Apprenticeship as a Career Development Alternative

Enrollment, Hours, and Earnings in Registered Apprenticeship Programs in Wisconsin

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Executive Summary

Registered apprenticeships are training programs in which participants get the opportunity to "earn while they learn" with tuition costs covered by employers or joint labor-management organizations, who gain access to a pool of skilled workers. Apprenticeship training is especially important to the construction industry.

Joint labor-management programs account for the vast majority of registered apprenticeship training, investment, and diversity in Wisconsin's construction industry.

- Joint labor-management programs are cooperatively administered and have standards, wages, and "cents per hour" financing that are negotiated privately between contractors and unions.
- In 2018, nearly 7,500 construction apprentices (81 percent) were enrolled in joint labor-management programs compared to fewer than 1,800 in employer-only programs.
- Joint construction programs enrolled 85 percent of all women, 89 percent of all Black and African American apprentices, 86 percent of all Hispanic and Latinx apprentices, and 85 percent of all military veterans training for careers in the construction trades.
- Joint labor-management programs account for 95 percent of all training investments in Wisconsin's construction workforce.
- Joint labor-management programs invest $5,600 per construction apprentice—nearly five times as much as employer-only programs ($1,200 per construction apprentice).

Joint labor-management (union) apprenticeship programs deliver training and wage outcomes that far exceed employer-only (nonunion) programs and rival the state's public universities.

- On average, construction apprentices are required to complete 41 percent more hours of on-the-job and classroom training than bachelor's degree students at the University of Wisconsin and 183 percent more hours than students pursuing associate degrees at Wisconsin's technical colleges.
- Experienced-level journeyworkers earn average incomes of more than $67,200 annually—on par with average annual earnings for workers with bachelor's degrees ($69,500).
- Union journeyworkers graduating from joint construction programs earn $34 per hour compared with just $24 per hour for nonunion workers from employer-only apprenticeship programs.

Registered apprenticeships could be expanded to enhance worker skills and raise wages in Wisconsin.

- 97 percent of registered apprentices are satisfied with their paid-related instruction and 98 percent of employed apprentices work in Wisconsin.
- Pre-apprenticeship programs could be expanded in Wisconsin's high schools.
- Wisconsin could increase access to child care, which is a significant barrier to female participation in the construction trades.
- Wisconsin could link apprenticeship training with growing investments in clean energy infrastructure.
- Wisconsin could reinstitute a prevailing wage law, which would institutionalize training contributions and increase apprenticeship training in construction.

Registered apprenticeships are the bachelor's degrees of Wisconsin's construction industry. Registered apprenticeship programs deliver training hours, competitive earnings, and diversity outcomes that rival four-year public universities in the state. These outcomes are achieved without incurring $27,100 in debt, which is the average loan burden for graduating seniors from the University of Wisconsin-Madison who borrowed. Registered apprenticeship programs can be promoted as viable alternatives to college.

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Introduction

Economic and social science research finds that investing in infrastructure and investing in education are the most effective public policies at boosting employment and growing the economy. For every dollar increase in infrastructure spending, the U.S. economy grows by between $1.57 and $2.20 (Zandi, 2010; Arnon et al., 2020). Similarly, an extra year of education increases an individual's earnings by up to 10 percent and boosts economic growth (Stevens & Weale, 2003; Barro, 1997). Research has found that a 10 percent increase in spending on public education statistically increases the probability of graduating high school by 7 percent, improves the future wages of students by 7 percent, and reduces their chances of living in poverty once they reach adulthood by 4 percent (Baker, 2018; Jackson et al., 2015).

However, additional education through four-year college degrees is not always the right path for everyone. For many young people, enrolling in a registered apprenticeship program is a better option than attending college or a university. Registered apprenticeships are training programs that help businesses in Wisconsin find skilled workers who are in high demand. Unlike participants at most four-year colleges, participating apprentices get the opportunity to "earn while they learn," with minimal or no out-of-pocket costs. Employers, joint labor-management organizations, and unions all sponsor apprenticeship programs, covering tuition costs and offering structured, on-the-job training and certified classroom instruction tailored to meet the needs of employers. In return for this significant investment, businesses in Wisconsin gain access to a pool of skilled, productive workers. By developing skills, apprenticeship programs create additional pathways into middle-class careers for young adults. More than 2,000 Wisconsin employers have chosen to train their workforce using apprenticeship programs, resulting in nearly 11,700 active apprentices in the state (DWD, 2020a; DOLETA, 2020).

Economic research finds that registered apprenticeship programs have positive economic impacts. Countries that have more widespread usage of apprenticeship programs are more successful at transitioning young workers into stable jobs, resulting in lower youth unemployment rates (Bertschy et al., 2009; Ryan, 2001; Ryan, 1998). In Germany, where these programs are especially prevalent, apprenticeships have been found to increase a worker's wages by 8 percent per year (Clark & Fahr, 2002). In the United States, participants in registered apprenticeship programs have been found to earn about $124,000 more in wages and fringe benefits over their careers than similar non-participants (Reed et al., 2012).

Apprenticeship training is particularly important to the construction industry in America. Through registered apprenticeship programs, "construction operates the largest privately-financed system of higher education in the country" (Philips, 2014). Nearly all of this investment comes from joint labor-management programs cooperatively administered by labor unions and signatory employers. Joint labor-management programs account for 97 percent of all active construction apprentices in Illinois, 94 percent in Indiana, 93 percent in Minnesota, 92 percent in Nevada, 82 percent in Ohio, 78 percent in Michigan, 63 percent in Oregon, and 55 percent in Iowa (Manzo & Bruno, 2020; Philips, 2015; Manzo & Duncan, 2018; Waddoups & Duncan, 2019; Onsarigo et al., 2017; Bilginsoy, 2017; Stepick & Manzo, 2021; Manzo & Gigstad, 2021).

For many young people, a debt-free registered apprenticeship program offers an alternative to upward economic mobility. This report, authored jointly by the Midwest Economic Policy Institute and the Project for Middle Class Renewal at the University of Illinois at Urbana-Champaign, evaluates enrollment, investments, completion requirements, and average earnings for construction apprentices in Wisconsin. These outcomes are contrasted with public universities in Wisconsin to compare apprenticeship as an alternative post-secondary option for high school graduates in the state. Joint labor-management programs are also compared with employer-only programs in construction. Lastly, the report discusses potential policy options for Wisconsin before a concluding section recaps key findings.

Data and Methodology

This study utilizes 2018 data from the Wisconsin Department of Workforce Development (DWD). The DWD provides potential apprentices with general information on the various apprenticeships in Wisconsin's industries. The DWD also provides statistics on the number of active apprentices and new registrants. In total, there were 13,800 active apprentices in Wisconsin in 2018 (DWD, 2020b).

Apprenticeship programs in Wisconsin are largely focused on careers in the construction trades (Figure 1). For the 2018 calendar year, the DWD reported that there were nearly 9,300 active construction trade apprenticeships, accounting for 67 percent of all registered apprentices in the state. The construction apprentices were enrolled in 89 unique programs that cover 38 specific construction trades. The remaining one-third of apprenticeships were in the health care, manufacturing, information technology, service, agriculture, finance, and utility sectors (DWD, 2020b).

Apprenticeship programs are sponsored either jointly by labor unions and employers that are signatories to collective bargaining agreements (joint labor-management programs) or unilaterally by employers. Joint labor-management programs are cooperatively administered with standards, trainee wages, and apprentice-to-worker ratios established in collective bargaining agreements. Funding for training in joint labor-management apprenticeship programs is financed by "cents per hour" contributions that are part of the total wage and fringe benefits package negotiated with signatory contractors. Under this system, investments in training the next generation of skilled tradespeople are institutionalized, included in project bids and paid by project owners. Conversely, employer-only apprenticeship programs are sponsored by an employer or group of employers—usually through a trade association—who unilaterally determine the content, length, and standards for their apprenticeship programs. Funding for employer-only programs relies on voluntary contributions from contractors, who often have an incentive to forgo long-term workforce training investments in order to win project bids.

Joint labor-management apprenticeship programs encompass most of the registered apprentices in Wisconsin. In 2018, joint labor-management programs enrolled about 7,500 active construction apprentices as compared with fewer than 1,800 for employer-only construction programs (Figure 1). Fully 81 percent of registered apprentices in construction were enrolled in joint programs. In fact, joint labor-management programs in construction alone accounted for 54 percent of all registered apprentices in the state.

FIGURE 1: STATISTICS ON REGISTERED APPRENTICES ENROLLED BY TYPE OF PROGRAM AND INDUSTRY IN WISCONSIN, 2018

Type of Registered Apprenticeship Program	2018 Active Apprenticeships	Share of Apprentices
Joint Labor-Management Program in Construction	7,487	54.2%
Employer-Only Construction Program	1,775	12.9%
All Other Non-Construction Programs*	4,550	32.9%
Total for All Registered Apprenticeship Programs	**13,812**	**100.0%**
Joint Labor-Management Share of Construction Apprenticeships		*80.8%*

Source(s): 2018 active apprenticeship data by committee by the Wisconsin Department of Workforce Development (DWD, 2020b).

This study also explores Form 990 tax data to assess the finances of apprenticeship programs in Wisconsin. Form 990s are prepared by nonprofit organizations to disclose financial information to the Internal Revenue Service (IRS). Form 990s are publicly available and can be found on multiple online databases (e.g., ProPublica, 2020; Candid, 2020). Among other items, Form 990 reports include information on the number of employees, annual program revenues, total expenditures, net assets, land, buildings, and equipment costs.

Finally, this report utilizes higher education data for public universities in Wisconsin. Each university in the University of Wisconsin System reports student demographic characteristics for each school year, including racial or ethnic background. Based on enrollment data from the 2017-2018 academic year, about 174,500 students were enrolled in the University of Wisconsin (UW) System (UW, 2020).

Enrollment in Apprenticeship Programs and Public Universities in Wisconsin

Joint labor-management programs train more than 8-in-10 registered apprentices (Figure 2). In 2018, joint labor-management programs enrolled 81 percent of all registered apprentices in the construction trades. Joint labor-management programs accounted for approximately 80 percent of male apprentices in construction and 85 percent of all female apprentices in construction. Joint labor-management programs registered 80 percent of all White apprentices, 89 percent of all Black and African American apprentices, and 86 percent of all Hispanic and Latinx apprentices. In fact, nearly 700 Black and Hispanic apprentices were registered in joint construction programs compared with fewer than 100 in employer-only construction programs. Joint construction programs also trained 85 percent of military veterans (Figure 2).

FIGURE 2: DEMOGRAPHIC CHARACTERISTICS OF CONSTRUCTION APPRENTICES IN WISCONSIN, BY TYPE OF PROGRAM, 2018

Enrollment of Construction Apprentices, 2018	Joint Labor-Management Programs	Employer-Only Programs	Total for All Programs	Joint Share
Total (All Apprentices)	**7,487**	**1,775**	**9,262**	**80.8%**
Gender: Male	7,282	1,761	9,043	**80.5%**
Gender: Female	205	14	219	**84.6%**
Race: White	6,706	1,655	7,910	**80.2%**
Race: Black or African American	328	40	368	**89.1%**
Race: Hispanic or Latinx	349	57	406	**85.6%**
Status: Military Veteran	427	78	505	**84.6%**

Source(s): 2018 active apprenticeship data by committee by the Wisconsin Department of Workforce Development (DWD, 2020b).

Joint labor-management construction programs in Wisconsin are more diverse than employer-only programs, such as those affiliated with the Associated Builders and Contractors (ABC) of Wisconsin. The share of registered apprentices who are women, Black and African American, and Hispanic and Latinx were all about 2 percent higher in joint construction programs, while the share who are White alone was 6 percent lower. Similarly, a higher share of active apprentices were military veterans in joint construction programs (6 percent) than in employer-only programs (4 percent) (Figure 3).

FIGURE 3: DEMOGRAPHIC SHARES OF CONSTRUCTION APPRENTICES IN WISCONSIN, BY TYPE OF PROGRAM, 2018

Diversity of Construction Apprentices, 2018	Share of Apprentices in Joint Labor-Management Programs	Share of Apprentices in Employer-Only Programs	Joint Difference
Gender: Male	97.3%	99.2%	**-1.9%**
Gender: Female	2.7%	0.8%	**+1.9%**
Race: White	89.6%	93.2%	**-6.4%**
Race: Black or African American	4.4%	2.3%	**+2.1%**
Race: Hispanic or Latinx	4.7%	3.2%	**+1.5%**
Status: Military Veteran	5.7%	4.4%	**+1.3%**

Source(s): 2018 active apprenticeship data by committee by the Wisconsin Department of Workforce Development (DWD, 2020b).

Although joint labor-management apprenticeship programs in construction can take steps to improve the diversity of their apprenticeship classes, their racial and ethnic diversity is generally on par with public universities in Wisconsin (Figure 4). The Black and African American share of apprentices in joint construction programs (4 percent) is higher than the Black and African American share of non-international students enrolled in the University of Wisconsin System (3 percent). The share of Hispanic and Latinx apprentices in joint construction programs (5 percent) is slightly lower than, but close to, the UW system (6 percent). The share of White graduates is higher in joint construction programs (90 percent) than public universities (82 percent), but that is partially because the share of graduates from all other racial and ethnic backgrounds—most notably, Asians and Pacific Islanders—is higher in public universities (9 percent) than joint construction programs (1 percent). Overall, joint labor-management apprenticeship programs in construction are more diverse than employer-only construction programs and enroll a higher share of African Americans (4 percent) than public universities (3 percent) in Wisconsin (Figure 4).

FIGURE 4: TOTAL NUMBER AND SHARES OF ENROLLED PARTICIPANTS BY HIGHER EDUCATION PROGRAM IN WISCONSIN, 2018

Diversity of Participants Enrolled in Higher Education Classes by Program, 2018	Apprentices in Joint Labor-Management Programs in Construction		Non-International Students in University of Wisconsin System	
	Number	Share	Number	Share
All Higher Education Enrollment	**7,487**	**100.0%**	**165,282**	**100.0%**
White	6,706	89.6%	136,043	82.3%
Black or African American	328	4.4%	5,270	3.2%
Latinx	349	4.7%	9,766	5.9%
Other Race (or Unknown)	104	1.3%	14,203	8.6%

Source(s): 2018 active apprenticeship data by committee by the Wisconsin Department of Workforce Development (DWD, 2020b) and 2018 undergraduate enrollment data from the University of Wisconsin System (UW, 2020).

Joint Labor-Management Programs Invest More in Apprenticeship Training in Wisconsin

There are substantial differences between joint labor-management apprenticeship programs and employer-only apprenticeship programs. As mentioned previously, joint programs are cooperatively administered by labor unions and signatory contractors and are funded through "cents per hour" contributions that are negotiated privately by contractors and workers. By contrast, employer-only apprenticeship programs rely on voluntary contributions from employers, who often lack incentive to invest in long-term workforce development. The result is that employer-only apprenticeship programs train only 19 percent of all construction apprentices in Wisconsin. Employer-only apprenticeship programs are also less diverse, enrolling fewer women, Black and African American trainees, Hispanic and Latinx individuals, and military veterans.

FIGURE 5: FORM 990 AVAILABILITY FOR CONSTRUCTION APPRENTICESHIP PROGRAMS IN WISCONSIN, FY2018

Availability of Form 990 Financial Documents	Apprentices Covered
Programs with Complete Form 990 Data	6,786
Programs with Missing Data	2,476
Share of Construction Apprentices Covered in the Data	**73.3%**

Source(s): Authors' analysis of IRS Form 990 reports (ProPublica, 2020; Candid, 2020) using 2018 active apprenticeship data by committee by the Wisconsin Department of Workforce Development (DWD, 2020b).

This study uses Form 990 tax reports filed with the Internal Revenue Service (IRS) by Wisconsin's apprenticeship programs. Complete Form 990 data were obtained for registered apprenticeship programs that enrolled about 6,800 active apprentices (73 percent) in 2018 (Figure 5). Data for programs covering the

remaining construction apprentices were unavailable for fiscal year 2018. This research assumes that programs with missing data have similar characteristics as those with complete data.[1]

FIGURE 6: CONSTRUCTION APPRENTICESHIP PROGRAM INVESTMENTS IN WORKER TRAINING, BY TYPE OF PROGRAM, 2018

Type of Registered Apprenticeship Program	Total Estimated Revenues	Total Estimated Expenditures
Joint Labor-Management Programs	$48,028,814	$41,665,525
Employer-Only Programs	$2,396,207	$2,098,894
Total for All Programs	$50,425,022	$43,764,419
Share by Joint Labor-Management Programs	**95.2%**	**95.2%**

Source(s): Authors' analysis of IRS Form 990 reports (ProPublica, 2020; Candid, 2020) using 2018 active apprenticeship data by committee by the Wisconsin Department of Workforce Development (DWD, 2020b).

Programs funded jointly by employers and labor unions account for the vast majority of human capital investment in Wisconsin's construction industry (Figure 6). Joint labor-management apprenticeship programs generate 95 percent of all private training contributions in Wisconsin, bringing in an estimated $48.0 million per year in training revenues compared to just $2.4 million for employer-only programs. Similarly, joint labor-management programs spent $41.7 million on training for active apprentices (95 percent) compared with just $2.1 million for employer-only programs (5 percent).

FIGURE 7: CONSTRUCTION APPRENTICESHIP PROGRAM OPERATIONAL METRICS IN WISCONSIN, BY TYPE OF PROGRAM, 2018

Type of Registered Apprenticeship Program	Estimated Revenue Per Apprentice	Estimated Expenditure Per Apprentice
Joint Labor-Management Programs	$6,415	$5,565
Employer-Only Programs	$1,350	$1,182
Average for All Programs	$5,444	$4,725
Joint vs. Employer-Only Difference	**4.8x**	**4.7x**

Source(s): Authors' analysis of IRS Form 990 reports (ProPublica, 2020; Candid, 2020) using 2018 active apprenticeship data by committee by the Wisconsin Department of Workforce Development (DWD, 2020b).

Joint labor-management apprenticeship programs train 81 percent of all construction apprentices but account for 95 percent of all training investments in Wisconsin's current and future construction workers (Figure 7). In fact, joint labor-management programs invest nearly $5,600 in expenditures per registered construction apprentice, which is about five times as much as employer-only programs (less than $1,200 per registered apprentice) (Figure 7). Joint construction programs also generate about five times more revenue per apprentice (more than $6,400 per apprentice) than employer-only construction programs (less than $1,400 per apprentice).

Finally, Figure 8 compares the five largest joint labor-management programs in Wisconsin's construction industry with the Associated Builders and Contractors (ABC) of Wisconsin's Apprenticeship and Training Trust Fund. The five largest joint labor-management programs cumulatively employ 216 instructors and support staff and have $21.8 million in total revenues. By contrast, the ABC of Wisconsin has no paid staff and just $2.3 million in total revenues. Put another way, the five largest joint labor-management apprenticeship programs invest more than nine times as much in worker training every year as the ABC of Wisconsin (Figure 8).

[1] That is, missing programs are assumed to have the same average revenues and expenditures per apprentice as programs with available data.

FIGURE 8: EMPLOYEES AND REVENUE FOR THE TOP FIVE JOINT CONSTRUCTION PROGRAMS AND ABC OF WISCONSIN, 2018

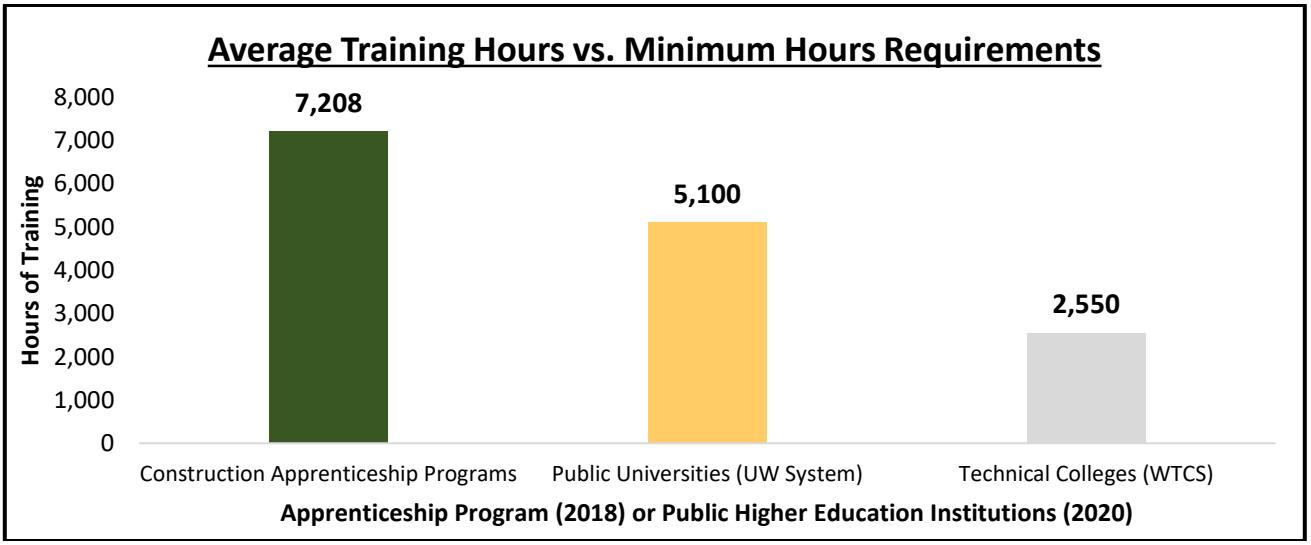
Rank	Construction Apprenticeship Program	Joint or Employer-Only	Program Employees	Total Revenue
1	Wisconsin Operating Engineers Skill Improvement and Apprenticeship Fund	Joint	56	$8,623,788
2	Steamfitters Training School (Local 601)	Joint	96	$4,024,622
3	Milwaukee Electrical Joint Apprenticeship and Training Plan	Joint	18	$3,432,350
4	North Central States Regional Council of Carpenters Training Fund	Joint	32	$3,251,708
5	Wisconsin Laborers Apprenticeship and Training Fund	Joint	14	$2,447,194
--	**Top Five Largest Joint Labor-Management Programs**	**Joint**	**216**	**$21,779,662**
--	**ABC of Wisconsin Apprenticeship and Training Trust Fund**	**Employer-Only**	**0**	**$2,311,159**

Source(s): Authors' analysis of IRS Form 990 reports (ProPublica, 2020; Candid, 2020) using 2018 active apprenticeship data by committee by the Wisconsin Department of Workforce Development (DWD, 2020b).

Apprenticeship Graduation Requirements Compared with Wisconsin's Public Universities

Building high-quality infrastructure that is both safe and durable requires a skilled workforce. Accordingly, registered apprenticeship programs are very rigorous in Wisconsin, providing thousands of hours of classroom and on-the-job training to boost workers' skills. On average, registered apprentices enrolled in joint labor-management programs in construction are required to complete about 7,200 hours of classroom and on-the-job training (Figure 9). Some programs require even more. For example, an apprenticeship as a sheet metal worker requires 8,550 on-the-job hours of training and 450 hours of related instruction time.

FIGURE 9: HOURS OF APPRENTICESHIP TRAINING VS. MINIMUM REQUIREMENTS TO GRADUATE FROM PUBLIC INSTITUTIONS



Source(s): 2018 active apprenticeship data by committee by the Wisconsin Department of Workforce Development (DWD, 2020b), "on the job time" and "related instruction time" by construction trade by the Wisconsin Department of Workforce Development (DWD, 2020c), "Undergraduate Guide" at the University of Wisconsin-Madison (UWM, 2020), and information from the Wisconsin Technical College System (WTCS, 2020).

Registered apprenticeship programs in construction require more hours of classroom and on-the-job training than university-level education (Figure 9). Registered apprenticeship programs have an average term length of more than 7,200 hours, including about 6,800 hours of on-the-job training and 400 hours of classroom instruction. By contrast, the typical 120-credit hour bachelor's degree at public universities in Wisconsin—such as the University of Wisconsin-Madison—requires a minimum of 5,100 "contact hours" (e.g., lectures and lab times) and "preparation hours" (e.g., homework and fieldwork) and the typical 60-credit hour associate degree from Wisconsin's Technical College System (WTCS) requires 2,550 total hours.[2] Registered apprenticeship programs in construction thus require 41 percent more hours of training to graduate than four-year universities and 183 percent more hours than two-year colleges.

The Earnings of Apprentices Compared with College-Educated Workers in Wisconsin

For young Wisconsin residents, registered apprenticeships in construction offer viable post-secondary options that parallel bachelor's degrees (Figure 10). On average, experienced-level journeyworkers earn more than $67,200 in annual income from wages in Wisconsin, according to data from the Department of Workforce Development (DWD, 2020c). This average income for journeyworkers who have completed registered apprenticeship training compares favorably to annual earnings for college-educated workers. Among comparable workers in Wisconsin who work at least 30 hours per week over 40 or more weeks per year, annual incomes from wages and salaries average about $69,500 for workers with bachelor's degrees and $50,700 for workers with associate degrees (Ruggles et al., 2020).[3] A typical construction worker who completes an apprenticeship program in Wisconsin earns 33 percent more than the average worker with an associate degree and only earns 3 percent less than the average worker with a bachelor's degree in the state—without incurring $27,100 in debt, which is the average loan burden for graduating seniors from the University of Wisconsin-Madison who borrowed money (UWM, 2021).[4]

FIGURE 10: AVERAGE ANNUAL INCOMES FOR WISCONSIN WORKERS BY APPRENTICESHIP PROGRAM OR EDUCATION, 2018

Average Annual Income from Wages for Workers by Educational Attainment, Including Construction Apprenticeship Programs	Annual Income from Wages and Salaries*
Registered Apprenticeship Programs' Experienced-Level Salary	$67,249
Workers with High School Degrees	$40,760
Workers with Associate Degrees	$50,699
Workers with Bachelor's Degrees	$69,498
Workers with Master's Degrees	$84,128
Workers with Professional and Doctorate Degrees	$141,585

Source(s): 2018 active apprenticeship data by committee by the Wisconsin Department of Workforce Development (DWD, 2020b), "experienced level salary" by construction trade by the Wisconsin Department of Workforce Development (DWD, 2020c), and 2018 *American Community Survey* data (five-year estimates) by the U.S. Census Bureau (Ruggles et al., 2020). *2018 data by educational attainment are for workers employed at least 30 hours per week for at least 40 weeks per year (minimum: 1,200 annual hours).

Some trades produce even higher wages that approach the earnings of workers with master's degrees (Figure 11). Figure 11 presents both training hours and the experienced-level earnings for construction workers in

[2] One credit hour is defined as 50 minutes of "contact hours" and two hours of "preparation hours" (UW, 2018). During the COVID-19 pandemic, "contact hours" was shifted to pseudo-contact hours, such as online learning and remote instruction.

[3] The average annual income is for all workers with bachelor's degrees in Wisconsin, and is not limited to just those graduating from the University of Wisconsin-Madison or University of Wisconsin System.

[4] According to the University of Wisconsin-Madison, over half of graduating seniors (57 percent) do not take out student loans while earning their bachelor's degree at the university (UWM, 2021). Generally speaking, 100 percent of construction apprentices in joint labor-management programs do not take out student loans while completing their training.

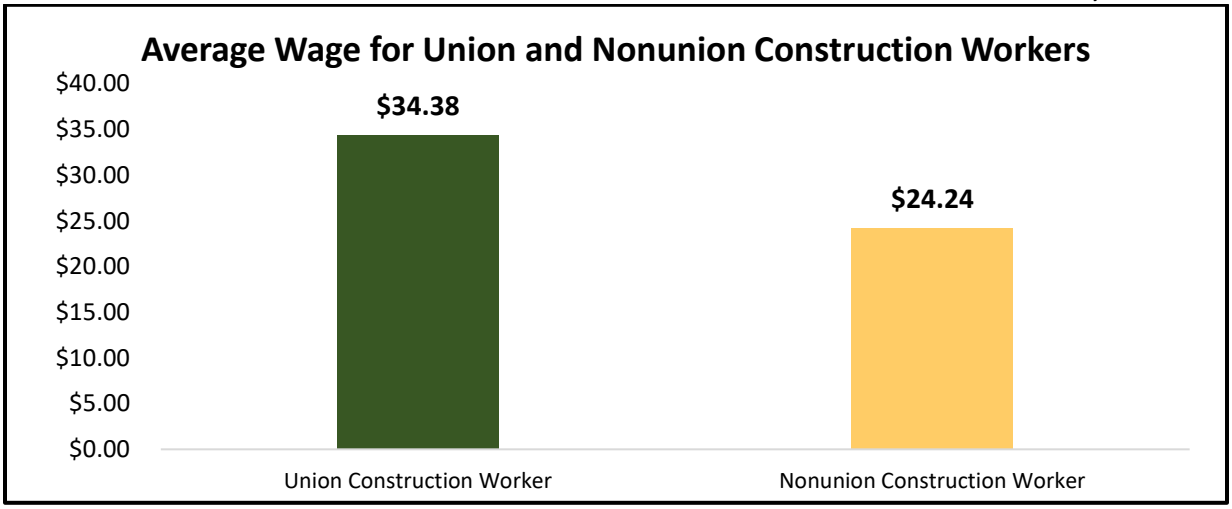
the ten largest trades, sorted by the number of active apprentices. Five of these trades—plumbers, two types of steamfitters, ironworkers, and operating engineers—earn between $70,000 and $80,000 per year after completing between 6,400 hours and 8,000 hours of on-the-job and classroom training. These solidly middle-class incomes are greater than the average earnings for comparable workers with bachelor's degrees (about $69,500 per year) and nearly on par with those who have earned master's degrees (about $84,100 year). Registered apprentice programs provide strong alternatives to college for skilled workers in Wisconsin.

FIGURE 11: HOURS REQUIRED AND EXPERIENCED-LEVEL SALARY FOR TOP 10 CONSTRUCTION CRAFTS, BY APPRENTICES, 2018

Construction Trade in Wisconsin (DWD Data)	Total Training Hours Required	Experienced-Level Salary	2018 Active Apprentices
Electrician	8,400	$68,540	2,003
Plumber	8,000	$79,147	1,301
Carpenter (Construction)	6,240	$58,439	1,198
Operating Engineer	6,400	$70,616	873
Laborer	4,400	$49,897	588
Sheet Metal Worker	9,000	$64,376	567
Ironworker	7,000	$73,170	404
Steamfitter (Construction)	8,000	$79,147	374
Carpenter (Millwright)	6,240	$58,439	242
Steamfitter (Service/Refrigeration)	8,000	$79,147	221
Weighted Average for All Programs	**7,208**	**$67,249**	**9,262**

Source(s): 2018 active apprenticeship data by committee by the Wisconsin Department of Workforce Development (DWD, 2020b), and "experienced level salary" by construction trade by the Wisconsin Department of Workforce Development (DWD, 2020c).

FIGURE 12: AVERAGE REAL WAGE FOR UNION AND NONUNION CONSTRUCTION WORKERS IN WISCONSIN, 2015-2019



Source(s): 2015-2019 Current Population Survey Outgoing Rotation Groups (CPS-ORG) data by the U.S. Department of Labor and U.S. Census Bureau (CEPR, 2020).

The best pathways into Wisconsin's middle class for young individuals interested in the trades, however, are through joint labor-management apprenticeship programs (Figure 12). Data from the *Current Population Survey* released by the Bureau of Labor Statistics (BLS) at the U.S. Department of Labor—which is used to report monthly statistics on the unemployment rate—reveals that the average hourly wage of union construction workers, who graduate from joint programs, is about $34 per hour. By contrast, the average wage of nonunion construction workers, who tend to come from employer-only apprenticeship programs, is $24 per hour. All wage data are adjusted for inflation (CEPR, 2020). Union journeyworkers earn 42 percent

more per hour, creating a strong financial incentive for high-quality candidates to apply for and complete the more rigorous joint labor-management construction programs.

Joint labor-management apprenticeship programs in construction also play an important role in reducing inequality in the construction industry. Not only are they more diverse than employer-only programs, but union journeyworkers who complete their apprenticeships, perform the same trade, and operate the same equipment in the same local market all earn the same wage, per their collective bargaining agreements. Regardless of age, gender, sex, sexual orientation, racial identification, ethnic background, religious preference, or any other characteristic unique to an individual, all able-bodied journeyworkers who have proven that they have mastered their crafts earn the same hourly income.

Potential Policy Options for Wisconsin

Not all young people are able or willing to earn college degrees. For many, the path to upward economic mobility is through registered apprenticeship programs—particularly in the construction trades. In a recent survey of 365 workers who completed apprenticeship training, fully 96 percent were employed one year after receiving their completion certificates, 97 percent were satisfied with their paid-related instruction, and 98 percent of employed apprentices were working in Wisconsin (WTCS, 2021). Registered apprenticeship programs could be expanded to enhance worker skills, improve productivity and safety, and raise wages locally in Wisconsin.

First, apprenticeship readiness programs and pre-apprenticeship programs could be both encouraged and expanded across Wisconsin. The State of Wisconsin could partner with existing pre-apprenticeship programs to increase training course offerings in apprencticeable occupations at public high schools and community colleges, especially in low-income communities (Olinsky & Ayers, 2013). For example, Destinations Career Academy of Wisconsin is a recent program which opened in 2016. Destinations Career Academy of Wisconsin is an online public charter school that includes both traditional academics and career readiness education, with state-licensed teachers who teach both full-time and part-time high school students (DCAWI, 2020). Upon graduation, students achieve applicable skills required to transition into positions in registered apprenticeship programs. In 2019 alone, 70 students were enrolled from more than 20 different school districts across Wisconsin. Similarly, Operation Fresh Start provides young people ages 16 to 24 years old in Dane County with a path to self-sufficiency by helping them attain high school diplomas, driver's licenses, and Pre-Apprenticeship Readiness Certificates while working for seven weeks in a paid construction position with on-the-job training. Operation Fresh Start annually provides wrap-around services to approximately 300 participants (Operation Fresh Start, 2020).

The Illinois Department of Transportation (IDOT) has operated the Highway Construction Careers Training Program (HCCTP) at 12 community colleges since 2011. The goal of this pre-apprenticeship program is to increase the participation of women, people of color, and disadvantaged individuals in the highway construction industry (IDOT, 2021). The 14-week program includes math curriculum for the trades and technical skills training such a tool usage, and places certified graduates on IDOT project sites at a pay of $15 per hour. In total, more than 3,000 students have completed the program and nearly 1,200 have been placed in registered apprenticeship programs across Illinois. The Wisconsin Department of Transportation (WisDOT) could consider offering similar apprenticeship readiness programs to bolster apprenticeship completion certificates at the 16 technical colleges in Wisconsin's Technical College System.

As part of any expansion in apprenticeship readiness and pre-apprenticeship programs, the State of Wisconsin should work to remove any perceived stigma associated with choosing trade schools over college

(St-Esprit, 2019). Educating students, parents, teachers, and counselors about apprenticeship programs and addressing misconceptions about the trades can help residents understand that vocational training may be a better path to stable jobs for many workers than college degrees. Creating mentoring programs within apprenticeship programs and retaining counselors to address challenges unique to people of color can also help improve racial diversity within the state's private apprenticeship programs (Bruno et al., 2016).

The State of Wisconsin could increase access to child care and early childhood education programs to increase female participation in the trades. Women report that the lack of access to affordable child care is a significant barrier to participating in registered apprenticeship programs (Reed et al., 2012). In construction, for example, apprentices often wake up very early to travel to a worksite, receive on-the-job training all day, and then attend classroom instruction after work. Expanding early childhood education programs has also been found to boost employment, especially among women (Schocet, 2019).

The State of Wisconsin could link apprenticeship training with taxpayer-subsidized and ratepayer-funded investments in clean energy production. Governor Tony Evers signed an Executive Order in 2019 for the state to reach 100 percent carbon-free electricity by 2050 and the state's largest utility companies have committed to bold investments on the path to becoming carbon-neutral by 2050 (Morehouse, 2019). For example, WEC Energy Group, the state's largest utility, will retire 1.8 GW of coal and natural gas generation as part of its effort to become carbon neutral by 2050 (Kaeding, 2020). Madison-based Alliant Energy Corporation announced six solar power projects in May 2020 that will produce enough solar energy to power 260,000 homes. WEC budgeted a five-year capital improvement plan in solar, wind, and battery storage totaling $16 billion, while Alliant budgeted $2.2 billion over a five-year period towards smarter and greener energy infrastructure (Bollier, 2021). Encouraging utility companies to utilize registered apprentices on large wind and solar developments through project labor agreements (PLAs) or apprenticeship ratios could increase the number of apprentices in Wisconsin and ensure that the transition to renewable energy is built by skilled local workers.

Finally, the State of Wisconsin could reinstitute a prevailing wage law. Prevailing wage standards supported skilled construction workers on public works projects in Wisconsin for more than eight decades between 1932 and 2016. Prevailing wages are essentially minimum wages for different types of skilled construction workers on taxpayer-funded projects based on wages, benefits, and training investments that are actually paid in local communities. Prevailing wages level the playing field for all construction contractors by ensuring that public expenditures reflect local market standards of compensation and craftsmanship. Economic research has shown that prevailing wage laws increase apprenticeship training in construction (Duncan & Ormiston, 2017). The number of apprentices, as a share of the overall construction workforce, is 8 percent higher in states with prevailing wage laws (Bilginsoy, 2003). Apprentices have also been found to complete graduation requirements at a faster rate in states with prevailing wage laws (Bilginsoy, 2003). After Wisconsin repealed prevailing wages in 2017, the number of apprentices completing their training grew 25 percent slower than in neighboring states that retained their prevailing wage laws (Manzo et al., 2020). Construction worker earnings fell by 6 percent, turnover increased by 8 percent, and there was a 60 percent increase in new Wisconsin Department of Transportation projects being awarded to out-of-state contractors—all without reducing costs to resurface or maintain roads (Manzo et al., 2020). Reversing these negatives effects by passing a new prevailing wage law would improve labor market outcomes for blue-collar construction workers and strengthen Wisconsin's system of privately-funded apprenticeship training.

Conclusion

Joint labor-management apprenticeship programs account for the vast majority of registered apprentices in Wisconsin's construction industry. These programs train 81 percent of all active construction apprentices and account for 95 percent of all training investments in Wisconsin's current and future construction workers. Joint labor-management apprenticeship programs are also more rigorous than employer-only construction programs and require 41 percent more hours of on-the-job and classroom training than a typical bachelor's degree. Journeyworkers graduating from joint labor-management construction programs earn about $34 per hour, resulting in annual incomes that parallel the average for workers with bachelor's degrees. These programs offer workers pathways into middle-class trades that are in high demand.

For many young people, the path to upward economic mobility is through "earn while you learn" registered apprenticeships. To expand registered apprenticeships, Wisconsin could encourage pre-apprenticeship programs at public high schools and community colleges, improve access to child care to increase female participation, take steps to remove any perceived stigma associated with choosing trade schools over college, and reinstitute a prevailing wage law. Registered apprenticeship programs can be promoted as viable alternatives to college.

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Appendix

TABLE A: ALL WISCONSIN CONSTRUCTION APPRENTICESHIP PROGRAMS, ACCORDING TO DWD (2020)

Apprenticeship Program Committees		
ABC of WI - Fond du Lac	La Crosse Area Carpentry JAC	Milwaukee Area Tile Setters JAC
ABC of WI - Green Bay	La Crosse Area Electrical JAC	Northeast WI Area Electrical JAC
ABC of WI - La Crosse	La Crosse Area Masonry JAC	Northeast WI Area Masonry JAC
ABC of WI - Madison	La Crosse Area Plumbing JAC	Northeast WI Area Plumbing JAC
ABC of WI - Marshfield	La Crosse Area Steamfitting JAC	Northeast Wisconsin Carpentry JAC
ABC of WI - Waukesha	Lakeshore Area Carpentry Advisory Comm	Northeast Wisconsin Fabricator JAC
Appleton Area Plumbing JAC	Lake To Lake Area Plumbing JAC	Northern WI Area Heat & Frost JAC
Appleton Area Steamfitter JAC	Madison Area Bricklaying JAC	Northern WI Carpenters Advisory Comm
Appleton/Oshkosh Area Electical JAC	Madison Area Carpentry JAC	Northern WI Plumbing Advisory Committee
Central WI Area Plumbing JAC	Madison Area Cement Masonry JAC	Northwestern WI Masonry JAC
Central Wisconsin Area Carpentry JAC	Madison Area Electrical JAC	Northwest WI Constr Craft Laborers JAC
East Central Steamfitting JAC	Madison Area Electrical VDV JAC	Racine Area Electrical JAC
East Central WI Area Sheet Metal JAC	Madison Area Glazing JAC	Rhinelander Area Plumbing JAC
Eau Claire Area Carpentry JAC	Madison Area Ironworking JAC	SE WI Area Carpentry JAC
Eau Claire Area Electrical JAC	Madison Area Painting & Decorating JAC	SE WI Area Millwright/PileDriver JAC
Eau Claire Area Plumbing JAC	Madison Area Plumbing JAC	SE WI Area Steamfitting JAC
Eau Claire Area Steamfitting JAC	Madison Area Sheet Metal JAC	SE WI Construction Craft Laborers JAC
ELW Area Sheet Metal JAC	Madison Area Steamfitting JAC	SE Wisconsin Roofing & Waterproofing JAC
Fond du Lac Area Plumbing JAC	Marshfield Area Plumbing JAC	South Central Constr Craft Laborers JAC
Fox Valley Area Laborers JAC	Milwaukee Area Bricklaying JAC	South Central WI Area Electrical JAC
Fox Valley Area Sheet Metal JAC	Milwaukee Area Cement Masonry JAC	Southeastern Glazing JAC
Greater Wisconsin Millwright JAC	Milwaukee Area Elecrical JAC	Southeastern WI Area Sheet Metal JAC
Green Bay Area Steamfitting JAC	Milwaukee Area Ironworking JAC	Southern WI Heat & Frost Insulators JAC
Kenosha Area Electrical JAC	Milwaukee Area Painting & Decorating JAC	Southwest WI Area Electrical JAC
Kenosha-Racine-Walworth Plumbing JAC	Milwaukee Area Plumbing JAC	Southwest WI Area Plumbing Advisory Comm
Kettle Moraine Area Electrical JAC	Milwaukee Area Sheet Metal JAC	SW WI Area Const Craft Laborers JAC
K-R-W Steamfitting JAC	Milwaukee Area Sprinkler Fitter JAC	Tri-City Area Steamfitting JAC
		Tri-County Area Trowel Trades JAC
		Wausau Area Carpenters JAC
		Wausau Area Plumbing JAC
		Wausau Area Steamfitting JAC
		Western WI Area Plumbing JAC
		WI River Valley Area Electrical JAC
		WI River Valley Area Masonry JAC
		Wisconsin Operating Engineers JAC

Source(s): Department of Workforce Development – *Characteristics of Active Apprentice Contracts: Historical Summary, By Committee* (DWD, 2020).