

The State of

Indiana's Advanced

Manufacturing

Workforce

June 2022



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Welcome Letter

Daily headlines telegraph the overwhelming challenge the nation faces with the gap in open jobs and available workers. As COVID-19 raged on, the gap only widened, and the worker shortage was felt by most Americans as they stood in long lines at the grocery store, restaurant or gas station and found few employees to help them complete a transaction. The worker shortage has finally gained mainstream attention.

The nation's manufacturers don't need headlines to tell them what they have been experiencing for years. The lack of skilled workers has been a persistent problem for the nation's – and Indiana's – advanced manufacturing industry. As Indiana's largest industry sector, which accounts for 26 percent of the state's economic output and employs more than 520,000 Hoosiers, Indiana's advanced manufacturers are experiencing a skills gap that continues to grow with an estimated 83,000 to 95,000 unfilled positions by the end of 2022. That translates to an enormous statewide financial impact - up to \$6.8 billion in net losses for Hoosier advanced manufacturers and tax revenue for the state of Indiana.

The talent development challenge is clear and Hoosier manufacturers, state leaders and Conexus Indiana are squarely focused on solutions.

"The State of Indiana's Advanced Manufacturing Workforce" paints a vivid and comprehensive picture of today's workforce and uncovers opportunities to skill up more Hoosiers to succeed in the advanced manufacturing industry. Importantly, this data will serve as a baseline against which to measure the success of current and new programs and policies that are developed specifically to positively impact the Hoosier workforce and manufacturers.



The report is a collaborative effort led by Conexus Indiana with support of the Indiana Governor's Workforce Cabinet, Indiana Department of Workforce Development (DWD), Fourth Economy Consulting, Katz, Sapper & Miller (KSM), Ice Miller and members of the Conexus Indiana Advanced Manufacturing Council.

Compounding the advanced manufacturing talent shortage is an aging workforce, continuous workforce turnover and a decline in women's employment, all of which have been exacerbated by the pandemic.

At the same time, the labor participation rate in Indiana hovers at 62.4 percent and has been declining over time. There is clearly a need to engage with these populations to increase the pool of workers available to the advanced manufacturing industry (a one percent increase would equate to 53,000 Hoosier workers).

This report provides a statewide analysis and dives deep into these issues on a regional basis, looking at three workforce regions that are outsized in terms of advanced manufacturing intensity – regions 2 (North Central Indiana), 3 (Northeast Indiana) and 11 (Southwest Indiana).

The second half of our report analyzes Indiana's workforce pipeline from the kindergarten through post-secondary and adult education and pinpoints opportunities in the talent development ecosystem, specifically as it pertains to high school students and Career and Technical Education (CTE). Indiana is clearly not enrolling and graduating enough secondary students to succeed in Indiana's advanced manufacturing industry. In fact, data show that the CTE pipeline is not sufficient to fill current open positions in any Indiana region of the state.

I invite you to read this report, perhaps looking at data specific to your area of expertise or region. There is some great work being done already to tackle this issue but as a state we need to align programs that clearly impact some of the most pronounced gaps this report has identified.

A handwritten signature in black ink that reads "Brad Rhorer". The signature is stylized and cursive.

Brad Rhorer
Chief Talent Programs Officer
Conexus Indiana

Key Findings

Advanced Manufacturing Drives Indiana's Economy. There is a Lot at Stake.

Indiana's advanced manufacturing sector accounts for 26 percent of the state's economic output and has the highest concentration of advanced manufacturing jobs in the United States with more than 520,000 Hoosier workers.

Indiana is estimated to have more than 83,000 unfilled positions within advanced manufacturing by the end of 2022. The cost of these unfilled positions is staggering – up to \$6.8 billion in net losses for advanced manufacturers and tax revenue for the state of Indiana. This compares to the total economic output generated by the sector of more than \$100 billion per year.

An Aging Workforce, Loss of Women in Workforce Compound Workforce Shortages

Workers aged 55 and older make up more than a quarter of the advanced manufacturing workforce in Indiana and that number has steadily increased since 2010. While the pandemic has caused many 55+ aged workers to retire or exit the workforce, there are still many workers 55+ who are expected to retire in the next 10 years. In addition to an aging workforce, declining labor force participation rates are limiting the pool of workers.

Over the past decade, women's employment within advanced manufacturing has risen significantly. The pandemic, however, erased all employment gains for women since 2017. While the number of women re-entering the workforce picked up in Q1 2021, those gains still result in lower female employment rates than in recent years.

Indiana Manufacturers Predominantly Hiring for Positions Requiring High School Degrees

According to a workforce survey completed by Indiana advanced manufacturing companies, most advanced manufacturing job opportunities

do not require an advanced degree or credential. Survey respondents reported that 77 percent of positions for 2022 hiring expectations required a high school degree; the positions most in demand are production and machine operators. Just 16.6 percent of positions for 2022 hiring expectations required a bachelor's degree or higher with many of these positions in engineering, IT, administration and leadership. Additionally, survey respondents indicated that their hiring needs 2- and 5-years out are likely not to change dramatically. This underscores the opportunity for organizations to adopt a longer-term view of strategic personnel planning.

Significant Leaks in Workforce Pipeline Seen in Career and Technical Education Enrollments

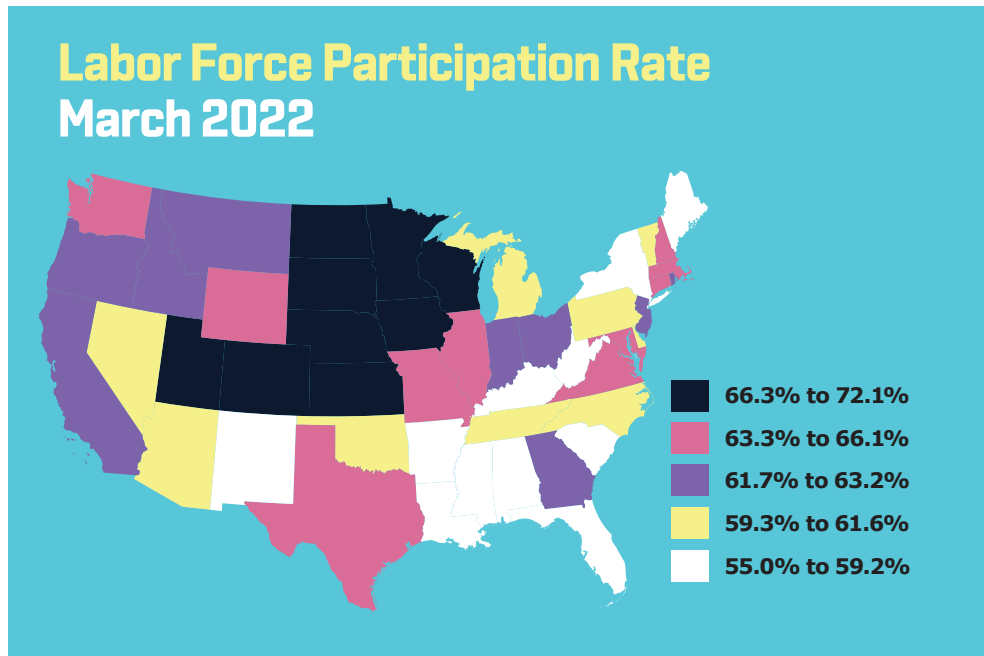
Indiana graduates nearly 85,000 high school students every year. Of those graduates, an estimated 35,000 leave high school without a plan or are post-secondary freshmen who do not return to school for a second year. Additionally, the percentage of 17-year-olds with demonstrated work experience has declined from 48 percent in 1968 to 19 percent in 2018.

In addition to losing many young Hoosiers to a lack of post-graduation plans, fewer than 6 in 100 students are enrolled in an advanced manufacturing and logistics Career and Technical Education (CTE) course in Indiana. The CTE pipeline in advanced manufacturing is insufficient to fill the existing openings in the sector. In fact, with estimated job openings ranging from 36,200 to 56,900 and current advanced manufacturing and logistics CTE enrollment at 19,020, at best, half of the open positions could be covered. When considering only 6,580 students have a concentration (currently defined as 2+ years of completed coursework) in advanced manufacturing and logistics, at best 18 percent of the existing demand for workers could be met. Simply, not enough students are enrolling in CTE to fill workforce needs.

Looking into the future, the share of the population 65 years of age or older is projected to increase to 18.6 percent by 2025 and 20.7 percent by 2035.⁶

According to Burning Glass, which compiles open job postings data from a multitude of sources, there were more than 212,000 open job postings in Indiana as of August 2021.⁷ This was an increase of more than 59,000 job postings year-over-year.

Comparing the 212,000 job openings to the total number of unemployed Hoosiers (72,000), Indiana, like many other states, clearly has a significant gap in available workers, which is a limiting factor on economic capacity and productivity for the state.



Dashboard Details: Hoosiers by the Numbers (in.gov)

Stemming the Workforce Shortage

Faced with growing workforce challenges, the state of Indiana is working to end workforce shortages with a multi-pronged attack that helps both employers and employees compete in today's marketplace.

Next Level Jobs

Next Level Jobs is part of Governor Eric Holcomb's broad vision for strengthening the state's economy and competitiveness.

For employers, Next Level Jobs' Employer Training Grants offer reimbursements for training workers for new or better positions in in-demand jobs. Companies can receive up to \$5,000 per employee for up to 10 employees they train, hire, and retain for at least six months. Advanced manufacturing and logistics are among the targeted industries, along with agriculture, IT and business services, construction, and health and life sciences.

For workers, Workforce Ready Grants pay costs for workers looking to improve their skills. Interested Hoosiers will find that tuition and fees for certain certificates will be covered if they get their training at an eligible provider. To qualify, Indiana residents and U.S. citizens must: have a high school diploma (or equivalent) but less than a college degree; enroll in a qualifying program; and meet additional requirements for specific training providers and programs. To apply,

candidates should complete a short online survey or call 866-591-5018.

Employers and workers interested in learning more can log onto www.nextleveljobs.org, where they'll find more information, helpful videos, and guidance on how to get started.

Skillful Indiana

Skillful Indiana brings investment, education, and innovation to support Governor Holcomb's Next Level workforce development plan. This statewide initiative brings together the Markle Foundation, Microsoft Philanthropies, LinkedIn, Walmart, Lumina Foundation, Purdue University, and Purdue Extension, along with the Governor's Workforce Cabinet and local workforce development boards, to create better career pathways to in-demand jobs for Hoosiers.

The initiative helps job seekers, particularly those without a 4-year college degree, identify and develop the skills required for in-demand jobs. Using technology tools like skills-based job postings and assessments, the organization assists employers in building their talent pool and increasing opportunities for diverse candidates. In 2019, Skillful Indiana launched its Governor's Coaching Corps, an 8-month development program for career coaches from a variety of institutions across the state, including public workforce centers, adult educational institutions, K-12 schools, and nonprofits.

⁶ Source: STATS Indiana, using data from the Indiana Business Research Center, IU Kelley School of Business. Available from http://www.stats.indiana.edu/pop_proj/. Accessed December 18, 2021.
⁷ Source: Burning Glass Technologies. burning-glass.com. 2019.

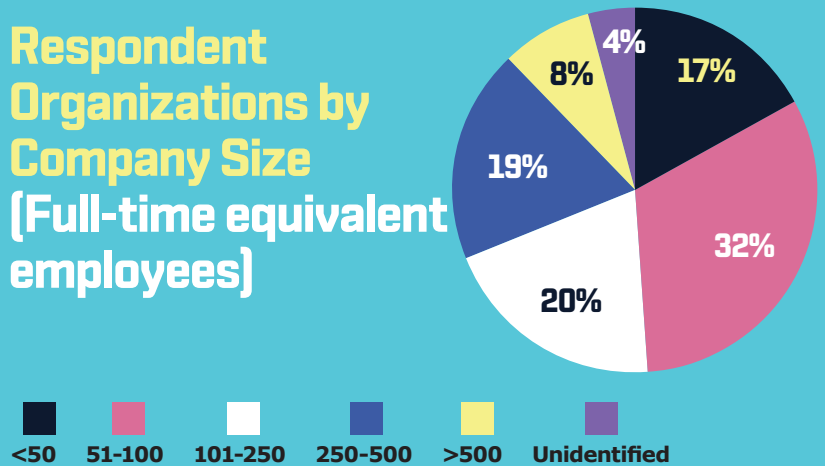
2021 Workforce & Wages Survey Methodology

of all sizes throughout the state of Indiana. Of those, 59 completed the survey. Small, medium, and large enterprises – as determined by number of employees – were all well-represented in the responses. Approximately 50 percent of the survey responses were from companies with 100 or fewer employees. The survey focused on nonexempt employees, which represents more than 80 percent of Indiana’s advanced manufacturing workforce.

To better understand current challenges and trends within the state’s advanced manufacturing industry, Conexus Indiana, in partnership with Katz, Sapper & Miller, conducted a confidential workforce survey of Indiana advanced manufacturing companies for the purposes of this report (the “Conexus Indiana 2021 Workforce & Wages Survey” or, “the survey”). Responses to the survey were accepted between September 13, 2021, and October 15, 2021.

The survey was distributed to hundreds of advanced manufacturing organizations

Respondent Organizations by Company Size (Full-time equivalent employees)



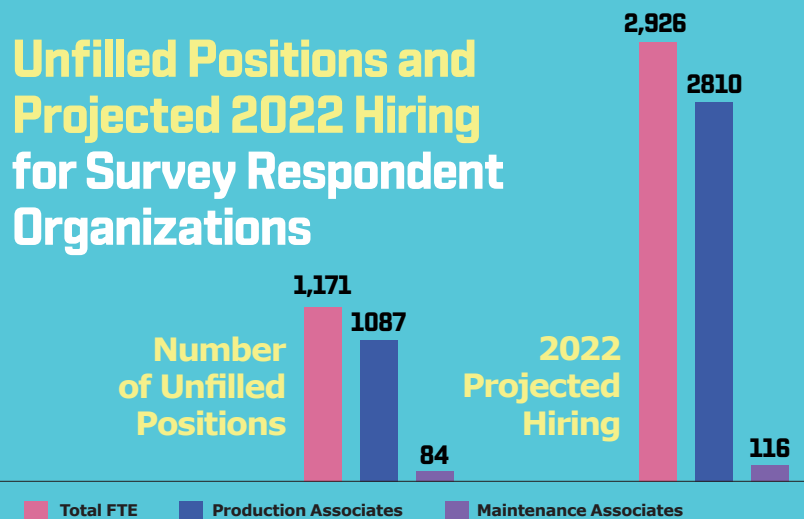
Hiring Expectations and Critical Positions

Altogether, the respondents indicated nearly 1,200 currently unfilled positions (equating to 7 percent of the respondents’ current workforce). The average number of unfilled positions as a percent of total full-time employees for all respondent organizations was 11 percent. Translating this to the entire state workforce would imply that there could be as many as 36,200 to 56,900 unfilled positions in the Hoosier manufacturing industry today.

Survey respondents collectively represent nearly 16,000 employees, or approximately 3.1 percent of the total manufacturing workforce in Indiana. They were asked to share the number of hires they plan to make in 2022 and the number estimate of current unfilled positions in each of the following categories:

- Total full-time equivalent employees
- Production associate
- Maintenance associate

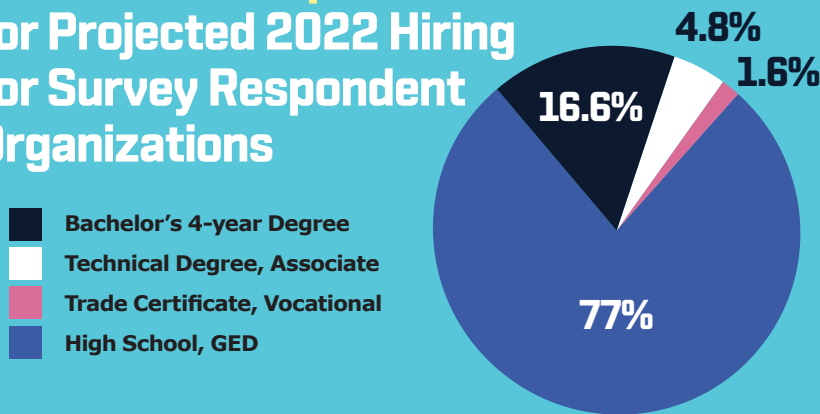
Unfilled Positions and Projected 2022 Hiring for Survey Respondent Organizations



Additionally, the respondents collectively expect to hire more than 2,900 full-time employees in 2022 (excluding temporary employees). This would represent an increase of 16 percent to 18 percent in overall workforce. If extrapolated to the entire state, the survey data implies that manufacturing organizations could be looking to hire approximately 83,000 to 95,000 workers in 2022.

degree or equivalent. Of advanced manufacturing companies participating in the survey, 77 percent of positions for 2022 hiring expectations required a high school degree. These positions were concentrated in production and machine operators. Just 16.6 percent of positions for 2022 hiring expectations required a bachelor's degree or higher, with many of these positions in engineering, IT, administration, and leadership. The educational requirements match with the need for general laborers and production associates cited by survey participants.

Educational Requirements for Projected 2022 Hiring for Survey Respondent Organizations

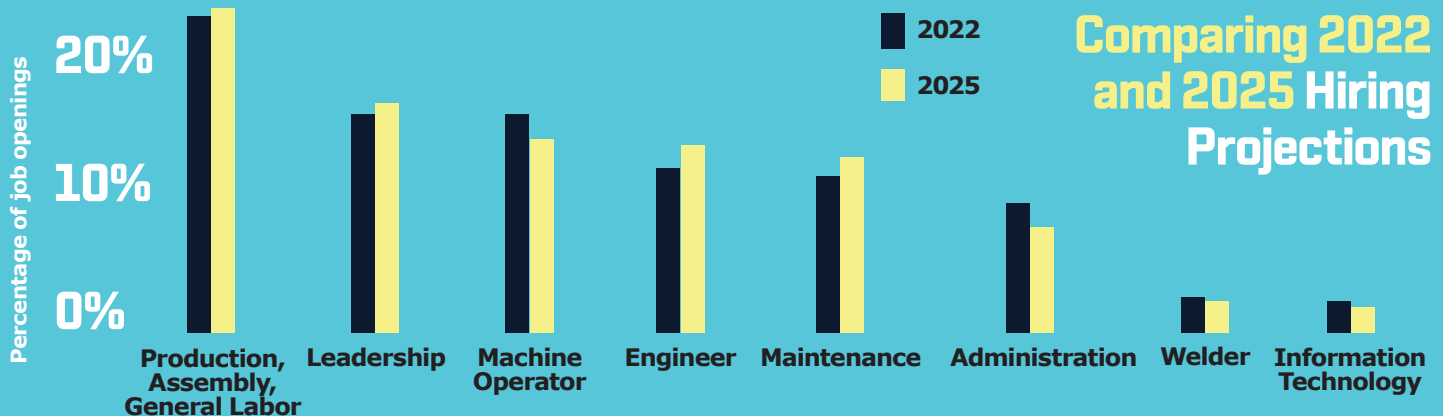


The survey asked respondents to describe hiring projections for both 2022 and 2025 position needs. Answers were consistent between 2022 hiring projections and 2025 hiring projections, with the share of companies mentioning specific position needs remaining relatively consistent across both years examined. Some variations include a slight projected increase in production and assembly, leadership, engineer, and maintenance occupations, and a slight projected decrease in machine operator, administration, welder, and IT occupations.

Production associates were the most cited positions for both unfilled positions and for 2022 projected hiring. Within the production associate category, machine operators, production and assembly workers, and general laborers were specific position needs quoted by survey respondents.

This observation reveals an important opportunity for organizations to adopt a longer-term view of strategic personnel planning. Building a pipeline of candidates takes time and careful planning, and organizations that take a more strategic approach will likely benefit in the long run.

Many advanced manufacturers anticipate needing to hire for positions that primarily require a high school



The Cost of Unfilled Positions

Fourth Economy Consulting estimated the cost of an unfilled advanced manufacturing position based on data from the most recent Annual Survey of Manufactures (ASM), which provides data for 2018 and 2019. This analysis estimates the net loss in sales for advanced manufacturers and the loss in tax revenue to the state.¹⁰ Fourth Economy averaged the values of sales, payroll and employment to estimate the cost of an unfilled position. The table below presents the aggregate costs of these unfilled positions based on a conservative scenario of 25,000 unfilled positions up to a worst-case scenario of 85,000 unfilled positions.

The annual impacts of unfilled positions are significant:

- **Net Loss in Sales** - An unfilled position results in lower productivity and output, and thus lost sales for advanced manufacturers. Net loss in

sales was adjusted for reduced costs of payroll and material costs. Over the course of a year, the net loss ranges from nearly -\$1.7 billion for 25,000 unfilled positions, up to -\$5.8 billion for a worst-case scenario of 85,000 unfilled positions.

- **Loss in Taxes** - An unfilled position also results in lost tax revenue to the state. Loss in taxes includes loss of personal taxes due to loss of income taxes and loss in sales tax from discretionary spending of individuals. Additional tax losses come from loss in corporate taxes. The estimated tax losses to the state government alone from lost income, sales, and corporate taxes ranges from -\$295 million to -\$1 billion per year.
- **Total Cost of Unfilled Advanced Manufacturing Positions** - The total cost to Indiana from lost sales and lost state taxes due to unfilled positions within manufacturing ranges from -\$2 billion for 25,000 unfilled positions to up to -\$6.8 billion for a worst-case scenario of 85,000 unfilled positions – a cost of -\$79,600 per worker. This compares to the total economic output generated by the sector of \$100 billion per year.

Aggregate Annual Cost of Unfilled Positions

Estimated Unfilled Positions:	25,000	50,000	75,000	85,000
Indiana Net Loss in Sales				
Net Loss (Net Loss = Lost Sales - Payroll Savings - Reduced Materials Cost)	-\$1,694,828,817	-\$3,389,657,634	-\$5,084,486,451	-\$5,762,417,978
Indiana Net Loss in Personal Taxes				
Income Taxes 3.25%	-\$64,440,797	-\$128,881,594	-\$193,322,391	-\$219,098,709
Sales Tax Lost (Wages for Unfilled Position * 70% Estimated Discretionary Spending * 7% Sales Tax)	-\$97,156,894	-\$194,313,788	-\$291,470,681	-\$330,333,439
Subtotal Personal Taxes	-\$161,597,691	-\$323,195,381	-\$484,793,072	-\$549,432,148
Indiana Net Loss in Corporate Taxes				
Corporate Sales Taxes (7% * Net Loss * In State Sales)	-\$118,638,017	-\$237,276,034	-\$355,914,052	-\$403,369,258
Corporate Income Tax (4.9% * Net Loss * In State Sales)	-\$14,948,390	-\$29,896,780	-\$44,845,171	-\$50,824,527
Subtotal Corporate Taxes	-\$133,586,407	-\$267,172,815	-\$400,759,222	-\$454,193,785
Total Taxes	-\$295,184,098	-\$590,368,196	-\$885,552,294	-\$1,003,625,933
Aggregate Annual Cost of Unfilled Positions (Net Loss in Sales + Loss in Taxes)	-\$1,990,012,915	-\$3,980,025,830	-\$5,970,038,745	-\$6,766,043,911

¹⁰ Additional notes on these estimates can be found in the Appendix.

Women in Advanced Manufacturing

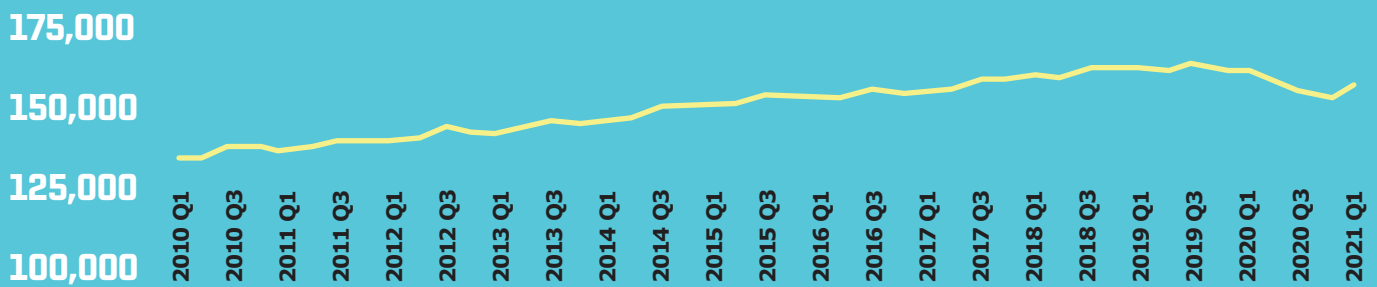
Over the past decade, women’s employment within advanced manufacturing has risen significantly. After 35 quarters of year-over-year growth, peak employment for women within advanced manufacturing occurred in 2019 Q3 at 160,899, an addition of 33,513 workers since the start of the decade. This level of employment represented a 26 percent increase from 2010. Today, 3 in 10 advanced manufacturing workers in Indiana are women.¹¹

The pandemic has disproportionately impacted female workers. Nationally, women’s labor force participation was approaching a record high before

the pandemic. However, 3.6 million women left the labor force between February 2020 and April 2020. September 2020 saw another drop in women’s labor force participation, as inconsistent childcare and school options forced many working mothers to remain home.

This story played out in Indiana, with declines in women’s employment across the advanced manufacturing sector over the course of 2020. Within Indiana advanced manufacturing as of 2020 Q1, the pandemic had erased all employment gains for women since 2017. From 2020 Q1 through the end of 2020, women continued to leave the advanced manufacturing workforce. In 2020 Q4, women’s employment within advanced manufacturing had fallen by 6 percent compared to pre-pandemic levels, a loss of 9,525 women workers. 2021 Q1 saw a rebound in employment, with women recovering half of the employment losses experienced during the pandemic. Despite these gains in the ongoing recovery, women’s employment remains lower than in recent years.

Women’s Employment by Quarter, Q1 2010 - Q1 2021



¹¹ Source: Census, Census Quarterly Workforce Indicators, 2010 Q1 - 2021 Q1 (unless otherwise noted). Available from <https://lehd.ces.census.gov/data/>. Accessed November 12, 2021.

55+ Workers in Advanced Manufacturing

Workers aged 55 and older make up more than a quarter of the manufacturing workforce in Indiana. One in every five workers aged 55 and older is employed within advanced manufacturing and since 2010, that number has grown by 45 percent, more than 2.5 times the rate of advanced manufacturing employment overall. Before the pandemic, employment for 55+ workers in manufacturing had risen by 45,868 since 2010. At peak employment levels in 2020 Q1, there were 137,041 advanced manufacturing workers who were 55+.¹²

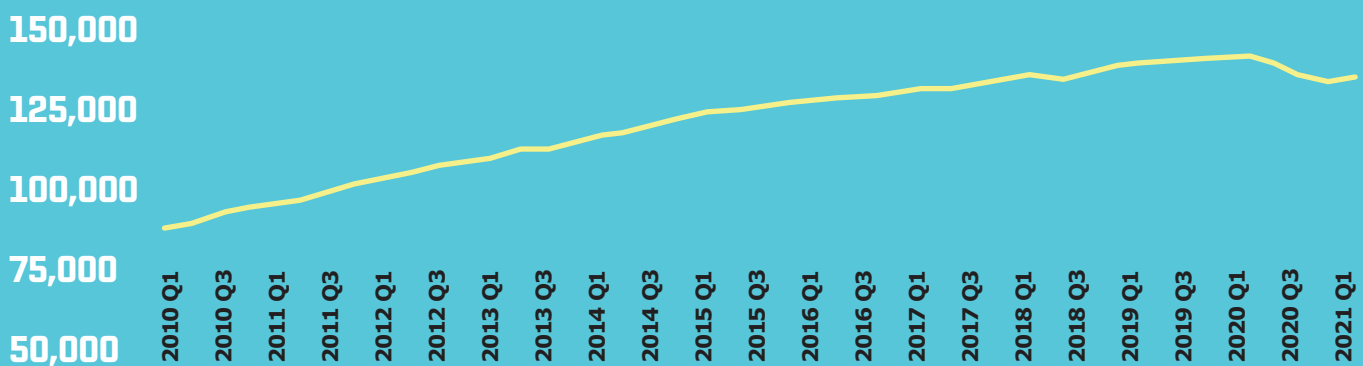
Nationally, pandemic impacts have included an increase in retirement among adults ages 55 and older. According to research by the Federal Reserve, "as of August 2021, there were slightly over 2.4 million excess retirements due to COVID-19."¹³ By 2021 Q3, more than half of U.S. adults aged 55+ indicated that retirement was the reason they

were out of the labor force.¹⁴ Retirement continues to shape labor force impacts across the country. However, as noted by the Pew Research Center, "It is unclear whether the pandemic-induced increase in retirement among older adults will be temporary or longer lasting."¹⁵

The Bureau of Labor Statistics recently released projections that suggest that labor force participation of older workers will bounce back to continue to follow long-term trends, and that current retirements could be temporary.¹⁶ If, however, workers in the 55+ cohort continue to sit out from the labor force at an increased rate, advanced manufacturing in Indiana could feel an acute impact. After a year of pandemic impacts, advanced manufacturing employment of 55+ workers remained lower than in prior years. Employment in 2021 Q1 for 55+ workers was at its lowest level since 2018, with 4,933 fewer workers than at the start of the pandemic.

Whether taking early retirement or not, many workers who are 55 and older will retire in the next 10 years. In 2021 Q1, 55+ workers accounted for 132,108 manufacturing employees. With a high concentration of 55+ workers, the advanced manufacturing industry will need to continue to pay attention to this cohort of workers in the next decade.

55+ Employment by Quarter, Q1 2010 - Q1 2021



¹² Source: Census, Census Quarterly Workforce Indicators, 2010 Q1 - 2021 Q1 (unless otherwise noted). Available from <https://lehd.ces.census.gov/data/>. Accessed November 12, 2021.

¹³ Federal Reserve Bank of St. Louis. "The COVID Retirement Boom." Available from <https://research.stlouisfed.org/publications/economic-synopses/2021/10/15/the-covid-retirement-boom>. Accessed December 8, 2021.

¹⁴ Fry, Richard. "Amid the pandemic, a rising share of older U.S. adults are now retired." Pew Research Center. November 4, 2021. Available from <https://www.pewresearch.org/fact-tank/2021/11/04/amid-the-pandemic-a-rising-share-of-older-u-s-adults-are-now-retired/>

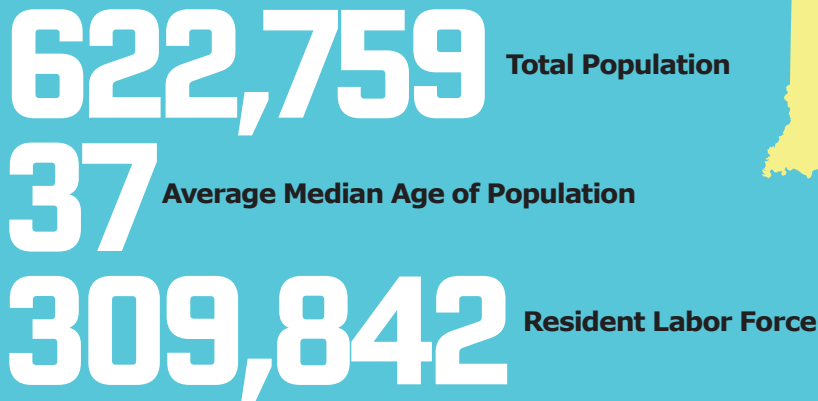
¹⁵ Fry, Richard. "Amid the pandemic, a rising share of older U.S. adults are now retired." Pew Research Center. November 4, 2021. Available from <https://www.pewresearch.org/fact-tank/2021/11/04/amid-the-pandemic-a-rising-share-of-older-u-s-adults-are-now-retired/>

¹⁶ Bureau of Labor Statistics. "Projections overview and highlights, 2020-30." Available from <https://www.bls.gov/opub/mlr/2021/article/projections-overview-and-highlights-2020-30.htm>

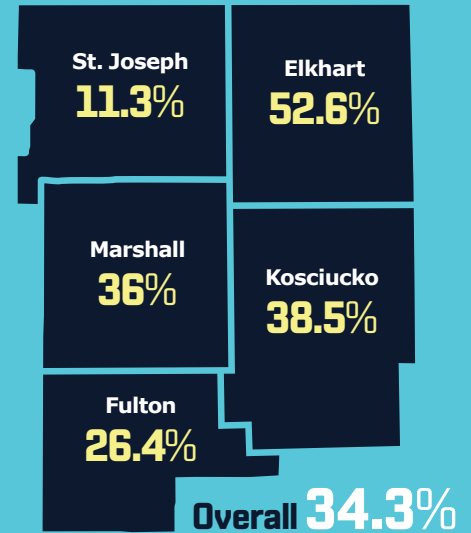
Regional Data Profiles

Evaluating workforce data on a regional basis is a critical component of workforce planning. The following profiles highlight three regions of Indiana with significant relevance within the state's advanced manufacturing sector. The regions are delineated according to the Indiana Department of Workforce Development's Economic Growth Regions.

Region 2 Workforce Statistics



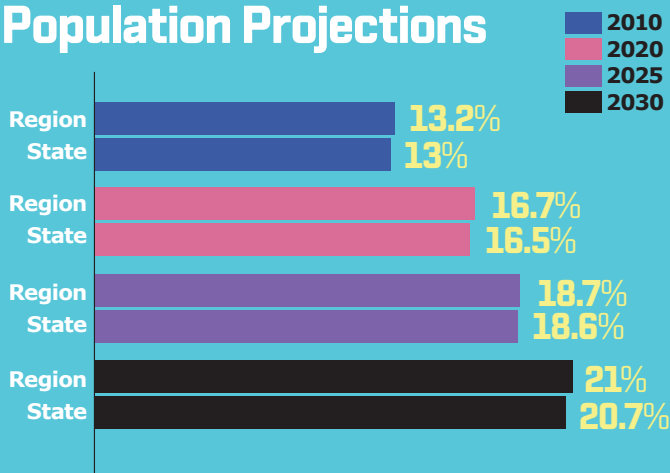
Manufacturing Intensity



Workforce Region 2 contains two metropolitan areas, South Bend-Mishawaka and Elkhart, located near the Michigan border. This region has a significant concentration of manufacturing positions, with Elkhart, Marshall and Kosciusco counties' manufacturing intensity clocking in well above the state average of 17.4%. It's population of over 620,000 residents represents 9.2 percent of the total state's population, though this proportion

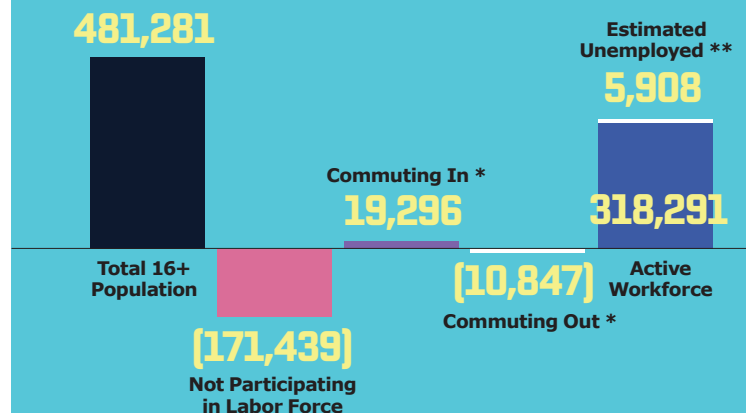
has decreased over time as population growth of 0.9 percent has lagged the overall state in the past 5 years. Commuting statistics indicate the region benefits from a net inflow of workers from neighboring geographic areas, specifically to the east and the west. The overall available workforce seeking employment within Region 2 is 1.9 percent (5,908), which by most standards is considered full employment.

Retirement Aged Population Projections



Data sources: U.S. Census Bureau, Bureau of Labor Statistics, Indiana Department of Workforce Development, and Indiana department of Revenue.

Active Workforce Estimate



*The estimated net impact of commuting in and out of the region is +8,449 workers, driven primarily by net inflows of 7,081 and 4,527 from regions 3 and 1, respectively, partially offset by an outflow to out of state areas of 2,670.

**As of November 2021. Not seasonally adjusted.

Region 3 Workforce Statistics

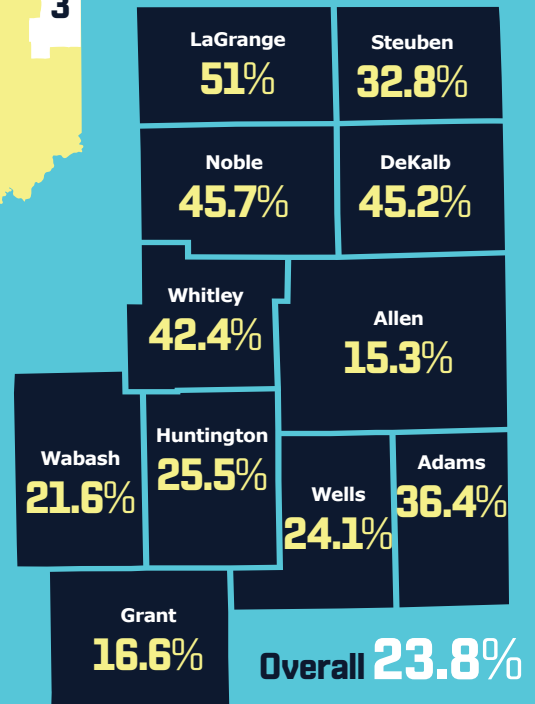
779,402 Total Population

38 Average Median Age of Population

387,911 Resident Labor Force



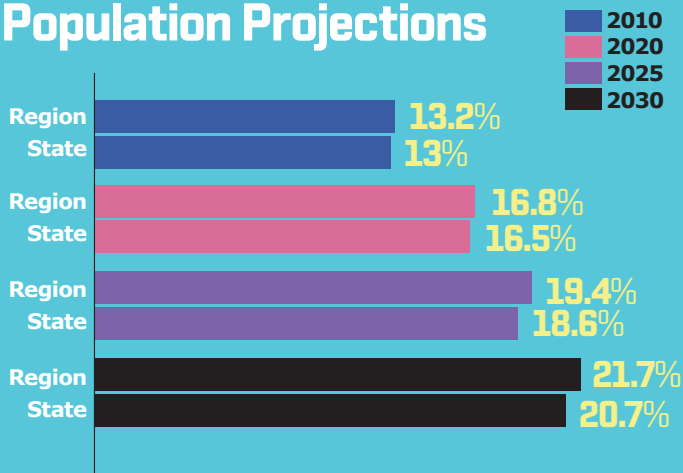
Manufacturing Intensity



Workforce Region 3 centers around Fort Wayne, Indiana's second most populous metropolitan area. It's population of nearly 780,000 residents represents 11.5 percent of the total state population. Population growth trends are in line with the state overall, increasing 0.4 percent in year-over-year in 2020 and 2.2 percent in five years. The region's manufacturing intensity of 23.8 percent is higher than the overall state of 17.4 percent, primarily driven by counties surrounding Fort Wayne; notably

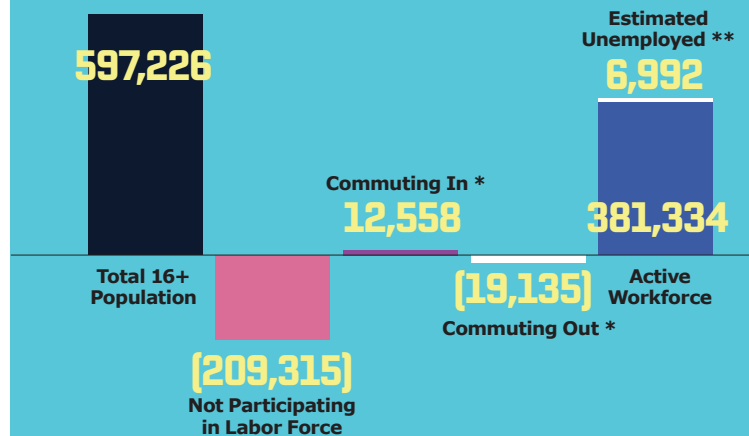
LaGrange, Steuben, Noble, DeKalb, Whitley, and Adams counties. Commuting statistics indicate that the region experiences a net outflow of workers to neighboring geographic areas, specifically workforce Region 2. The overall available workforce seeking employment within Region 3 is 1.8 percent (6,992), which by most standards is considered full employment.

Retirement Aged Population Projections



Data sources: U.S. Census Bureau, Bureau of Labor Statistics, Indiana Department of Workforce Development, and Indiana department of Revenue.

Active Workforce Estimate



*The estimated net impact of commuting in and out of the region is -6,577 workers, driven primarily by net outflows of 7,081 and 1,218 to regions 2 and out of state, respectively, partially offset by a net inflow from region 6 of 1,442.

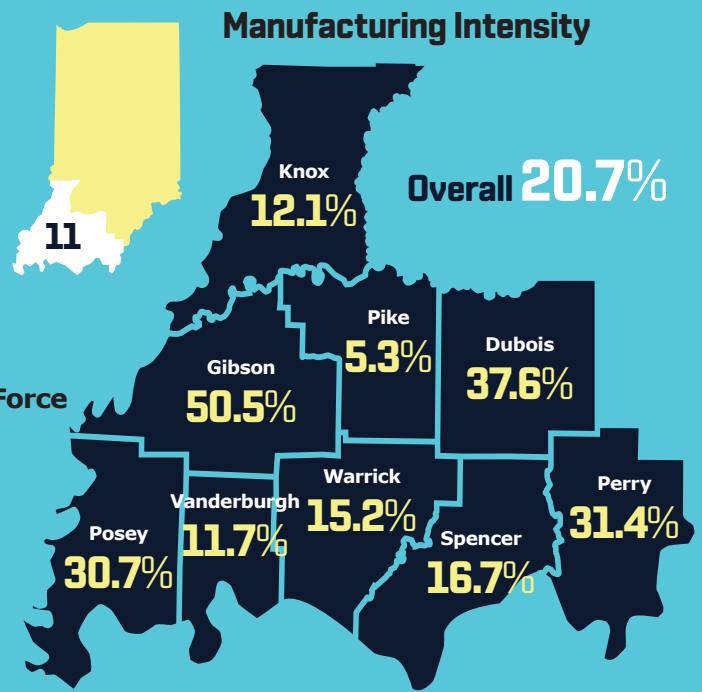
**As of November 2021. Not seasonally adjusted.

Region 11 Workforce Statistics

435,637 Total Population

40 Average Median Age of Population

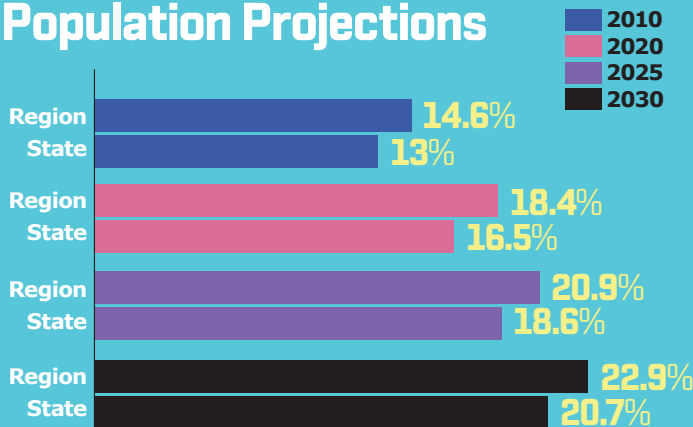
222,205 Resident Labor Force



Workforce Region 11 is anchored by Evansville on the southwestern border between Indiana and Kentucky. Workforce Region 11 is home to 6.4 percent of Indiana’s population. The average median age of 40 years old is higher than the overall state average of 38 years, indicating that impending retirements is a real threat to workforce availability in the region. By 2035, population projections indicate that nearly 23 percent of the region’s population will be over 65 years of age, up from 18 percent in 2020. The overall population of

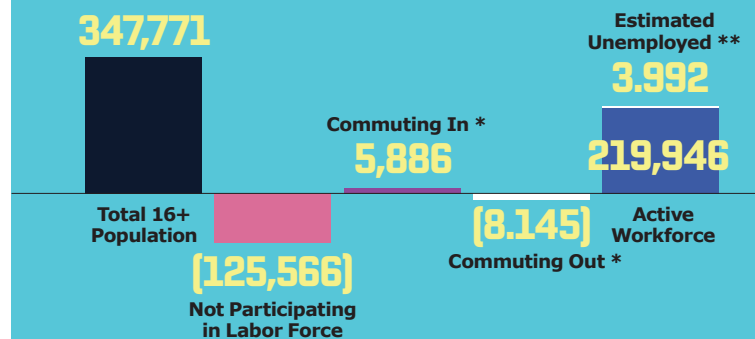
the region has also remained relatively flat in the past 5 years, compared to total state population growth of 2.2 percent. Commuting statistics indicate that the region loses more workers to outside geographic areas (mostly to out of state - Kentucky) than it brings into the region. The overall available workforce seeking employment within Region 11 is 1.8 percent (3,992), which by most standards is considered full employment.

Retirement Aged Population Projections



Data sources: U.S. Census Bureau, Bureau of Labor Statistics, Indiana Department of Workforce Development, and Indiana department of Revenue.

Active Workforce Estimate



**The estimated net impact of commuting in and out of the region is -2,259 workers, driven primarily by outflows of 3,752 to out of state areas, partially offset by a net inflow from region 8 of 1,292.

**As of November 2021. Not seasonally adjusted.

Education Pipeline

As important as the current state of the workforce is to the advanced manufacturing industry, the labor pipeline is equally as critical. The workforce pipeline can be generally characterized by three primary sources: K-12 education, post-secondary education, and adults. The following sections analyze each of these critical components as it relates to Indiana's advanced manufacturing industry.

K-12 Pipeline

While this report will focus on skill development and alignment in high school grades, it is important to note the role and importance of career exploration earlier in the K-12 continuum. From kindergarten through elementary school, children's thoughts about "what they want to do when they grow older" are already being formulated. This is a critical time for Indiana's advanced manufacturing industry to focus on messaging to parents and creating as much opportunity as possible to showcase what happens inside the four walls of an advanced manufacturing facility. Middle school grades offer industry the ability to inspire creativity and curiosity through efforts such as cross-curricular projects, the makerspace movement, coding academies, and introductory career and technical education classes. Often, this is the best time for employers to create an impression directly with tomorrow's talent. Furthermore, this work sets the stage for specific skill development, pathway selection, and work-based learning in the high school and career center settings.

Work-Based Learning

According to the Governor's Workforce Cabinet, Indiana graduates nearly 85,000 high school students every year. Of those graduates, it is estimated by the state 25,000 of those students leave high school without a plan. They are not enrolled in post-secondary education, enlisted in the military or employed. Additionally, it is also estimated by the state 10,000 post-secondary freshmen do not return to school for a second year. Therefore, we have 35,000 students annually trying to find their way.

Furthermore, the proportion of 15- to 17-year-olds with demonstrated work experience has dropped from 48 percent in 1968 (Boomers), to 30 percent in 2002 (Millennials), and 19 percent in 2018 (Gen Z).

Partly in recognition of these issues, the State of Indiana recently reformed graduation requirements to ensure every Hoosier student graduates high school with (1) a broad awareness of and engagement with individual career interests and associated career options, (2) a strong foundation of academic and technical skills, and (3) demonstrable employability skills that lead directly to meaningful opportunities for post-secondary education, training, and gainful employment.¹⁷ This reform took place in 2019 and will be required for all students in the state, beginning with the 2022-2023 graduating class.

One of the three options to demonstrate employability skills is through a work-based learning experience, which is a strategy to reinforce academic, technical, and social skills learned in the classroom through collaborative activities with employer partners. Work-based learning experiences allow students to apply classroom theories to practical problems, to explore career options, and pursue personal and professional goals.

For employers, when it comes to the current advanced manufacturing labor shortage, rapid changes in advanced technology and skills needs are creating greater demand for life-long learning and career development within advanced manufacturing. To address changes in the workforce and labor market in an impactful way, public and private sector leaders must work together to develop and implement scalable solutions. In addition to building strong K-12 pipelines, targeted work-based learning programs are becoming increasingly relevant.

Conexus is actively involved in this effort to bridge connections between industry and education and to expand work-based learning opportunities. By leveraging foundational elements of Ascend Indiana's Modern Apprenticeship Program, Conexus is helping advanced manufacturing employers develop effective work-based learning programs in concert with education partners. Currently, Conexus is engaging with a variety of individual employers and identifying larger geographic pilot regions where best practices can be established. Through these pilot regions, Conexus will develop resources that can be shared and implemented throughout Indiana.

¹⁷ Per the Indiana State Board of Education. Learn more about graduation requirements here: <https://www.in.gov/doe/files/graduation-requirements.pdf>

Below are some examples of work-based learning programs currently being implemented in the State of Indiana and nationwide:

Henry Ford College's Multi-Skilled Manufacturing Maintenance (Mechatronics) Program

A free two-year pre-apprenticeship program through which junior and senior high school students can earn undergraduate credit hours. The combination of classroom and laboratory experience offers skills building in modern manufacturing. Upon completion, students will have earned up to 28 hours of undergraduate credits toward Henry Ford's associate degree and the potential to be accepted directly into an apprenticeship program following graduation.

Partnership to Advance Youth Apprenticeship (PAYA)

A multi-year program led by New America that helps states and cities expand access to high-quality apprenticeships for high school age youth. Research shows that 91 percent of apprentices retain employment following their program and 89 percent of youth apprentices reach a three-year retention. Furthermore, apprenticeships have demonstrated the ability to increase productivity, reduce recruitment costs, and enhance employee motivation. In 2019, New America facilitated a 12-month planning process to build a strategy for youth apprenticeships in Indiana. In its key findings, the project team noted the importance of building a statewide apprenticeship system combined with coordinated local piloting to meet the diverse needs across Indiana.

CareerWise

An apprenticeship system that began in Colorado to address the state's skilled-worker shortage and has since expanded its efforts. They have developed a scalable framework that allows for more efficient, cost effective apprenticeship launches across the country, including Indiana. CareerWise Elkhart County recently received a major grant from Bloomberg Philanthropies to expand high-quality youth apprenticeships across northern Indiana. This investment will uplift a greater number of youth through access to a postsecondary education and wage earning opportunity before completing high school, while also offering recruitment and talent building resources to employers.

Modern Apprenticeship Program (MAP)

Inspired by the work in Colorado, Conexus Indiana, TechPoint, and other key state and regional leaders have come alongside Ascend Indiana to launch the Modern Apprenticeship Program (MAP). MAP is a new apprenticeship model focused on preparing high school students for careers in high-demand industries, notably Advanced Manufacturing. MAP is a paid two- to three-year work-based learning experience with local employers, where students will emerge with a high school diploma, college credits, relevant credentials, and professional experience. During the first two years of the apprenticeship, high school students spend a portion of their day in school and the remainder engaged in work-based learning experiences. After graduating high school, the third year is focused primarily on work-based learning while finishing the requirements to earn industry recognized credential(s). This schedule provides students with the flexibility to maintain extracurricular activities and social connections while in high school and increases the rate of retention. The model began in the Indianapolis area and is currently launching pilots in regions throughout the state.

Endress+Hauser: Patient, targeted approach to talent development

Even though it's part of a global company with more than 15,000 employees in more than 100 countries, Endress+Hauser USA takes a decidedly local approach to cultivating talent for the future.

For its U.S. operations – where some 1,000 employees work, roughly half of them in Greenwood – the Swiss measurement and automation technology firm focuses its student programs on a relatively small area. For example, its annual Community Career+Education Forum, which attracts hundreds of Johnson County and southern Marion County students from grades 7 to 9, along with their parents and educators, to an opportunity to mingle with manufacturing professionals in an event highlighting STEM and advanced manufacturing career opportunities.

That clearly defined geographic footprint is indicative of Endress+Hauser's overall approach to talent development. The initiative has succeeded, Director of Workforce Development Nicole Otte says, by staying focused and taking the time to do things right, whether they're doing the annual forum, conducting school visits, hosting information nights or other outreach activities.

"We didn't do all the things we're doing now in a day," she says. Her advice to organizations looking to execute a more targeted approach to talent development is to start small, whether that first step is signing up to be a guest speaker at a school or implementing a new internship or mentorship program. She also suggests identifying your geographic footprint and desired impact upfront, which she believes to be a critical factor contributing to E+H's programmatic success.

While it's always been important, the current worker shortage makes it imperative that the advanced manufacturing industry engage future employees before they start down a career path, Otte says, but doing so requires patience and a long-term commitment. Firms willing to take that long view will see a return on their investment over time in the form of a more robust talent pipeline, decreased turnover, or other benefits.

Otte adds that Endress+Hauser's experience also highlights the importance of engaging parents and educators who have influence over a student's decisions about the future, and to get those people on-site at manufacturing facilities along with the student when possible. Her firm's success has come from recognizing that the purpose of such outreach events, community forums and in-school initiatives is not to "close the deal" on the first meeting. Instead, the job is to build trust and relationships that position employers to inform a student's career path.

One thing that likely won't work terribly well, Otte suggests, is trying to go it alone. It's best to build consortiums with other firms in the industry, working together to promote the opportunities to be found throughout the field and collaborating with community organizations, economic development groups and others that can help make your case.

Following guidelines like these has helped Endress+Hauser build its local workforce and maintain a high employee-retention rate, Otte says, even in the midst of the pandemic and worker shortage.

"The great resignation? We're feeling it also," Otte says. "But I feel it's not to the level of some organizations, and that's because, with our early talent initiative, our funnel is more full."

Indiana Manufacturing Competitiveness Center (IN-MaC)

The Indiana Manufacturing Competitiveness Center (IN-MaC) at Purdue University supports Indiana's competitive edge in the global advanced manufacturing marketplace. The organization is a partnership between Purdue University, Ivy Tech and Vincennes University, and focuses on three areas: technology adoption and transfer, research for future competitiveness and education and workforce development.

IN-MaC's talent programs are delivered to K-12 and higher education students as well as the incumbent workforce and include work-based learning opportunities and exposure to technologies and innovations that are driving industry growth. Not only do these programs provide practical skills, but they increase awareness of the many career opportunities in Indiana's advanced manufacturing industry. Additionally, IN-MaC programs are developed in collaboration with industry to ensure students gain the skills needed to pursue careers with Indiana manufacturers.

Specific talent programs include:

Design and Innovation Studios:

These studios serve schools, educators, students and industry through hands-on experience with 3D printing, robotics, and engineering and science learning modules. IN-MaC has industry studios located at Subaru of America Indiana, Toyota and Honda, and more than 20 elementary school-based studios throughout the state. More than 10,000 Indiana students have participated in the studio activities.

Manufacturing Internship Program:

Purdue University, Ivy Tech and Vincennes students can participate in paid internships at manufacturing facilities to experience real-world manufacturing systems and technology as well as business processes and production support.

Micro-Grant Program:

Since its inception in 2018, the Purdue IN-Mac Micro-Grant Program has awarded 225 grants impacting more than 114,000 K-12, post-secondary and incumbent workers in nearly 90 percent of Indiana's counties. The program provides between \$1,000 and \$2,000 in grant funding to organizations to increase access to and awareness of Indiana manufacturing. Programs have increased manufacturing career awareness through STEM-related activities, hands-on experiences, internships, and access to robotics, digital technologies and automation.

Pathway System for Education and Industry:

IN-Mac connects industry with local schools to develop and implement innovative work-based learning opportunities.

For more information on how to get involved with IN-MaC, contact Sascha Harrell, IN-MaC Director of Education & Workforce, (765) 494-2278 or Lisa Deck, Program Manager of Education & Workforce, adeck@purdue.edu, (812) 593-4288.

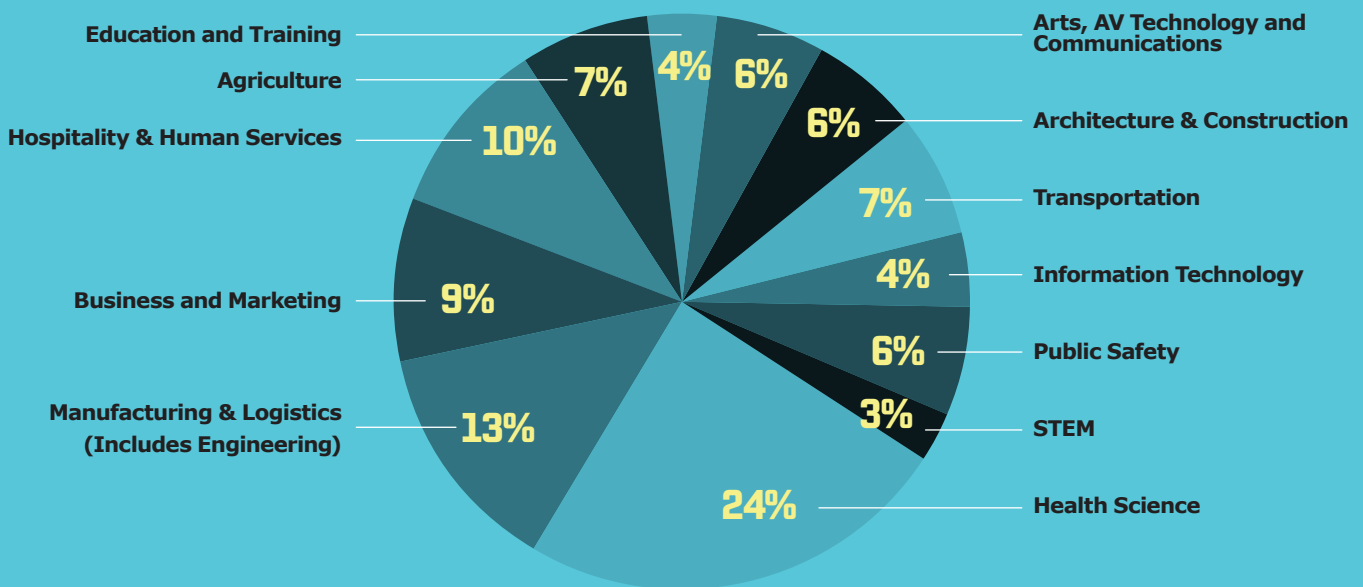
Current State of Career and Technical Education (CTE)

In Indiana, Career and Technical Education (CTE) enrollments for the 2019-20 school year total 151,172, with many students engaging within multiple pathways. However, not every student who enrolls in a CTE pathway achieves concentrator

status. A CTE Concentrator must earn a C average after completing at least two non-duplicative, advanced courses (courses beyond introductory level) within a single program or program of study.

Advanced Manufacturing and Logistics-related (AML) pathways were the second-most popular category for the 2019-20 student cohort, with 19,020 enrollments and 6,580 students achieving concentrator status in an AML pathway. As shown in the pie chart below, AML pathways ranked after Health Sciences-related pathways and slightly ahead of Business & Marketing-related pathways. Of this AML enrollment cohort, approximately 34.6 percent achieved concentrator status, which is about average compared to other pathway clusters. Pathway clusters with significantly higher achievement of concentrator status include STEM, public safety, arts, and transportation.

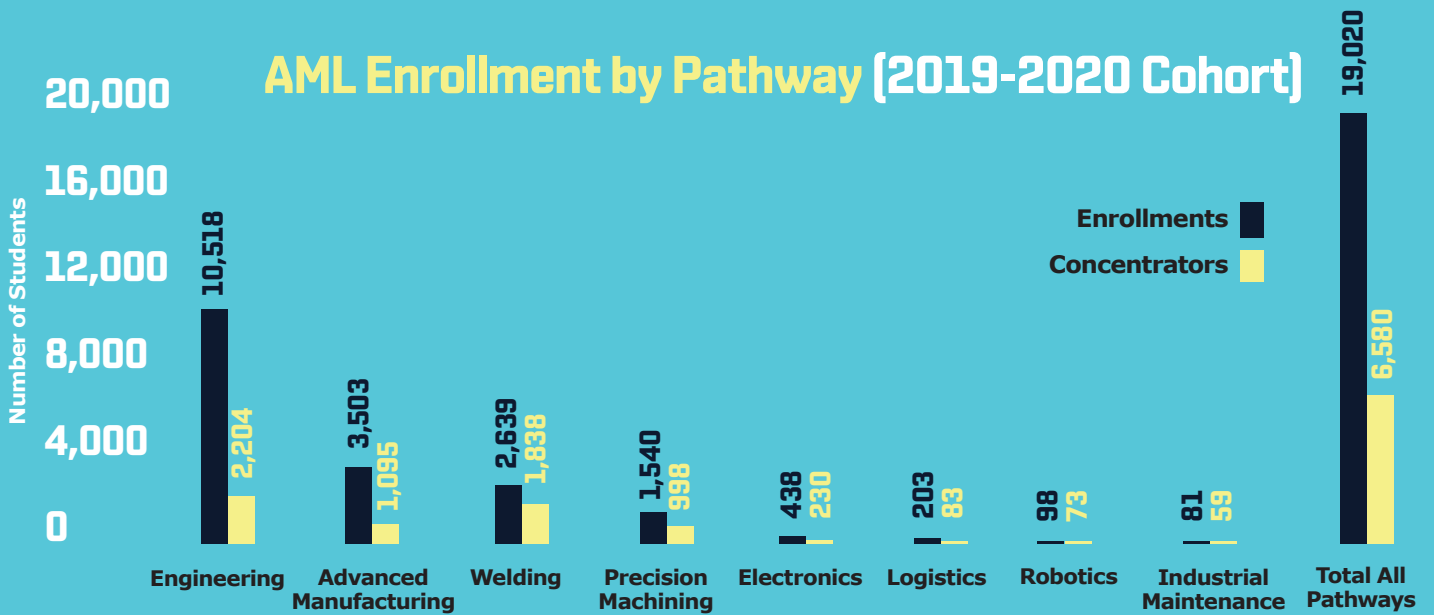
CTE Concentrators by Pathway Cluster (2019-2020 Cohort)



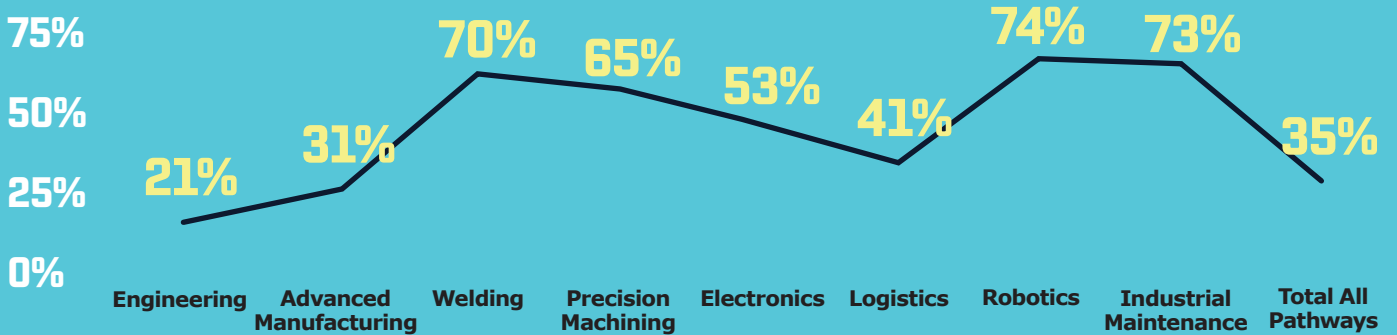
Source: Based on data obtained from the Governor's Workforce Cabinet.

Note: excludes unspecified pathways, which primarily consists of those opting to enroll in the general college and career preparation elective without enrolling in any specific CTE pathway electives.

AML Enrollment by Pathway (2019-2020 Cohort)

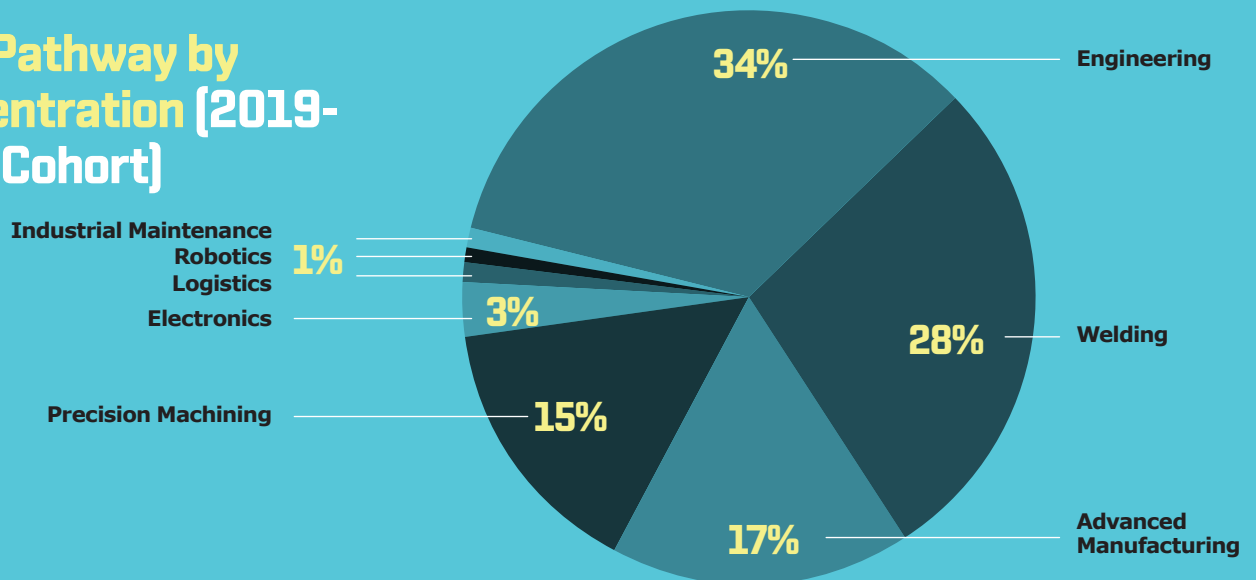


Concentrator Status Achieved



Source: Based on data obtained from the Governor's Workforce Cabinet.

AML Pathway by Concentration (2019-2020 Cohort)

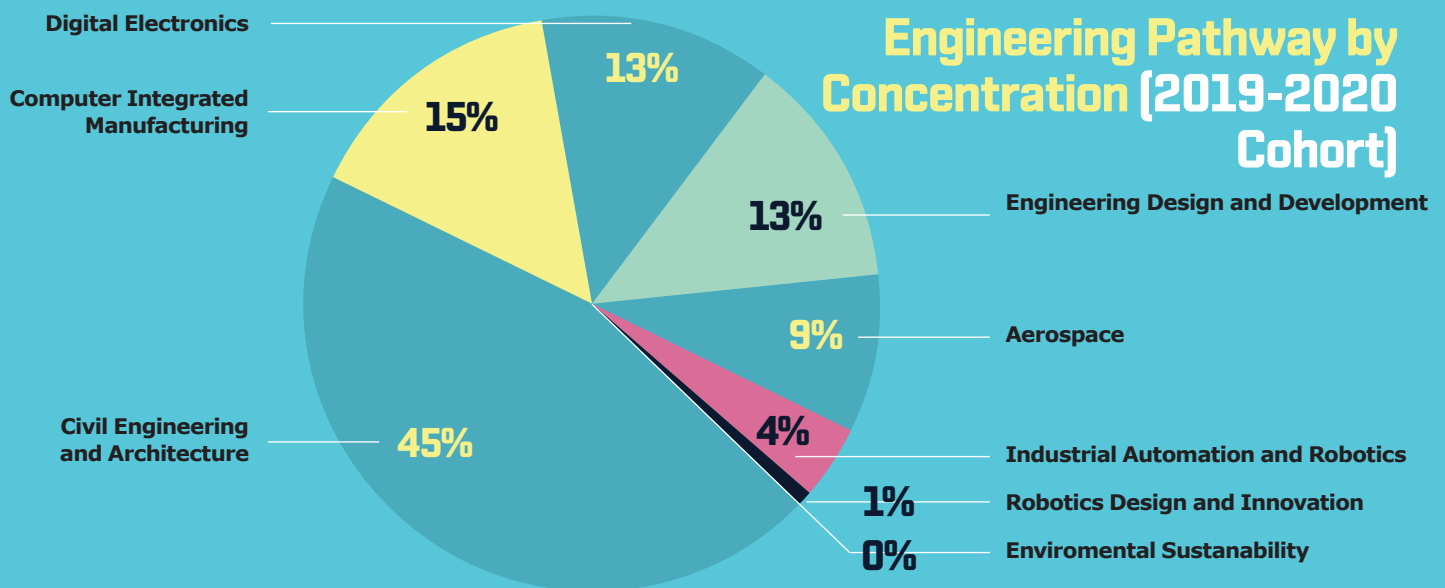


Source: Based on data obtained from the Governor's Workforce Cabinet.

The most popular pathway amongst AML enrollments was Engineering, followed by Advanced Manufacturing. However, only 21 percent of those enrolled in the Engineering pathway achieved concentrator status, compared to 31 percent for Advanced Manufacturing, 70 percent for Welding, and 65 percent for Precision Machining.

The difference in percent concentrator status achieved is reflected in the pie chart on the previous page where Engineering represents 34 percent of concentrators, followed by Welding at 28 percent and Advanced Manufacturing at 17 percent.

Engineering pathways are included within the AML pathway cluster due to the close alignment to AML-related workforce needs and job openings. About a third of engineering pathway students who achieved concentration status chose to focus in areas more directly related to AML, such as computer integrated manufacturing, engineering design and development, industrial automation and robotics, or robotics design and innovation. It is important to note, however, that approximately 60 percent of students who enrolled in an engineering pathway may not have access to more advanced courses in engineering required to achieve concentrator status. This pool of students could also be great candidates for AML employers.



Source: Based on data obtained from the Governor's Workforce Cabinet.
 Note: excludes unspecified concentrations, which primarily consists of those who complete Project Lead the Way engineering classes but do not continue on to achieve concentrator status by completing more advanced and specified engineering electives.

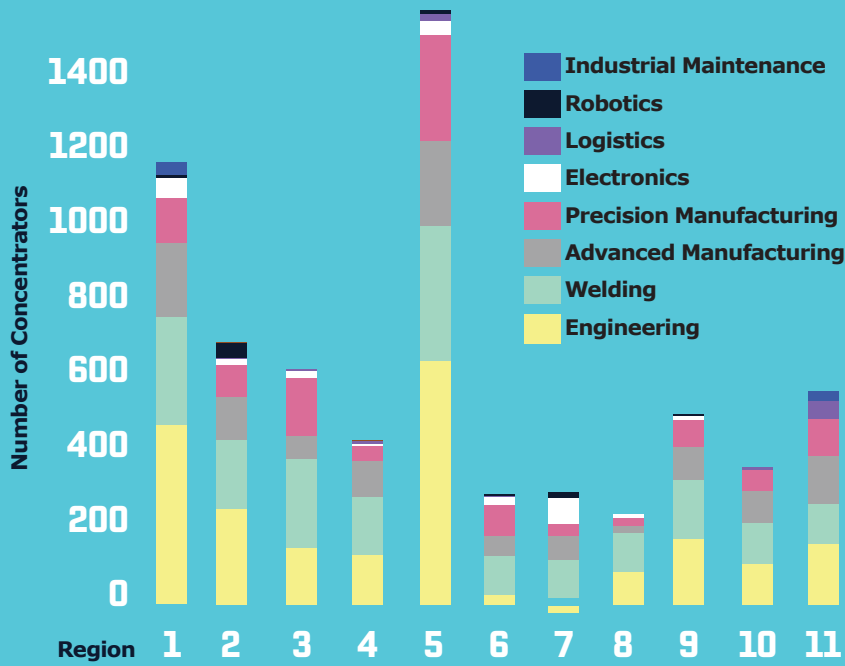
Regional Analysis

Further analysis of CTE pathway data reveals that there is significant regional variation in concentrations by AML pathway (see page 23 for regional analysis). This is attributable both to student choice as well as the availability of electives to achieve certain pathway concentrations. For instance, here are a few observations based on regional analysis:

- Region 5 concentrators skew heavily toward engineering
- Precision machining is disproportionately popular in Regions 3 and 6, although Region 5 still had the most precision machining concentrators of all the regions

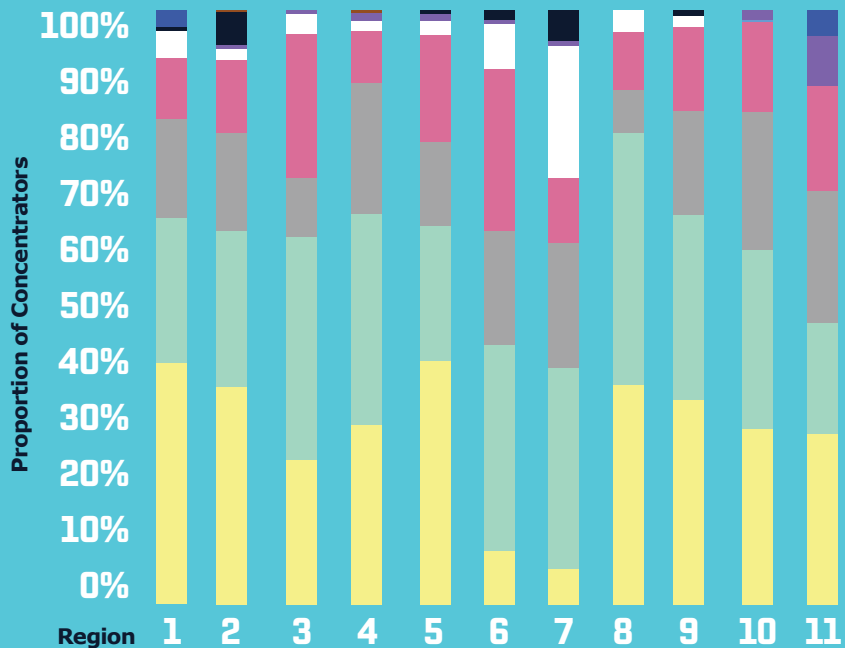
- While still a small proportion of overall concentrators, some regions have better representation of students achieving concentrator status in less popular pathways than others:
 - Regions 2 and 7 are the only areas of the state with a meaningful proportion of students achieving concentrator status in robotics
 - Industrial Maintenance concentrator status is clustered, almost exclusively, in Regions 1 and 11
 - There are more logistics concentrators in Region 11 than all other regions combined

Total AML Concentrators by Pathway, by Region (2019-20 Cohort)



Source: Based on data obtained from the Governor's Workforce Cabinet. The regions are delineated according to the Indiana Department of Workforce Development's Economic Growth Regions, which can be found here: https://www.stats.indiana.edu/maptools/maps/boundary/economic_growth_regions.pdf

Proportion of AML Concentrators by Pathway, by Region (2019-20 Cohort)



Source: Based on data obtained from the Governor's Workforce Cabinet. The regions are delineated according to the Indiana Department of Workforce Development's Economic Growth Regions, which can be found here: https://www.stats.indiana.edu/maptools/maps/boundary/economic_growth_regions.pdf

Comparing CTE With Open Positions

With 517,185 workers as of 2021Q2, advanced manufacturing represents nearly 18 percent of the statewide workforce.¹⁸ Despite the sector employing nearly 2 in 10 workers statewide, only 2 in 100 high school students are CTE concentrators within advanced manufacturing and logistics, and fewer than 6 in 100 are even enrolled in an advanced manufacturing and logistics CTE course.¹⁹

The CTE pipeline of enrollments and concentrators in manufacturing and logistics are insufficient to fill the existing openings in the sector. The number of open positions within advanced manufacturing across Indiana statewide is estimated at 7 percent to 11 percent, representing 36,200 to 56,900 open positions. Current advanced manufacturing and logistics CTE enrollments are 19,020, which would cover at best half of the open positions, but only 6,580 students have a concentration in advanced manufacturing and logistics, which would cover at best 18 percent of the existing demand for workers.

Statewide, the gap between the current unfilled positions and the CTE pipeline ranges from a low estimate of 29,620 to a high estimate of 50,320. Regional variations for CTE uptake exist, but the CTE concentrator pipeline is not sufficient to fill current open positions in any Economic Growth Region (EGR). Indiana's CTE pipeline falls significantly short of meeting the market demand for workers in advanced manufacturing and logistics, with the largest gaps in EGRs 2, 3, and 5, which are some of the most manufacturing-intensive regions in the state.

Comparison of CTE Concentrators and Unfilled Positions

Region	Employment Manufacturing, 2021 Q2	Unfilled Mfg Positions (Estimate of 7% to 11%)	CTE Concentrators Manufacturing & Logistics	Covered by CTE Concentrators (Percent of Unfilled Positions)	Remaining Gap (Unfilled Positions - CTE Concentrators)
EGR 1	41,600	2,900 to 4,600	1,140	25% to 39%	1,760 to 3,460
EGR 2	107,100	7,500 to 11,800	680	6% to 9%	6,820 to 11,120
EGR 3	81,200	5,700 to 8,900	610	7% to 11%	5,090 to 8,290
EGR 4	48,100	3,400 to 5,300	420	8% to 12%	2,980 to 4,880
EGR 5	88,800	6,200 to 9,800	1,530	16% to 25%	4,670 to 8,270
EGR 6	18,700	1,300 to 2,100	290	14% to 22%	1,010 to 1,810
EGR 7	11,400	800 to 1,300	300	24% to 38%	500 to 1,000
EGR 8	18,000	1,300 to 2,000	230	12% to 18%	1,070 to 1,770
EGR 9	40,100	2,800 to 4,400	490	11% to 17%	2,310 to 3,910
EGR 10	18,700	1,300 to 2,100	360	18% to 28%	940 to 1,740
EGR 11	43,500	3,000 to 4,800	550	11% to 18%	2,450 to 4,250
Statewide	517,200	36,200 to 56,900	6,580	12% to 18%	29,620 to 50,320

Source: Employment figures from Hoosiers by the numbers, 2021 Q2. Unfilled Positions estimate from Conexus Indiana 2021 Workforce & Wages Survey. CTE Enrollment and Concentrator based on data obtained from the Governor's Workforce Cabinet.

¹⁸ Hoosiers by the numbers, 2021 Q2

¹⁹ School Enrollment Data from Indiana Department of Education. CTE Enrollment and Concentrator based on data obtained from the Governor's Workforce Cabinet.

Post-Secondary Pipeline

There are approximately 1.56 million people in Indiana with an associate degree or higher, and an additional 0.89 million with at least some post-secondary education but without a degree.²⁰ This equates to 55 percent of the population aged 25 years or older.

For the 2020 academic year, there were 285,000 students enrolled in a credential, college, or graduate program.²¹ There are 126 post-secondary institutions across the state that help attract, develop and retain a diverse and talented workforce in the state. These institutions award more than 70,000 certificates, associate, and bachelors' degrees annually.²¹

This pipeline of workers with some level of post-secondary education is an important piece of the puzzle for advanced manufacturing employers, especially those seeking to fill critical positions such as engineering, IT, administration, and leadership.

The Conexus Indiana 2021 Workforce & Wages Survey indicated that approximately 23 percent of near-term projected open positions will require some form of post-secondary education, including a technical degree or certificate, a four-year bachelor's degree, or a master's degree.

Select Post-Secondary Institutions in Indiana



²⁰ Source: U.S. Census Bureau & American Community Survey, 5-year estimates, via Stats Indiana. Available from http://www.stats.indiana.edu/dms4/new_dpage.asp?profile_id=302&output_mode=1. Accessed November 12, 2021.

²¹ Source: Indiana Commission for Higher Education. Public Enrollment and Degree Facts, Available from https://public.tableau.com/app/profile/che.staff/viz/FB_11/Story1, Accessed November 19, 2021. Indiana Certificates Report 2020, Available from https://www.in.gov/che/files/2020_Certificates_Report_02_17_2021.pdf, Accessed November 19, 2021.

Below is an example of a modern adult apprenticeship program for post-secondary students

The Federation for Advanced Manufacturing Education (FAME)

The Federation for Advanced Manufacturing Education (FAME) is a premier workforce education and development program with 32 chapters in 12 states across the country. This 5-semester earn-and-learn model has garnered the attention of educators, employers, students, and policymakers due to its successful mix of classroom instruction and paid on-the-job training. FAME's earnings structure allows students to graduate debt free with an associate degree and certification as an Advanced Manufacturing Technician (AMT). In addition to offering these credentials, the program emphasizes overall career development. With technical training accounting for only one-third of the curriculum, students have time to practice important manufacturing core exercises and professional behaviors, building the soft skills necessary to grow a multidimensional career.

FAME's apprenticeship model is particularly unique because it is an employer-educator collaboration managed by the employer, not the educator. In this model, a group of local companies forms an employer collective. Together, this collective selects its community college partner, oversees curriculum development, and manages student recruitment. Kentucky FAME, the oldest FAME state network, serves as an exemplary model with demonstrated success across student graduation rates, satisfaction, and earnings. Its program completion rate is significantly higher than other comparable non-FAME technical programs. Additionally, most participants believe the program was the right decision for them and would recommend it to a close friend or relative. Furthermore, the median earnings of Kentucky FAME participants is higher than non-FAME participants 1 year after graduation, a gap that widens significantly 5 years after graduation.

- 80 percent — FAME participants who completed their program of study, compared with 29 percent of other students in comparable programs
- 97 percent — FAME participants who felt the program was the right decision for them and would recommend it to a close friend or relative
- \$59,164 — Median earnings of FAME participants 1 year after graduation, 63 percent higher than non-FAME technical graduates with median earnings of \$36,379
- \$98,000 — Median earnings of FAME participants 5 years after graduation, 86 percent higher than non-FAME technical graduates with median earnings of \$52,783

Source: Kentucky FAME: Fulfilling the Promise of Apprenticeships, October 2020, Opportunity America and the Brookings Institute

Kentucky's program demonstrates how the FAME model, when executed with a focus on quality and inclusion, can enhance equity and economic mobility. Based on a study conducted by Opportunity America and the Brookings Institution Kentucky's FAME program has been particularly effective for less-prepared high school students and mid-career adults. It's an opportunity to achieve a post-secondary credential and high-earning career for those who might not have thought it possible for themselves.

Indiana FAME (INFAME) is part of the national FAME network and launched its AMT program in 2019. It has quickly grown to 4 chapters - Northeast Indiana, Central Indiana, Southern Indiana, and Hoosier - and is considered to be one of the most extensive networks of the 12 participating states. For more information on Indiana's FAME chapters, visit indianafame.com.

Second-Chance Hoosiers

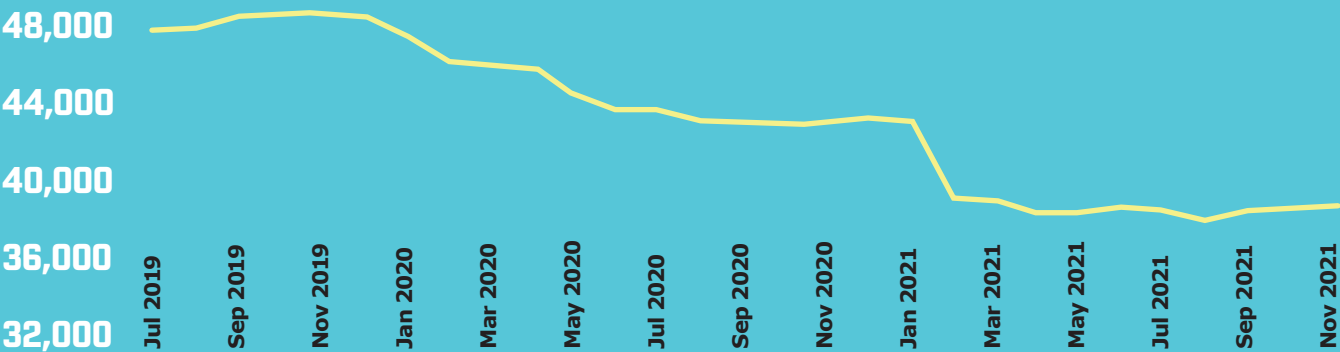
Adult Pipeline

With a workforce participation rate of 62.4 percent, Indiana’s total labor force is an estimated 3.3 million people. In addition to new workers being added through the K-12 and post-secondary pipelines, there are specific groups of the adult population that employers should consider as a meaningful resource for workforce planning. In the following sections we highlight three population groups that share the common circumstance of transition – formerly incarcerated individuals, former military service members, and refugees.

The population of adult offenders in the State of Indiana’s correctional system (including state department of correction, community correction programs, and local jail holds combined) was approximately 38,500 in November 2021.²² In recent years, the number of new releases significantly outpaced new admissions, resulting in a downward trend in population over time.

In 2020, there were 9,782 adult releases across all Indiana counties.²³ Of these, approximately 56 percent were released with community supervision and parole, which often entails more intensive work release supervision and transitional services provided by the state.²⁴ The remaining 44 percent were released under probation or discharge, which generally require a lower level of supervision and would be the most relevant representation of work eligibility.

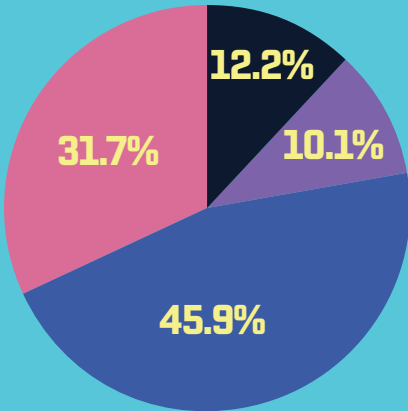
Adult Offenders, Population Trend Summary



Source: Indiana Department of Correction

Adult Releases by Releasing Supervision Type, 2020

- Discharge
- Community Program (CTP)
- Parole
- Probation



Source: Indiana Department of Correction

²² Source: Indiana Department of Correction. <https://www.in.gov/idoc/files/Indiana-Department-of-Correction-November-2021-Total-Population-Summary.pdf>, Accessed December 8, 2021.

²³ Source: Indiana Department of Correction. <https://www.in.gov/idoc/files/Adult-REL-CY2020.pdf>, Accessed December 8, 2021.

²⁴ Source: Indiana Department of Correction. <https://www.in.gov/idoc/about-idoc/community-supervision-and-parole/>, Accessed January 11, 2022.

Below are two examples of second-chance programs in Indiana:

Catapult Indiana

Even when employers successfully hire talent for entry-level production jobs, they frequently struggle to retain them. Some employees just can't envision a path toward long-term career success in the advanced manufacturing industry.

Conexus Indiana launched Catapult in response to this challenge, and it has helped Hoosiers throughout the state secure employment and grow in advanced manufacturing careers.

Catapult is a 160-hour, full-time, paid training program combining work-based learning with classroom instruction focusing on problem solving and teamwork while providing critical context for the importance of each production role. It's this combination of training that helps students in the Catapult class understand the importance of their work in the manufacturing process and to see opportunities for career growth.

The program is offered in six Indiana communities with community colleges and other education partners delivering the training, and with industry

and local community organizations ensuring hiring opportunities immediately upon program completion.

In many instances, Catapult training ends on a Friday, with on-site interviews and resulting job offers yielding positions that start the following Monday, transitioning formerly underemployed and unemployed adults into entry-level production workers. Data shows that 12 to 18 months post-program completion, Catapult graduates have often received promotions to supervisor or equivalent status—with a commensurate wage increase—and have access to further promotions throughout their industry tenure.

Catapult is possible through a combination of funding provided by philanthropic, industry, community and economic development organizations. CTE funding supports high school implementations of Catapult, designed to address the 30 percent, or 25,000 students, who leave high school without a plan.

Nehemiah Manufacturing Second Chance Program

Co-Founder and CEO, Dan Meyer, started Nehemiah Manufacturing with the goal of bringing jobs back to Cincinnati, Ohio. Early in its founding, the company decided to embrace second chance hiring to make a meaningful impact in the community and propel company growth. Despite its initial effort and intention, Nehemiah's Second Chance program was not an immediate success. When the company first began accepting applicants with criminal records and other backgrounds that typically impede hiring, employees entering through this program were leaving without notice after only a few months. Committed to its cause, Nehemiah pushed forward with additional research and adjustments that transformed its Second Chance program into a leading initiative.

Through their holistic approach, Nehemiah offers re-entry support that goes well beyond a job offer. The program is led by a social support team, composed of both in-house staff and community partners, that meets with new employees, assesses their immediate challenges, and builds a personalized plan to remove barriers. The team addresses issues around housing, transportation, outstanding debts, substance abuse, and mental health. Nehemiah addresses these barriers through employee benefits, such as:

- paid public transportation prior to first paycheck,

- on-site peer counseling and addiction recovery group meetings,
- personal finance and computer literacy classes,
- resources to support GED or higher educational attainment, and
- legal assistance.

The results have been impressive. By 2021, 130 of its employees, or roughly 75 percent of the company, have been welcomed through the Second Chance program. According to Nehemiah, integrating social services into its employee benefits has helped the company reduce its turnover rate to 15 percent and realize an approximate 40 percent improvement in efficiency per employee after 3 months on the job. In these ways, the benefits of the program outweigh the costs, so that net savings can be reinvested into the company and its employees. Nehemiah ranks in the top 20 percent of manufacturing firms in earnings, which the company's CEO attributes, in large part, to the success of the Second Chance program.

Nehemiah's model has now been adopted by more than 80 companies, including Kroger Manufacturing, JBM Packaging, and Batesville Products, Inc. For companies looking to start and scale their own second chance program, Nehemiah has shared its biggest lesson learned: partnering with local service agencies is vital to a successful program, and if possible, hiring an on-staff social worker can be greatly beneficial.

Former Military Service Members

According to The Manufacturing Institute, approximately 200,000 people transition out of the military every year, many with skills that are particularly well suited for careers in manufacturing. Further, the current veteran population in Indiana is 201,000. As such, companies are realizing the benefits of tailoring recruitment and employee benefits to meet the unique needs of veterans so that they may transition to a lasting career in manufacturing.

INvets

Specific to Indiana, INvets is a nonprofit organization founded by veterans that helps Indiana employers recruit and retain former military service members through skills translation, marketing opportunities, financial assistance for veteran relocation, and more. Roughly 2,000 Servicemembers transition back to Indiana every year. On average, INvets over the last three years has been responsible for 160 servicemembers annually relocating to the state of Indiana. Visit invets.org for more information.

Private Sector Examples

Support for former military service members begins with the way companies are marketing their available jobs. To expand equitable hiring, whether it relates to the military community or other diverse candidates, employers are creating more inclusive job descriptions and requirements. This involves a more comprehensive review and understanding of the types of skills and experiences that will lead to a candidate's success within a role. With inclusive job postings, a company may welcome a greater number of qualified applicants and better demonstrate the value it places on diverse talent. One such example is Michigan-based manufacturer Dow Inc.'s use of a military degree equivalents. Dow offers military service equivalents in all job postings with bachelor's or associate degree requirements, recognizing the value of military training and experience in lieu of, or in conjunction with, more traditional education.

When it comes to retention, companies have developed long-term support initiatives to assist military community members not only with their transition but also their career development. Such initiatives include flexible leave of absence policies for active-duty and reserve service members, employee resource groups, mentorship programs, and assistance for military spouses.

Foreign-Born Population

Indiana's population of foreign-born individuals is estimated to be nearly 350,000 as of 2019.²⁵ This represents 5.2 percent of the total population – a meaningful proportion of the talent pool in an extremely tight labor market environment. This

population is estimated to have increased 10.6 percent over the last five years, compared to a 2.2 percent increase in overall population. It is estimated that 40 percent of the individuals comprising this population are naturalized U.S. citizens, and 7 out of 10 entered the U.S. prior to 2010.²⁶

Refugees, other nontraditional hires bring opportunities

When Tim Siddiq encourages area businesses to hire refugees and other foreign-born workers, his urging is driven by good experiences and a commitment to hiring from a nontraditional talent pool.

Siddiq serves as Chairman and CEO of Indianapolis-based freezer warehouse operation MW Cold, which has embraced that commitment for decades because the firm believes it benefits everyone involved. The company gets to address labor challenges and reduce turnover. Employees find acceptance, opportunity and purpose, and the community gains a stepping stone for residents' economic mobility.

Acknowledging that hiring these workers might require some extra work – getting visas, overcoming language barriers, adapting to the new culture – Siddiq says the barrier often isn't as substantial as expected. Most of the refugees speak some English and are comfortable with American culture, and MW Cold works with a variety of community partners, including specialized staffing agencies and human service organizations, who assist with overcoming administrative, language or transportation challenges.

To show how the approach works, Siddiq points to Mukhtar Ibrahim. When MW Cold hired Ibrahim in 2008, the Somalian native had spent most of his life as a refugee. Now he has spent almost half of his life at MW Cold, working his way up from sweeping floors to his current supervisory role.

"Loyalty is the payoff,'" says MW Cold Chairman and CEO Tim Siddiq. "We say Mukhtar is our 'ninja supervisor.' You could not ask for a more dedicated person."

Of course, Siddiq could be expected to have a soft spot for refugees. Born in Kabul, he fled with his family shortly before the Soviet Union's 1979 invasion of Afghanistan. They settled in Indiana, where Siddiq attended high school and college and now works alongside his brother, Sharif, the Business Development Manager at MW Cold. Given their own story, it's no surprise that the Siddiqs have been especially interested in the recent influx of refugees into Indiana, since it comes from their native Afghanistan. But Tim says there's more to their advocacy than their common origin stories.

The most recent refugees have a lot to offer Indiana employers, he says, especially today. "Most of these people have some kind of logistics experience," Tim notes. "Organizations should be taking advantage of this opportunity."

Similar opportunities can be found with other nontraditional hires, Tim says, including people coming out of the justice system. In addition to providing opportunities to people who need a second chance, the practice often leads to the same byproduct MW Cold found in hiring people like Mukhtar Ibrahim. "I think, in the long run, if you're trying to help someone out with a dream, they'll be loyal," Tim says.

²⁵ Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimates. Selected Social Characteristics In The United States. Available from <https://data.census.gov/cedsci/table?q=foreign%20born&g=0400000US18&tid=ACSDP5Y2019.DP02>, Accessed December 3, 2021.

²⁶ Source: U.S. Census Bureau. Census Population Estimates by Age, Sex, Race, and Hispanic Origin, 2020. Available from <https://data.census.gov/cedsci/profile?g=0400000US18>. Accessed December 17, 2020.

Appendix: Notes On The Estimated Cost Of Unfilled Positions

As outlined on page 10, Fourth Economy Consulting estimated the cost of an unfilled manufacturing position. In the table below, detailed estimates are provided per hour, day, month, and year. The lost sales assume the value of sales per employee and per hour worked. The savings from not paying that worker, and the reduced material costs from the lost production were subtracted from the lost sales to arrive at the net loss.

The corporate sales taxes are based on the net loss, which excludes the material costs for production to account for some manufacturing exemptions

and to avoid double counting taxes on materials purchases between Indiana firms. The sales tax is also adjusted to account for taxes paid from sales in Indiana only; it does not include sales taxes that manufacturers would owe to other states. Using data from the 2017 Commodity Flow Survey, Fourth Economy estimated the manufacturing sales that both originated and had a destination in Indiana. This resulted in an estimate of 18 percent of sales with an origin and destination in Indiana, meaning that the estimates above assume that 18 percent of total manufacturing sales are subject to Indiana corporate sales tax.

These estimates do not include other costs to manufacturers, such as increased production costs due to a shortage of skilled workers that results from decreased production capacity, increased cycle times with fewer workers, increased overtime costs, and turnover costs from employee burnout. The net loss also assumes that each employee contributes equally to production and sales. Obviously, there are more complicated dynamics in terms of specific positions. Furthermore, the losses are not entirely incremental, as a firm may be able to absorb some unfilled positions as long as they have enough workers to maintain their production lines and shifts, however if they have to drop a shift or close a production line then these losses would be considerably larger. These thresholds will vary by industry and even by company.

Detailed Estimates of the Cost of One Unfilled Position

Cost of One Unfilled Position	Per Hour	Per Day	Per Month	Per Year
Lost Sales	-\$273	-\$2,185	-\$45,526	-\$546,313
Minus Savings from Reduced Wages and Materials	Per Hour	Per Day	Per Month	Per Year
Wages for Unfilled Position	\$39.7	\$317	\$6,609	\$79,312
Material Costs (Each Hour of Production Loss Reduces Material Costs)	\$200	\$1,597	\$33,267	\$399,208
Net Loss (Net Loss = Lost Sales - Payroll Savings - Reduced Materials Cost)	-\$34	-\$271	-\$5,649	-\$67,793
What does the state lose in taxes?				
Personal Taxes	Per Hour	Per Day	Per Month	Per Year
Income Taxes 3.25%	-\$1	-\$10	-\$215	-\$2,578
Sales Tax Lost (Wages for Unfilled Position * 70% Estimated Discretionary Spending * 7% Sales Tax)	-\$2	-\$16	-\$324	-\$3,886
Total Personal Taxes	-\$3	-\$26	-\$539	-\$6,464
Corporate Taxes	Per Hour	Per Day	Per Month	Per Year
Corporate Sales Taxes (7% * Net Loss * In State Sales)	-\$2	-\$19	-\$395	-\$4,746
Corporate Income Tax (4.9% * Net Loss * In State Sales)	\$0	-\$2	-\$50	-\$598
Total Corporate Taxes	-\$3	-\$21	-\$445	-\$5,343

Note: Sales and materials costs based on data from the Census Annual Survey of Manufacturers for 2018 and 2019. Average pay for an unfilled position based on data from the National Association of Manufacturers for 2019.