows the location of registered construction apprentice and training programs in Kentucky. The purple hexagons represent union programs and the peach ones denote nonunion programs. The size of the hexagons represents the number of active apprentices in the program. Both union and non-union programs cluster mostly near Louisville and Lexington, although small non-union programs are scattered throughout most of the western two thirds of the state. The union hexagons are larger in most cases because joint programs train more apprentices. (For more details on the map, including the ability to hover over a program and see program details, go to: [https://www.datawrapper.de/\\_/YPT46/?v=2](https://www.datawrapper.de/_/YPT46/?v=2)) The map suggests that there may be a need to satellite training locations for some union apprenticeships in more rural parts of the state – although the combination of virtual classes and weekend or summer visits by apprentices to the state’s two largest metropolitan areas may reduce the need for new bricks-and-mortar training locations in rural areas.

Figure 5

#### Registered Construction Apprentice Programs in Kentucky

Hexagon size corresponds to number of active apprentices in 2023. Purple hexagons denote union programs, peach denote nonunion. Programs with zero active apprentices are labeled as .05



Keystone Research Center analysis of Registered Apprenticeship Partners Information Database System data  
Created with Datawrapper

#### ***Kentuckiana Builds: A Louisville Pathway Into Construction Careers***

As in Pennsylvania, Kentucky has established new pathways into apprenticeship for diverse workers in recent years. One example is featured at a White House virtual summit in July 2022 was Louisville’s Kentuckiana Builds pre-apprenticeship program.<sup>44</sup> The program is run by the Louisville Urban League and has helped over 350 diverse residents access good construction jobs, including apprenticeships with the International Brotherhood of Electrical Workers (IBEW) and the Carpenters Unions. Across the country, the North American Building Trades Unions (NABTU) have helped establish more than 190 apprenticeship readiness programs.

<sup>44</sup> White House, “FACT SHEET: White House Announces over \$40 Billion in American Rescue Plan Investments in Our Workforce – With More Coming,” 2022; <https://www.whitehouse.gov/briefing-room/statements-releases/2022/07/12/fact-sheet-white-house-announces-over-40-billion-in-american-rescue-plan-investments-in-our-workforce-with-more-coming/>.

# On-Ramps to Construction Careers in West Virginia

## Federal Funding Provides an Opportunity to Grow Apprenticeships and Create Pathways to Quality Jobs

Over the past half century, the Appalachian region, or coal country, has experienced a devastating loss of good manufacturing and extraction jobs. The economic impact and human costs of this restructuring can be seen in declining and stagnant wages and collapsing labor force participation rates, as workers become discouraged from participating in the job market.<sup>45</sup> These employment trends have both contributed to, and been exacerbated by, the opioid crisis and “deaths of despair.”

Today, however, we have an unprecedented opportunity to create more good jobs for West Virginia workers of every gender, race/ethnicity, and background. Massive federal investments in climate infrastructure will create a boom in construction, land restoration, and agroforestry jobs, one that coincides with the retirement of the youngest post-World War II baby boomers. Moreover, joint labor-management apprenticeship and apprenticeship prep programs connected to unionized construction firms can create pathways to these high-paying careers, including for low-income rural workers, people of color, women, and returning citizens. The income earned in these careers and the dignity that comes from making a vital contribution to society – as an essential worker of climate response – can help revitalize and restore hope to communities across the coal-country region of Appalachia.

### Apprenticeship has many benefits for the Appalachian region

Unionized construction, in particular, is good at training skilled workers and creating family-sustaining jobs. Of the four states we examined, West Virginia has the smallest employment in private construction, with over 29,000 construction workers. About 14% of these workers are members of a labor union. As explained in the Pennsylvania section of this report, however, union density among trades workers in non-residential construction is likely more like twice 14%, a little under a third.

*Table 1*

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<sup>45</sup> Claire Kovach, Stephen Herzenberg, Amanda Woodrum, Ted Boettner, “Targeted Employment: Reconnecting Appalachia’s Disconnected Workforce,” Reimagine Appalachia, Keystone Research Center, Ohio River Valley Institute, July 2023; [https://reimagineappalachia.org/wp-content/uploads/2023/07/Repot\\_Targeted-Employment\\_FINAL.pdf](https://reimagineappalachia.org/wp-content/uploads/2023/07/Repot_Targeted-Employment_FINAL.pdf).

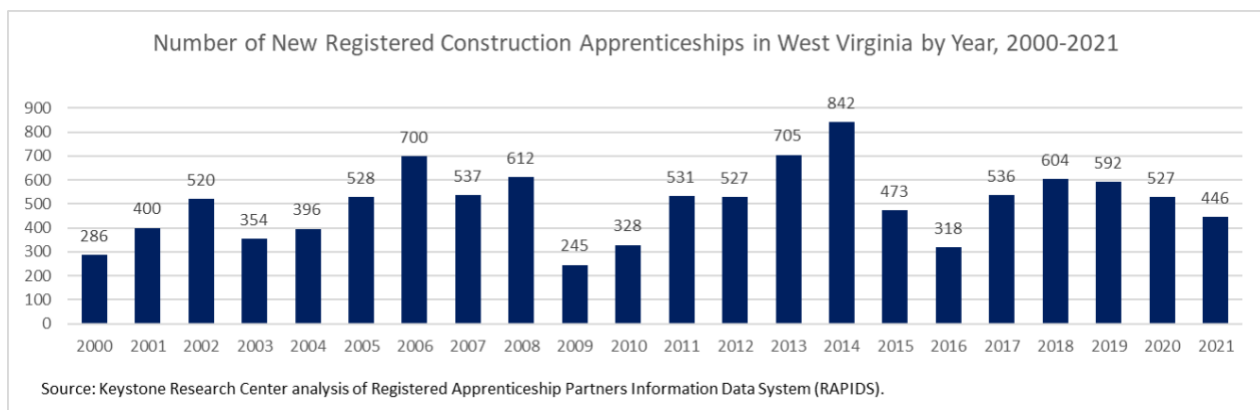
<b>Employment in and unionization in private construction by state, 2021</b>			
	Employment in Private Construction	Represented by a Union	% Represented by a Union
Kentucky	61,703	9,496	15.4
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Pennsylvania	291,020	81,312	27.9
West Virginia	29,356	4,172	14.2

NOTE: Union density is even higher among blue-collar trades.  
Source: Data from unionstats.com and come from Current Population Survey (CPS) Outgoing Rotation Group (ORG) Earning Files, 2021.

## A Profile of Construction Apprenticeship in West Virginia

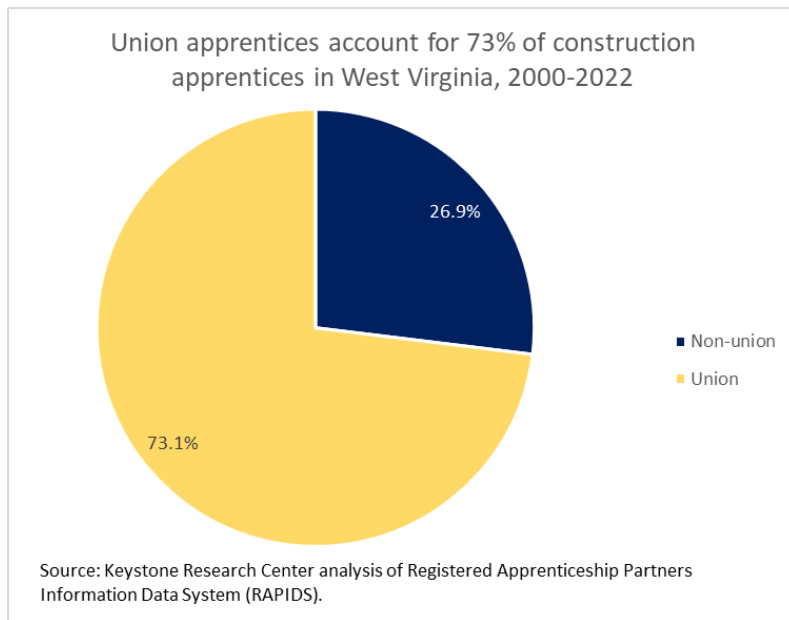
Employment and apprenticeship registrations in West Virginia construction are driven by the business cycle and sometimes by the booms and busts of extractive industries. When employment opportunities are limited, there will naturally be less need to bring on and train new workers. Figure 1 shows a big dip in construction registrations in the Great Recession but then a relatively rapid increase in 2011 and continuing to 2014 followed by a big drop off in 2015-16. The trends from 2011-16 may reflect, in part, a growth then decline in fracking-related jobs and pipeline work. Apprenticeship intake then recovered in 2018 and 2019 before dropping off in the pandemic.

Figure 1



In West Virginia, most construction apprentices (73%) over the past two decades were trained in union apprenticeships.

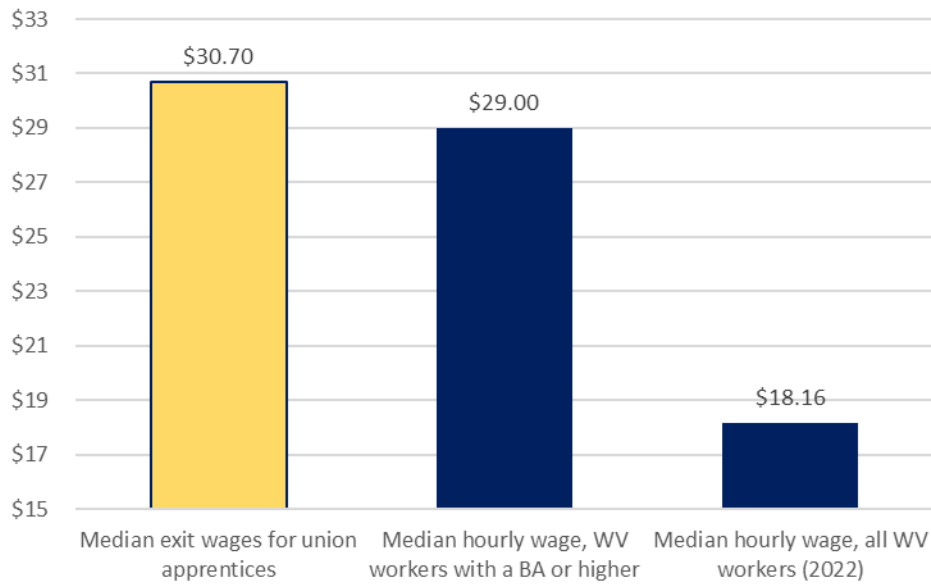
Figure 2



Union construction apprentices earn a good wage upon completion of their program, a median of \$30.70 per hour. This is significantly higher than the median wage for all West Virginia workers (\$18.16 per hour) and slightly more than the median wage for all West Virginians with a four-year college degree (\$29.00).

Figure 3

Upon completion of a union construction apprenticeship in West Virginia, workers earn significantly more than the median wage of all WV workers AND more than workers with a BA or higher



Source: Bar 1: Keystone Research Center analysis of RAPIDS data; Bar 2: Economic Policy Institute, 2023, Current Population Survey Extracts; Bar 3: [https://www.bls.gov/oes/current/oes\\_wv.htm](https://www.bls.gov/oes/current/oes_wv.htm)

Median hourly wages for construction apprentices completing their programs are higher than the overall median hourly wage for men, women, white, Black, and Hispanic workers in West Virginia (figure 4). For example, while the median wage for women is \$18.55 per hour, female apprentices earn \$29.29 upon exit from their apprenticeship.

Figure 4



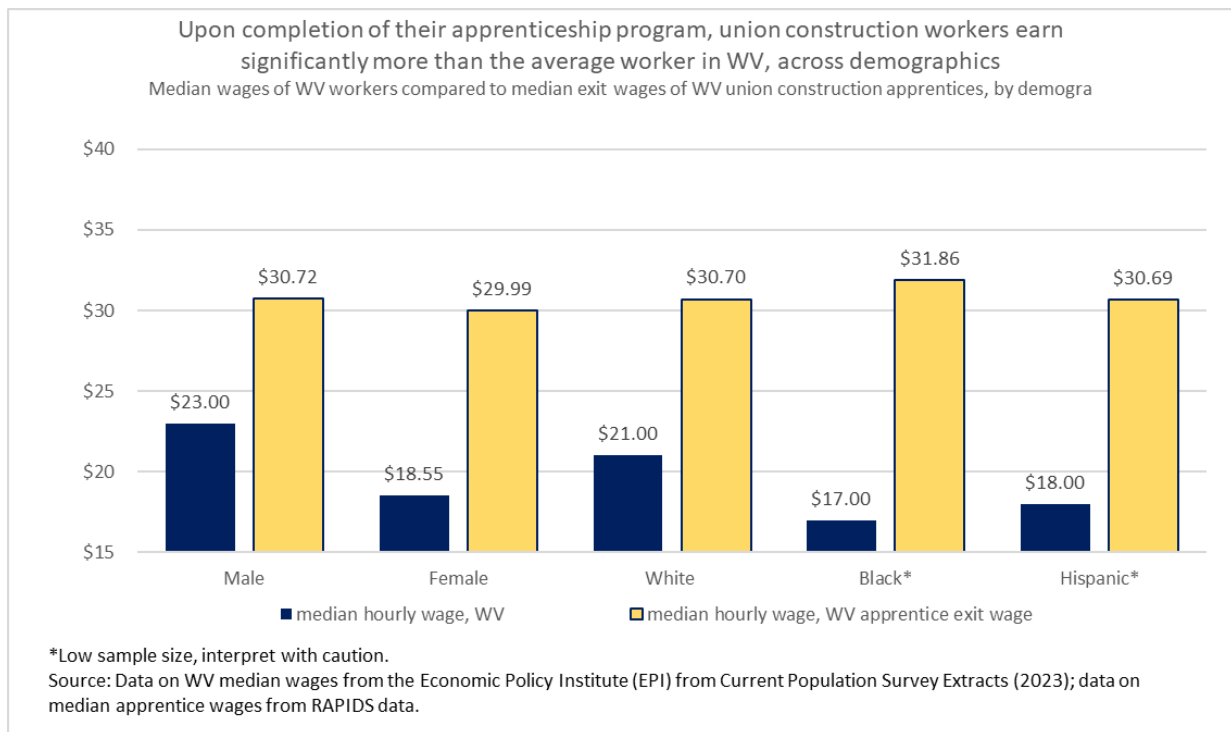


Table 2 below shows the starting wages at the beginning of apprenticeship and exit wages at the completion of apprenticeship for the 20 trades occupations with the largest number of apprentices. Overall, union apprentices saw a 70% increase in their wages over the course of the apprenticeship, from \$18.06 an hour to \$30.70 an hour.

Table 2

**West Virginia Union Construction Apprenticeship Completers and Their Starting and Exit Wages (2021\$), the Largest 20 Occupations, 2000 to 2022**

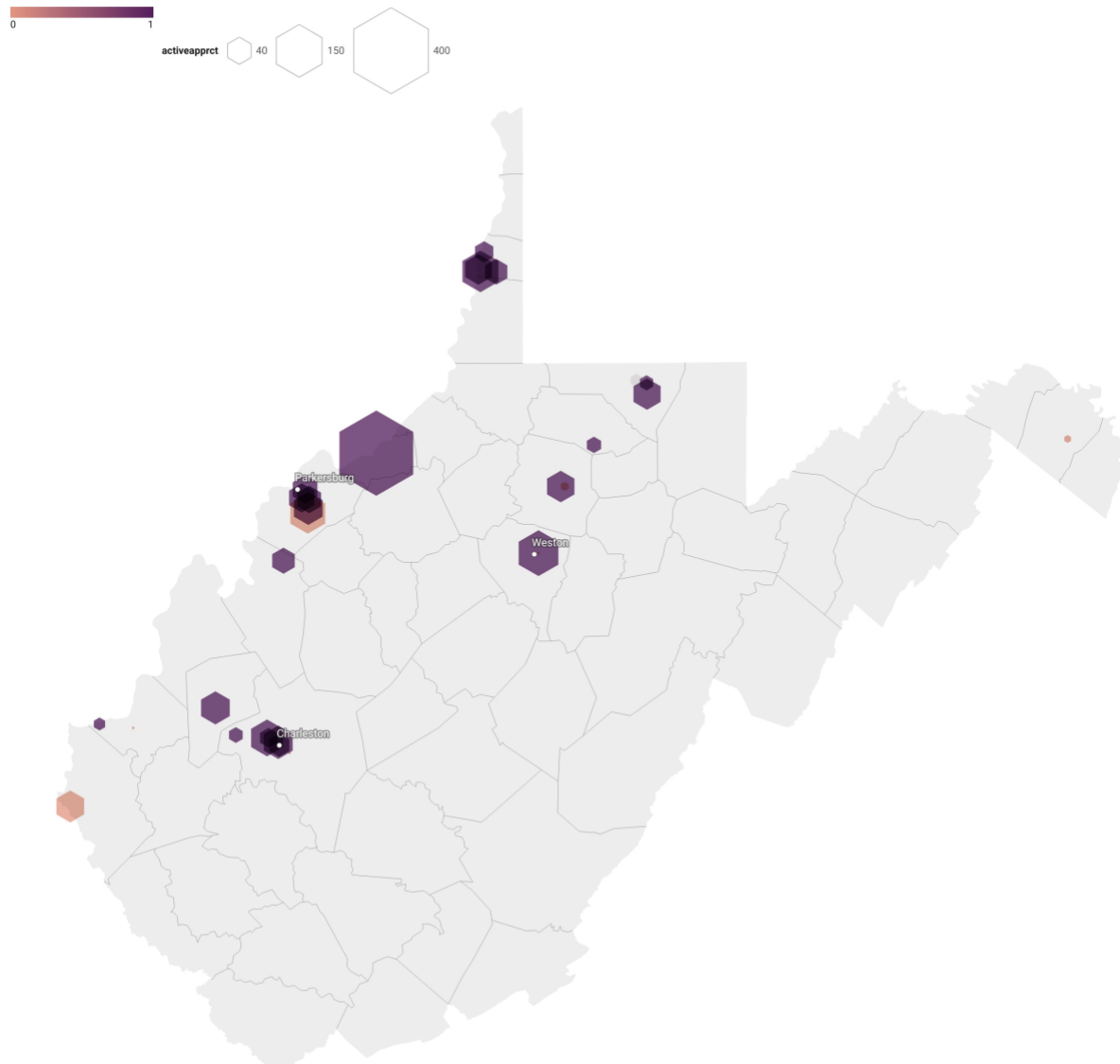
	Number of completers	Share of total	Cumulative total	Starting wage	Exit wage	Percent change
ELECTRICIAN (Alternate Title: Interio..	606	19.0%	19.0%	\$15.44	\$32.52	110.6%
PIPE FITTER (Construction)	552	17.3%	36.4%	\$17.78	\$35.42	99.3%
STRUCTURAL STEEL WORKER (Alternate Ti..	512	16.1%	52.4%	\$19.27	\$29.97	55.5%
CARPENTER	416	13.1%	65.5%	\$19.12	\$29.44	54.0%
ROOFER	233	7.3%	72.8%	\$15.88	\$30.62	92.8%
OPERATING ENGINEER (Alternate Title:..	182	5.7%	78.5%	\$19.36	\$23.04	19.0%
CONSTRUCTION WORKER I	148	4.6%	83.2%	\$18.74	\$35.18	87.8%
PAINTER (Const)	134	4.2%	87.4%	\$13.27	\$24.45	84.2%
PLUMBER	106	3.3%	90.7%	\$18.42	\$37.78	105.1%
BRICKLAYER (Construction)	54	1.7%	92.4%	\$16.85	\$31.32	85.9%
ELEVATOR CONSTRUCTOR (Alternate Title..	54	1.7%	94.1%	\$24.23	\$41.22	70.1%
GLAZIER	41	1.3%	95.4%	\$16.07	\$29.61	84.3%
PIPE COVERER & INSULATOR	32	1.0%	96.4%	\$25.88	\$33.91	31.0%
CEMENT MASON	31	1.0%	97.4%	\$20.69	\$22.72	9.8%
COMPOSITE PLASTIC FABRICATOR (Existin..	29	0.9%	98.3%	\$18.19	\$35.70	96.3%
HEATING & AIR-CONDITIONER INSTALL/SER	17	0.5%	98.8%	\$20.27	\$37.62	85.6%
TAPER (Alternate Title: Drywall Finis..	13	0.4%	99.2%	\$13.61	\$25.63	88.4%
PAINTER, INDUST COATING AND LINING AP..	8	0.3%	99.5%	\$17.45	\$30.14	72.7%
RESIDENTIAL CARPENTER	4	0.1%	99.6%	\$10.78	\$20.93	94.2%
RESIDENTIAL WIREMAN	4	0.1%	99.7%	\$9.88	\$9.24	-6.4%
<b>TOTAL*</b>	<b>3,184</b>			<b>\$18.06</b>	<b>\$30.70</b>	<b>70.0%</b>

\* The total number of completers is more than the listed occupations because this table only includes the top 20 occupations.  
Source: Keystone Research Center analysis of Registered Apprenticeship Partners Information Data System (RAPIDS).

Figure 5

### Registered Construction Apprentices Programs in West Virginia

Hexagon size corresponds to number of active apprentices in 2023. Purple hexagons denote union programs, peach denote nonunion. Programs with zero active apprentices are labeled as .05



Keystone Research Center analysis of Registered Apprenticeship Partners Information Database System data  
Created with Datawrapper

For a more detailed and interactive map, go here: [https://www.datawrapper.de/\\_/O80gL/?v=5](https://www.datawrapper.de/_/O80gL/?v=5)

Union apprenticeships in West Virginia, 2023		
Program Name	City and State	Training for what occupation?
Charleston Roofers J.A.T.C.	Charleston, WV	Roofer
Charleston Joint Apprenticeship	Charleston, WV	Plumber
I.U.E.C. Local #48 Joint Apprenticeship Committee	Charleston, WV	Elevator Constructor (Alternate Title: Elevator Constructor Mechanic)
Charleston Electrical, J.A.T.C.	Charleston, WV	Electrician (Alternate Title: Interior Electrician)
Clarksburg I.B.E.W. J.A.T.C.	Clarksburg, WV	Electrician (Alternate Title: Interior Electrician)
Huntington Plumbers & Pipefitters Local 521 J.A.T.C.	Huntington, WV	Pipe Fitter (Construction)
Central J.A.C. & Roofers L.U. #242	Mineral Wells, WV	Roofer
Morgantown Plumbers J.A.T.C.	Morgantown, WV	Plumber
Pennline - Tri County Electrical Contractors	Morgantown, WV	Electrician (Alternate Title: Interior Electrician)
Mid-Atlantic Regional Council Of Carpenters, J.A.T.C.	Parkersburg, WV	Carpenter
Parkersburg I.B.E.W. J.A.T.C.	Parkersburg, WV	Electrician (Alternate Title: Interior Electrician)
Parkersburg Iron Workers J.A.T.C.	Parkersburg, WV	Structural Steel Worker (Alternate Titles: Ironworker Or Structural Ironworker)
Parkersburg Plumbers J.A.T.C.	Parkersburg, WV	Pipe Fitter (Construction)
Wv Operating Engineers J.A.T.C.	Ravenswood, WV	Operating Engineer (Alternate Title: Heavy Construction Equipment Mechanic)
Orders Construction Company Inc J.A.C.	St. Albans, WV	Form Builder Carpenter (Existing Title: Form Builder)
Finishing Trades Institute Of West Virginia Region (F.T.I. Of Wv Region)	Weston, WV	Painter, Indust Coating And Lining App Specialist
Wheeling Plumbers J	Wheeling, WV	Pipe Fitter (Construction)
Wheeling Area Roofers	Wheeling, WV	Roofer
Wheeling Iron Workers Local 549 J.A.T.C.	Wheeling, WV	Structural Steel Worker (Alternate Titles: Ironworker Or Structural Ironworker)
Wheeling Elect. J.A.T.C.	Wheeling, WV	Electrician (Alternate Title: Interior Electrician)
Bricklayers & Allied Craftsmen District Council Of Wv J.A.T.C.	Whitehall, WV	Bricklayer (Construction)
Source: Keystone Research Center analysis of RAPIDS data.		