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Building a better working world

Western New York REDC

Phase II Regional Sector-Based Strategies

Prepared by
Ernst & Young LLP
Economic Development Advisory Services
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Executive Summary

Recent investments demonstrate the State of New York's commitment to growing a strong and durable workforce for the future economy. Via the newly created Office of Strategic Workforce Development (OSWD), Empire State Development (ESD) and the Regional Economic Development Councils (REDCs) have identified the industry sectors that have the most potential for growing inclusive, robust economies in each region and throughout the state. Accomplishing this goal requires renewed collaboration between stakeholders in each region, and comprehensive assessments of existing and potential capacities in the workforce development ecosystem. A specific focus of this effort is the necessary strategies and partnerships that can have the most impact on increasing labor force participation, especially among underserved populations across the state.

Over the course of the project, the EY team, in partnership with Stragility, LLC. (a NYS Certified WBE), worked closely with the Western New York REDC (WNY REDC) to establish sector priorities and develop strategic considerations that support and augment existing strategies and have the most promising impact on economic growth and opportunity for the local workforce and industry. During the research and stakeholder engagement process, our team discovered several common themes across the regions and state. These themes formed the basis for strategy development and are expanded on further in the report. They include:

► Strategies for driving long-term competitiveness and sustainable talent pipelines in the targeted sectors require intensive collaboration at the state, regional, and local levels. Some effective coalitions exist, and continued efforts in data sharing and developments of regional strategies can prevent duplication of efforts when building effective workforce strategies.

► Significant work remains in raising awareness of careers in the tradeable sectors. Articulating the potential wages and funded training is important in reaching the most vulnerable populations and will serve to counter misperceptions about technical careers.

► Labor force participation has negatively impacted incumbent labor pools, and training initiatives alone are not the solution. Special considerations are important to reach the underserved, and to compel those not seeking employment today to return to the workforce.

► There is inconsistency in the supply of educational programming, K-12 to industry pathways, and job placement consortiums that create opportunity and contribute to successful talent acquisition and retention in the targeted sectors.

► Employer engagement in the development of new training, identification of essential skills, and adoption of direct placement programs is essential in the workforce development pipeline.

The WNY REDC has shown a tireless commitment to the development of the region's workforce and industry. Recent developments in Western New York, including the awarding of a $25 million dollar Build Back Better Regional Challenge (BBBRC) award, demonstrate the ability of the region to build effective coalitions that comprehensively understand the workforce needs of the region. Educational, community, and innovation assets are present, and through a continued focus on collaboration and partnerships, the region has the potential to build a dynamic, inclusive workforce that supports future growth, innovation, and equity.

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Introduction

Background information

In the spring of 2022, New York Governor Kathy Hochul launched the Office of Strategic Workforce Development (OSWD) with a $350 million investment to align regional workforce development efforts with the needs of employers in New York, particularly for those in growing sectors. Under the direction of the Empire State Development (ESD), OSWD is charged with coordinating with agency partners, employers, institutions of higher education, and regional stakeholders to achieve the following goals:

- ► Expanding access to training and placement support for underserved communities that have traditionally faced barriers to employment
- ► Ensuring New York's workforce is equipped with skills to meet the needs of businesses in high-growth, tradable sectors across the state
- ► Creating pathways for unemployed and underemployed New Yorkers to access good jobs that provide economic security and opportunities for career growth
- ► Sustaining talent pipelines for essential industries experiencing growing needs and high attrition rates, such as health care, education, and civil service

In 2021, New York State's (NYS) 10 Regional Economic Development Councils (REDCs) were tasked to develop a Regional Workforce Inventory (Inventory or Phase I) that identified the following

- ► Each REDC's priority tradeable sectors
- ► The most in-demand skill sets needed by employers
- ► Populations for whom workforce training is most needed
- ► Wraparound services needed to lower workforce entry barriers

In addition to benchmarking each region's post-pandemic workforce needs, Phase I laid the groundwork for the optimizing multi-year funding, which includes $150 million in grant programs designed to support employer-driven, high-skilled workforce training programs.

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Phase II objective

In August 2022, ESD retained Ernst & Young LLP (EY) to aid the WNY REDC with validating and building upon the work completed in Phase I and aligning the WNY REDC's work with ESD's goals, objectives, and statewide strategy for economic development.

In Phase II, EY, in partnership with Stragility, LLC. (a NYS Certified WBE) was tasked with developing sector-specific workforce strategies that provide a roadmap for how to address the workforce issues identified for WNY REDC's targeted tradeable sectors. More broadly, the strategies seek to promote the overall economic health of the region, increase the resiliency and size of the labor market for employers, and serve the underserved and underrepresented populations.

In addition to benchmarking each region's post-pandemic workforce needs, Phase I laid the groundwork for optimizing multi-year funding, which includes $150 million in grant programs designed to support employer-driven, high-skilled workforce training programs.

Process

The process for Phase II included four workstreams occurring over three months. Those workstreams are illustrated below.

Over the course of the engagement, EY maintained ongoing communication with WNY REDC and ESD to provide status updates, plan meetings, and track progress.

Industry selection

When considering the industry sectors to prioritize in the workforce development strategy, EY and WNY REDC evaluated how WNY's inventory of established tradeable sectors performs against the following criteria:

- ▶ Opportunities to extend findings from Phase I into considerations for implementation
- ▶ Alignment with ESD's statewide target industry sectors
- ▶ Best use of WNY's current and planned future assets and tools
- ▶ Support for WNY's goals and values
- ▶ Regional labor force and employer needs
- ▶ Minimal barriers to entry for unemployed, underemployed, and underserved
- ▶ Recurring trends of in-demand skills
- ▶ Projected job growth (positions and wages) in the sector

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Industry selection (continued)

Of the four tradeable sectors identified in Phase I, the WNY REDC and its advisory committee agreed to focus their regional strategies in support of the Advanced Manufacturing and Technology industry sectors. The North American Industrial Classification System (NAICS) codes associated with these sectors were defined by the New York Department of Labor and provided to the EY team by ESD. These will be included in the data appendix to the final report.

Advanced Manufacturing and Technology represent regional employment pipelines that have the potential to bridge high-wage occupations with current and future job seekers that may be unemployed, underemployed, and underserved. The diverse basket of goods manufactured and assembled in Western New York is consumed on a global scale, which bodes well for the industry sectors' resilience.

Background review

To begin the project, EY conducted a background review of documents provided by WNY REDC to better understand the workforce and target sectors of the WNY region, as well as recent economic development priorities and achievements for the region and the WNY REDC. The following is a non-exhaustive list of materials provided to and reviewed by EY:

- ▶ 2017 Buffalo-Niagara Labor Market Assessment
  - ▸ Where are our opportunities?
  - ▸ Who's our economy?
- ▶ 2019 Clean Energy Workforce Assessment for WNY
- ▶ 2020 WNY Recovery Report
- ▶ 2021 REDC Annual Report
- ▶ 2022 REDC Annual Report
- ▶ 2022 Build Back Better Regional Challenge:
  - ▸ 10-page narrative
  - ▸ Vision for NWTC Programs
- ▶ 2022 Good Jobs Challenge Narrative
- ▶ Goodwill Goodskills Briefs:
  - ▸ Goodskills career builder overview
  - ▸ Tech and Buffalo's rebound
  - ▸ Workforce readiness skills training and Buffalo's rebound
  - ▸ Addressing a triple threat in the workforce
  - ▸ Outreach and recruitment strategies for a diverse workforce in Buffalo-Niagara
- ▶ 2022 NYS Department of Labor
- ▶ WNY Workforce Development Surveys

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Supplemental data analysis

While the Phase 1 inventory provides a sound foundation for direction, further quantitative research was needed to validate those findings and the findings from the surveys conducted in partnership between New York State and the Business Council of New York State.

The following were suggested for supplemental research and are provided as an appendix to the final report:

▶ Regional workforce conditions

▶ Industry analysis on the two target sectors: Advanced Manufacturing and Technology

▶ Occupational analysis of the two target sectors

▶ Educational programming that supports overall workforce development and the programming specific to the two target sectors

Stakeholder engagement

To supplement the analysis and findings from Phase I and Phase II, EY collaborated with WNY REDC and its advisory committee to identify employers, industry associations, training providers, community-based organizations, wraparound service providers, educational institutions, labor unions and other relevant stakeholders across the Advanced Manufacturing and Technology sectors. These groups were invited to participate in focus groups and interviews during October 2022.

Focus group and interview list

Industry	Civic/non-profit	Interviews
Technology (2)	Workforce training providers	Outer-county WFDBs
Advanced Manufacturing (2)	Wraparound service providers	Labor force research
Consortiums		Technology research

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Advanced Manufacturing

A workforce development strategy for the Advanced Manufacturing industry in Western New York

Advanced Manufacturing:
Research findings

Industry overview

The WNY REDC and EY selected it as one of the two sectors to receive a workforce strategy based on its potential for unemployed, underemployed, and underserved jobseekers, as well as its ability to promote resiliency in the regional economy.

The Advanced Manufacturing sector in Western New York currently employs over 29,000 workers. Today, approximately two-thirds of manufacturing positions require a high school diploma or less. In addition, most of the workforce is aging, and there is a disproportionate number of males employed in the sector. The number of Advanced Manufacturing employers in the region has been relatively stable from 2010 to 2021.

Modern Advanced Manufacturing talent development requires a diverse array of awareness, outreach, training, and support services for talent and industry. The outreach to incumbent talent will be among the most important tasks to increase labor force participation. The following goals describe the challenges relating to Advanced Manufacturing and provide a framework for scaling existing success and focus areas that will position the region for talent and industry success in this sector.

A low barrier of entry to the workforce, potential high wages, and a low job turnover rate position Advanced Manufacturing as a key tradeable sector for the region to invest in. While there are improvements that can be made to the overall Advanced Manufacturing ecosystem in Western New York, these changes are attainable through employer, training provider, and social service collaboration.
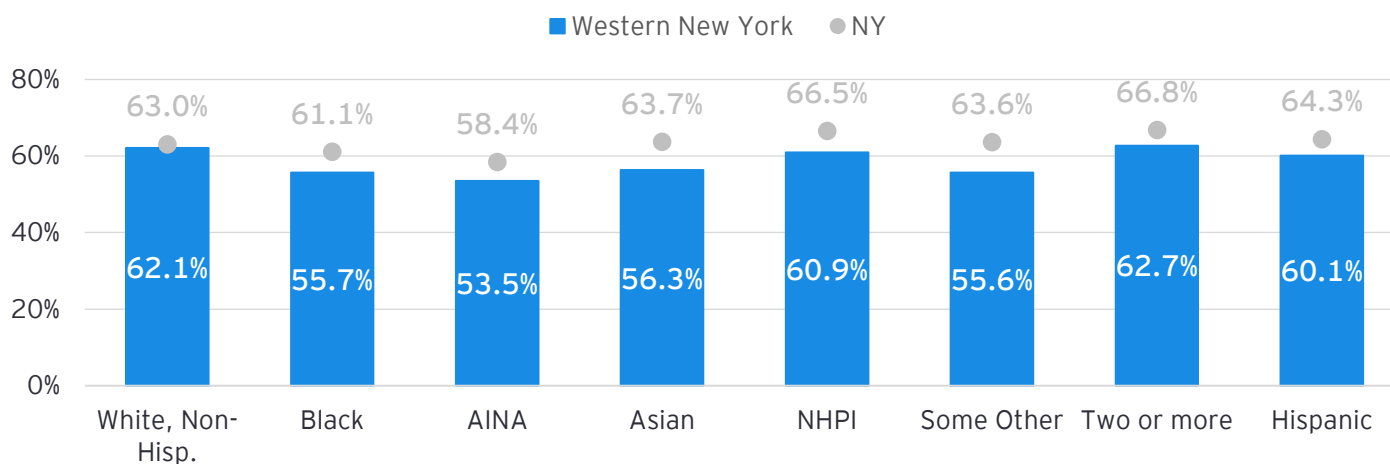
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Regional workforce analysis

The socioeconomic and demographic trends in WNY present several areas that are primed for opportunity. Population trends by year, age, and race/ethnicity can provide insight on the region's ability to supply the labor needed to support the region's economy. Having a solid understanding where the region currently stands provides a benchmark for future goals.

Unemployment and labor force participation

▶ While unemployment rates have recovered to pre-pandemic levels, the size of the labor force has not fully recovered.

▶ Unemployment rates for Black and multi-racial populations are twice as high as white unemployment; Hispanic unemployment is 50% higher while Asian unemployment is lower than white unemployment.

▶ Unemployment rates decline with higher levels of education. Less-educated workers in Western New York have higher unemployment than the state average.

▶ The labor participation rate is lower in Western New York than the state average with labor participation rates for minorities lower than the state average; adults without a high school diploma are much more likely to be out of the labor force in Western New York.

▶ Labor force participation rates increase significantly for workers with more education. Adults in Western New York without a high school diploma are much less likely to be in the labor force than the state average.

▶ Labor participation rates are highest for people in their 20s and 30s. Participation rates in Western New York are above the state average for those age 16 to 34, but below average for the 65+ population.

▶ Labor participation rates for minorities are lower than white and multi-racial populations in Western New York. Participation rates vs. state averages are lowest for minorities.

The region has an opportunity to increase minority participation in the workforce

Labor force participation rate by race/ethnicity, 2020

■ Western New York ● NY

	White, Non-Hisp.	Black	AINA	Asian	NHPI	Some Other	Two or more	Hispanic
NY	63.0%	61.1%	58.4%	63.7%	66.5%	63.6%	66.8%	64.3%
Western New York	62.1%	55.7%	53.5%	56.3%	60.9%	55.6%	62.7%	60.1%

Source:
US Census Bureau

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Population trends

▶ Population growth in Western New York has seen an uptick after nearly a decade of slow declines. This is attributed to growth in Erie County and by Asian and Hispanic populations. Still, the region is predominantly white and has smaller minority populations and relatively few foreign-born residents.

▶ The Western region's retirement population (65+) has grown the fastest, followed by those 25 to 44 years old. All other age groups have declined.

Industry analysis

Examining the overall trends facing the Advanced Manufacturing industry sheds light on the region's competitiveness to recruit, expand, and retain high-impact businesses that invest in the tax base. Equally important, these enterprises present an opportunity to offer high-quality, in-demand jobs for Western New York's unemployed, underserved, and underrepresented populations.

▶ 500 Advanced Manufacturing employers are in Western New York, employing nearly 30,000 workers.

▶ Eleven subsectors employ 1,000 or more workers in the region, but only Pharmaceuticals, Electrical Equipment, and Electronic Components are growing.

▶ Miscellaneous Manufacturing has the largest number of businesses (69) within the region, accounting for more than 13% of businesses, followed by Medical Equipment and General Machinery. Mineral Product Manufacturing has gained the most new firms.

▶ Industry wages are 50% higher than the regional average, and the sector offers low barriers to entry. Most jobs only require a high school diploma or equivalent.

▶ Sector employment is heavily weighted toward males and older workers.

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> ***Earnings in Advanced Manufacturing are significantly higher than the regional average***

Average annual earnings, 2010 – 2021

Source:
US Census Bureau

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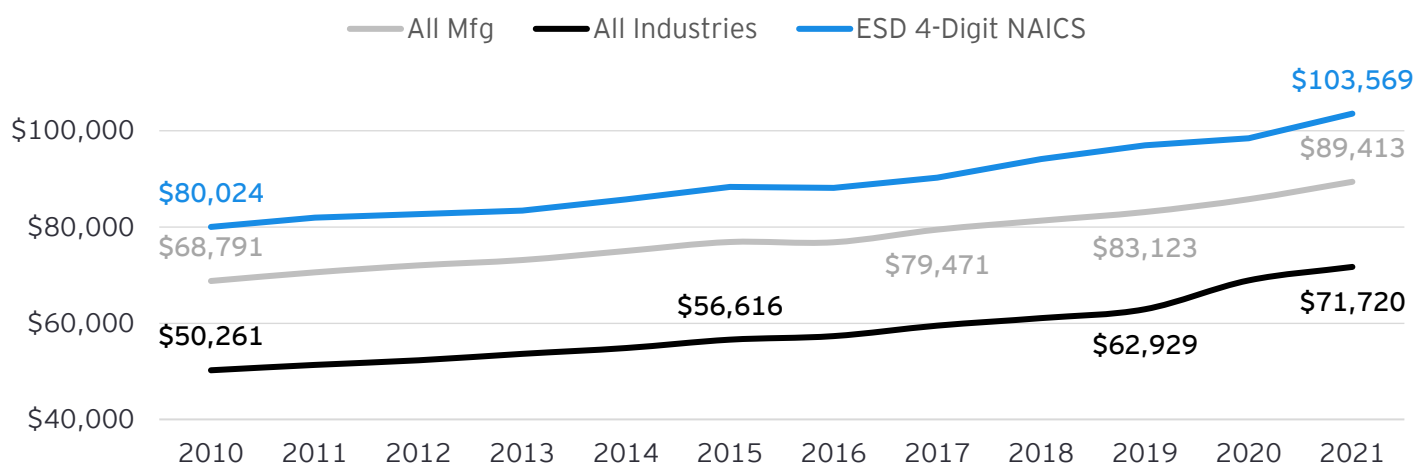
Occupational analysis

Talent development requires coordination among employers, educators, and training facilities. Maintaining a system-wide understanding of staffing patters, typical entry-level education, and potential earnings helps to preserve a talent pipeline that's responsive to the needs of employers and job seekers.

▶ Advanced Manufacturing offers low barriers to entry, as over half of all jobs require only a high school education. The median hourly earnings for the top 25 of these entry-level positions is $25.37.

▶ A large number of workers in Advanced Manufacturing in Western New York are assemblers, inspectors, supervisors, and machine operators. Bachelor's level demand is concentrated in engineering, operations managers, and accountants.

▶ For those with a high school diploma or equivalent, most jobs in Advanced Manufacturing in Western New York are in assembly, inspectors, supervisors, equipment operators, and machinists.

▶ For positions requiring some college, a certificate or an associate's degree, most jobs in Advanced Manufacturing in Western New York are for drivers, technicians, and clerks.

▶ For positions requiring a bachelor's degree, most jobs in Advanced Manufacturing in Western New York are for engineers, operations managers, buyers and accountants, and software developers.

Educational programming

A region's ability to produce talent across the entire labor spectrum is closely linked to its ability to sustain economic growth. Analyzing the output from Western New York's educational programming provides insights on labor shortages, misalignment with employer needs, and clarity into workforce development investments.

General

▶ The population in Western New York is slightly less educated compared with the state, with nearly 32% of adults (25+) having a bachelor's or higher (compared with 37% for the state).

▶ The bachelor's+ educational attainment of Western New York's adult population has grown since 2015.

▶ More than 70% of all accredited certificates and degrees produced in Western New York are at the bachelor's level or higher.

▶ Accredited certificate production in Western New York is highest for one-year programs, but shorter-term program production is on par with state averages.

▶ Health, Business, and Education lead graduate production in the region. Large increases in certificates over the last five years was seen in Health and Culinary. Engineering and IT experienced increases at the bachelor's level, and Engineering and Public Administration saw increases at the master's level.

▶ Registered apprenticeships have increased significantly in the region, led by Electrician and Construction trades.

▶ Electrician programs register the most new apprentices, followed by Painters, Construction and Maintenance.

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Educational programming

Industry-specific

▶ Advanced Manufacturing firms, as shown in tables in the previous pages, require diverse occupations and skill levels to fill jobs in their facilities. Our gap analysis below shows that Western New York is well-served by its graduate production across most occupations. Some exceptions are at the Certificate and Associate's levels, where Industrial Technicians, Maintenance, and Machinist have too few graduates for the regional economy.

▶ The table below shows occupation groups that are matched to degree programs to determine if the supply of graduates is sufficient to meet demand (measured as job openings in a year). A US comparison helps clarify if there is a gap or overproduction of graduates by comparing regional graduates to jobs with the US ratio of graduates to jobs (as shown in the right column below).

▶ Certificate and Associate's-level positions are relatively well-served by local graduate output. Relative to the US, Western New York produces a high number of graduates in Heavy Vehicle Mechanics, Electrical/Electronics Technicians, and Mechanical Engineering Technicians.

Supply-Demand Gap Conditions
Advanced Manufacturing, Western New York

Gap	Occupation Group	Avg. Educ. Level	Regional 2021 Job Openings	Graduates	Regional Ratio	Supply-demand Ratio versus US	
	Heavy Vehicle Mechanics (not Aero)	Certificate	173	57	33%	151%	
	General Machinist	Certificate	424	20	5%	44%	
	Industrial Production Technicians	Certificate	358	40	11%	118%	
	Industrial Machinery Maintenance	Certificate	215	0	0%	0%	
	Welders	Certificate	168	120	71%	90%	
	Chemical Technicians	Associate's	32	21	65%	106%	
	Electrical / Electronics Technicians & D	Associate's	48	16	34%	124%	
	Industrial Engineering Technicians	Associate's	77	32	41%	44%	
	Mechanical Drafters	Associate's	30	17	56%	49%	
	Mechanical Engineering Technicians	Associate's	22	102	470%	189%	
	Computer Support Specialists	Associate's	209	178	85%	95%	
	Executives & Management Analysts	Bachelor's	1,808	2,176	120%	187%	
	Chemists	Bachelor's	34	115	342%	151%	
	Electrical and Electronics Engineers	Bachelor's	66	180	274%	219%	
	Engineering Managers	Bachelor's	38	21	55%	106%	
	Industrial Engineers	Bachelor's	151	241	159%	217%	
	Mechanical Engineers	Bachelor's	91	613	677%	397%	
	Supply Chain Managers & Analysts	Bachelor's	41	6	15%	38%	

Lg Shortage	Shortage	In-Balance	Over-Supply	Lg Over-Supply

Source:
EY analysis of data from Lightcast and US Dept. of Education

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Ecosystem observations

An initial framework was developed after reviewing data and information from Phase I to help assess the strengths, challenges, and opportunities within the WNY's regional Advanced Manufacturing workforce development ecosystem. This framework focused on the areas of 1) industry-informed training, 2) awareness of opportunities, and 3) wraparound services and support.

The following illustration outlines the types of work within each of those focus areas:

Industry-informed training	Awareness of opportunities	Wraparound services and support
Industry/education partnerships	Development of career lattices/pathways	Ability to navigate resources
Career readiness skills (hard and soft skills)	Marketing career pathways	Basic needs and emergency funds
Earn and learn opportunities	Awareness for training opportunities	Life skills
Expanded capacity for training	Programs for target populations	Coaches/mentors pre- and post-employment

Industry-informed training

Utilizing relationships between employers and talent pipelines is a central component of OSWD's approach to workforce development. Alignment of industry needs with career readiness, job training, and upskilling activities may expand career pathways for all segments of the labor force.

▶ The region is home to several training centers that offer manufacturing-related degree and non-degree certifications, including Northland Workforce Training Center (NWTC), Buffalo Manufacturing Works (BMW), the Manufacturers Association of the Southern Tier (MAST), Trocaire College, Alfred State College, SUNY Erie, Jamestown Community College, Dream It Do It, Say Yes Buffalo and the four local BOCES, among others. These organizations have developed strong relationships through the development of Western New York's application for the Build Back Better Regional Challenge.

▶ Select manufacturers are engaged in developing industry-informed training with local education institutions and workforce partners. In other cases, they lack the available resources to dedicate to engaging with educators.

▶ Overall, employer engagement in the development of region-wide training and curriculum is limited.

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Ecosystem observations (continued)

Awareness of opportunities

Innovation within the Advanced Manufacturing industry has grown, resulting in a wide range of career opportunities. Clear definition of stakeholder roles, target audiences, and methods of promotion may increase awareness and participation within the target sectors.

▶ While there has been a concerted effort to promote on-site visits to manufacturing sites from organizations like Dream It Do It and the Northland Workforce Training Center, stakeholders still report that the industry needs a cohesive marketing plan that targets younger generations and underserved communities.

▶ Government and private/non-profit organizations are providing significant workforce development funding and assistance, especially in Advanced Manufacturing and for target populations. This funding has largely been concentrated in Erie County due to its share population and production within the region. Outer counties have been innovative in how they deploy the funding they receive, but due to the inflexible nature of the funding, often have to cut marketing strategies from the budget.

▶ Employer access to diversified funding streams for building workforce pipelines and tapping incumbent talent pools in the region will be critical.

Wraparound services and support

Socioeconomic barriers may hamper target populations' ability to retain a job in a regional tradeable sector, complete a career-advancement program, or participate in the labor force. Addressing these obstacles through services and programs may unlock opportunities for hidden talent for the Advanced Manufacturing industry sector.

▶ A lack of available childcare spots for new children, high cost for parents, and low wages for caretakers make it difficult for some residents with children to enter the labor force.

▶ Western New York is a vehicle-reliant region, and 69,000 individuals in the region do not have access to a vehicle. According to stakeholders, the region's public transit system is disconnected and often does not reach key work and/or training sites within set shift schedules.

▶ Potential job seekers that have been out of the workforce often require career readiness training and mentoring once employed. Programs like Western New York's Goodwill Goodskills seeks to mitigate that by offering pre-employment training programs and a three-year career mentorship.

▶ A lack of wraparound support services often inhibits untapped incumbent talent from workforce and/or training entry, and both job seekers and employers may struggle to navigate the available resources.

▶ There is a high concentration of small to medium manufacturers in the region that may not have the resources or capacity to pursue programs to upskill their labor force or onboard talent from non-traditional sources.

Heartland Regional Transportation Planning Organization
Ensuring the availability of efficient, cost-effective, and quality transportation services for transportation disadvantaged persons. The Transportation Disadvantaged Program is a coordinated system in all 67 Florida counties that provides vital transportation to medical appointments, employment, educational and other life sustaining services for those who cannot obtain their own transportation due to a disability, age, or income for an affordable co-pay.

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Advanced Manufacturing:
Strategy framework

Industry overview

With the insights gathered through the background review and stakeholder engagement process, the following strategic framework was developed as the foundation of a sector-based workforce development plan.

The strategic framework comprises four goals, each with considerations that clarify the direction Advanced Manufacturing leaders could pursue to achieve the goal. Within each goal, an assessment of activities identifies areas that are primed for change or investment. Solutions are presented as potential opportunities, which may be taken to address stated challenges and realize the goal.

Goals

1 Increased awareness and engagement for careers in Advanced Manufacturing

2 Increased training and wraparound services for underserved populations

3 Effective ecosystem collaboration to map and scale employer support services

4 Sustainable talent acquisition and retention by promoting direct hire, earn-and-learn, apprenticeship and short-term training consortiums

Target populations

Asset-Limited, Income Constrained, Employed (ALICE)

Individuals outside of the workforce

Talent outside of college bound students

Graduates from local colleges and universities

Incumbent workforce

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Goal 1: Increased awareness and engagement for careers in Advanced Manufacturing

In Western New York and other regions, stakeholders consistently report a lack of awareness and misperceptions surrounding career opportunities in Advanced Manufacturing. This concern is present across most industry sectors, and addressing it is a critical component of developing a workforce pipeline. It was also noted as a shared concern across all four regions served by EY during this project and is recognized as a nationwide issue as well. Its prominence across the regions, sectors, and employers suggests that it not only be a top priority for Western New York, but for the state as well.

In Western New York specifically, this goal has particular importance as it relates to the age and availability of the workforce. Over the past 12 years, the population in the Western New York MSA has moderately declined, but minority populations have increased twice as fast as others. This highlights the importance of awareness of these careers, and specific strategies to address awareness have the potential of impacting the most underserved populations the most. The workers include communities of color, particular in the New American population; the underserved; ALICE (asset-limited, income-constrained, employed workers) workers; talent outside of college-bound students; and individuals outside of the workforce.

The need for greater awareness of career and growth opportunities within Advanced Manufacturing is primarily focused on the K-12 talent pipeline but extends further to those seeking to re-enter the workforce or considering a career change. Local school districts and higher education partners are working with Dream It Do It to introduce kids, particularly young girls, to the industry. Their work also encompasses educational practices for parents and educators to dispel myths surrounding Advanced Manufacturing careers.

Here are some considerations when focused on the K-12 pipeline:

▶ Awareness and exposure can start at an early age with the level of employer engagement increasing over time as the students reach junior high school.
▶ Curriculum and activities should be focused on the applied aspect of the technical discipline, making the connection with hands-on experience to industry and technical careers.
▶ Comprehensive information about career opportunities related to Advanced Manufacturing industry sector given to school administrators, teachers and career counselors could jump-start students' awareness and access to valuable training and opportunities.
▶ Information on career opportunities and pipelines in Advanced Manufacturing should be readily accessible to parents, as they often play an important role in guiding their child's future career and educational decisions.

For all audiences:

▶ Compelling content partnered with local industry can provide consistent, actionable information for students and potential job seekers to enter the workforce.

▶ Having a central repository of consistent, up-to-date information of skills, resources, and networks in the industry can lower the barrier for residents and allow them to explore their potential role and career in the future workforce.

▶ Misperceptions will need to be addressed head on. Communicating the realities of the work, work environment, available resources and networks, and the skills necessary to do the job may improve people's perspectives of the industry and their future within it.

▶ Peer experience is viewed as an effective method for helping both students and potential job seekers see themselves in an opportunity. Ambassador-type programs have been popular for the last several decades and with social media, have the potential for an even greater reach.

▶ Career opportunities paired with a "live, work, and play" community framework can impact a region's appeal, driving talent attraction and retention.

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Assessment of career awareness in Advanced Manufacturing

Awareness of Advanced Manufacturing careers was one of the key aspects of the workforce ecosystem explored during our research on the region and in conversations with regional stakeholders.

Our main takeaways from stakeholder engagement and research were:

▶ Employers have an essential role in career opportunity awareness and talent attraction. Their presence and engagement in the community, participation in career awareness events and support of employees engaging in ambassador programs are pivotal in creating more excitement for local career opportunities. In designing their engagement, they will need to be cognizant of generational and cultural differences to capture potential talent from incumbent, untapped talent. Developing, marketing, and scaling of current programs that directly hire training participants or allow for earn-and-learn opportunities can further incentivize incumbent talent to pursue Advanced Manufacturing careers.

▶ The career awareness initiatives and resources available by school district vary by community. A shared, industry-informed plan for career awareness and employer engagement could benefit those schools with less resources and promote consistency throughout the region. In some instances, resources or equipment could be shared across numerous districts or a regional educational foundation (e.g., BOCES). This approach can be particularly effective when paired with site visits for students in the manufacturing sector, creating tangible experiences for those that are not university-bound.

▶ Regional assets and outreach programming in higher education make significant impacts in the community. Trocaire College, Alfred State College, SUNY Erie and Jamestown Community College are all sound examples of institutions of higher education working to bridge the gap between students, workers, and industry partners. Enhancing these programs and collaborating on similar efforts, will be beneficial for coordinated and holistic pipeline development.

▶ Reaching and engaging the target populations will require a well-resourced multi-media, multi-language campaign and interactive platform for promoting careers and educational opportunities in the target sectors. For example, NWTC embeds itself with the community in East Buffalo by hosting weekly outreach and creates content that highlights programs like CNC machining. An initiative of this size could be led at the state level with ties to regional resources and opportunities.

▶ Negative perceptions of Advanced Manufacturing still abound. Increased education to parents, teachers, counselors, influencers, community leaders, and others is important. For example, programs like Dream It Do It engage with girls within the region, educating them, their parents, and their teachers about their potential future in Advanced Manufacturing. In addition, industry collaboration, via peer or ambassador programs, tours, marketing collateral, promotion, events, and other activities can help to counter misperceptions of Advanced Manufacturing careers, resulting in greater interest and engagement.

▶ In addition to any statewide resources, there are resources and initiatives sponsored by national manufacturing associations for promoting careers in their sector. These often include networks, events and competitions, sample activities and curriculum suggestions, and toolkits for promoting the sector. For example, NWTC offers hands-on experiential learning at their site, along with career and financial services open to the community to connect. The region should leverage these publicly available resources when possible.

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Goal 1: Potential opportunities and partners

The following are opportunities that Western New York could explore to increase awareness and excitement for career opportunities in its targeted sectors.

▶ **Development of a regional campaign promoting Advanced Manufacturing careers.**

These campaigns could include testimonials from peers, videos showcasing companies and occupations, and virtual reality experiences, to name a few. Content should be optimized for various media channels and sharing platforms. Ideally, this content could be developed at the state level, focusing on the economic mobility of identified industry sectors, followed by regional campaigns supporting specific industry sectors. The goal of a campaign would be to dispel myths, create momentum, and generate interest in manufacturing careers.

Potential partners: Empire State Development, New York Department of Labor, major industry associations and employers, Western New York REDC, and local higher education

▶ **Launching of an interactive website and/or app to showcase pathways, opportunities, and resources.**

A multimedia campaign should direct students, parents, and potential jobseekers to a landing page to further explore statewide or regional information on sector opportunities. Employers, wraparound services providers, and other workforce/ecosystem participants could participate, resulting in a Western New York focus where job seekers, employers, training entities, and service providers can easily find services, content, and opportunities in the area. Some stakeholders envision a mobile app, styled after social media platforms, that allows users to quickly find training programs, services, and open positions based on their unique profiles.

Potential partners: Empire State Development, New York Department of Labor, major industry associations and employers, Western New York REDC, local higher education, local wraparound service providers, and staffing organizations

South Carolina Future Makers
The South Carolina Manufacturers Alliance launched a public-private partnership to increase engagement between the state's manufacturing companies, technology communities and students in middle school, high school, technical college and four-year college, plus their parents. The initiative showcases the many paths and opportunity within manufacturing.

▶ **Coordinated initiatives and immersive collaboration between schools, industry, and local training centers focusing on STEAM programming, K-12 industry engagement.**

A regional plan for employer engagement and career awareness initiatives for the K-12 pipeline could also include a plan for job shadowing, pre-apprenticeship programming, and resource sharing. Designed in partnership with industry, this plan could coordinate and build upon STEAM (Science, Technology, Engineering, Arts, and Math) education curriculum, STEAM competitions, and career awareness and exposure events at an early age. Middle school, junior high, and high school initiatives could occur in individual schools, at a broader community level or regionally. The audience would include administrators, career counselors, parents, and students. In some instances, new programs could be piloted in one district or school then scaled accordingly. Example programming in similar models includes Advanced Manufacturing (Industry 4.0), applied robotics, mechatronics, and engineering.

Potential partners: New York Department of Labor, New York State Education Department, New York State School Boards Association, school districts, BOCES, major industry associations, employers, and Western New York REDC

EY

Goal 1: Potential opportunities and partners (continued)

▶ **Establishment of dual-enrollment, job shadowing, pre-apprenticeship programming.**

Scaling dual-enrollment programs in technical disciplines can create accelerated pathways for high school graduates who are not university-bound. Coupled with job shadowing, co-op (Cooperative education), experiential learning, and pre-apprenticeships, this approach can make an immediate talent impact on underserved populations and employers. Higher education programming that focuses on post-secondary awards of less than one year is essential for talent efforts in Advanced Manufacturing. Today, over 80% of all post-secondary credentials in the Western New York region are baccalaureate or higher. Training programs of less than one year will be essential to meet the need.

Potential partners: BOCES, school districts, industry partners, economic development organizations, and local higher education

▶ **Establishment of local industry ambassador programs.**

Industry ambassadors can provide a deeper connection to the reality of a potential job opportunity. A regional program, utilizing industry representatives as proponents of Advanced Manufacturing careers, could train and deploy others with the faces, voices, and stories of local communities and target populations. Their stories are most powerful when told in person and could be featured in marketing materials. Western New York's diverse population, including New American and refugees, could benefit greatly from scaling existing programs that are focused on better understanding the cultures of the underserved. In addition, reaching individuals through community and faith-based organizations with the message of attainable employment pathways can prove to be effective.

Potential partners: Industry associations and employers, chambers of commerce, and economic development organizations, community-based organizations, Western New York REDC

Pennsylvania Advanced Manufacturing Ambassadors
A new program will fund teams of industry ambassadors to visit select high schools, trade schools and community colleges and spark interest and awareness for manufacturing careers among students, teachers and administrators.

Goal 2: Increased training and wraparound services for underserved populations

Western New York is challenged by a number of common workforce and population issues. While the unemployment rate in the region has recovered since 2020, the size of the labor force remains slightly below pre-pandemic levels. In addition, the labor force participation rate is lower in Western New York than the state average, and the region has a higher percentage of the population with a disability. These are just some of the unique circumstances that shed light on the importance of mapping, scaling, and coupling wraparound services with training programs that can make the most impact on vulnerable populations.

The following are considerations when developing training and wraparound services:

▶ The value proposition of training programs among vulnerable populations is centered around attainability, accessibility, funding, and placement. An assessment of the short-term, direct-hire programs in Western New York is essential, and enlisting direct-hire support from training programs is a leading practice in placement and talent development.

▶ Short-term training programs (<1 year) are often the most effective education tools for entry into the industry. These allow for participants to upskill and enter the workforce in a relatively short time period, placing an emphasis on attainability.

▶ There's direct correlation between post-secondary awards (less than Associate level), unemployment rates, and increased salaries. Industry input is essential in creating training programs, but keen understanding of target populations and outreach is what can make the most impact on incumbent workforce participation.

▶ Embedding wraparound services into short- and long-term training programs may increase participation and awareness among underserved populations. While it is common for this programming to be created and deployed independent of one another, the integration may more effectively reduce barriers that this population encounters when trying to enter the workforce.

Assessment of training and wraparound services in Advanced Manufacturing

Wraparound services and training were key components explored during our research on the region and in conversations with regional stakeholders.

Our main takeaways from stakeholder engagement and research were:

▶ Some physical training capacities exist but may be disjointed regionally and further collaboration is necessary to scale. Training needs are numerous, including space, equipment, consumables, instruction, curriculum, and design. Standing up training programs, particularly in Advanced Manufacturing, can prove cumbersome if one entity is responsible for all aspects. Memorandums of understanding, operating agreements, and consortiums, utilizing proprietary and industry validated curriculum, have proved to be effective models. For example, NWTC partners with two colleges (SUNY Erie and Alfred State) and numerous local employers to utilize their site for classes, trainings, and networking events. They place nearly 90% of their graduates into employment after completing their training programs.

Virginia New Economy Workforce Grant Program
The Virginia General Assembly passed HB 66 which established the New Economy Workforce Grant Program. This grant program is the first of its kind and provides a pay-for-performance model for funding noncredit workforce training that leads to a credential in a high demand field.

EY

Assessment of training and wraparound services in Advanced Manufacturing (continued)

▶ Traditional and emerging wraparound services can be complex to identify and expensive to deliver. For example, Western New York's dependency on cars for commuting requires job seekers to have reliable transportation. More than 69,000 residents in Western New York do not have access to a vehicle, creating a need for public transportation that does not exist to necessary capacity today. Several manufacturing sites exist outside of available bus routes and often the schedules for these jobs are not aligned with bus schedules. Barriers like these can impede those who don't have access to a vehicle and are pursuing jobs within the industry.

▶ Populations in need of training may struggle with access to common support services including transportation and childcare. However, when these barriers are addressed, stakeholders report that there is often a lack of soft skills, workplace essentials, financial literacy, and basic technology skills to successfully employ this talent. Career readiness skills can be developed in partnership between social services organizations and Advanced Manufacturing employers. For example, Western New York's Goodwill Goodskills program has developed a career readiness training program and career mentorship for their participants to support them through the hiring lifecycle.

▶ In diverse communities, cultural barriers between employers and the population often exist that may prevent engagement from displaced workers and underserved populations. In Western New York, stakeholder engagement demonstrated the need to focus on understanding the history, cultures, and interests of diverse communities to better design services and outreach that compel action from the target populations. This can be done by identifying a community advocate or representative to help design wraparound services and training programs that best address the needs of that particular community.

▶ While the labor force in Western New York has nearly recovered to pre-pandemic levels, labor force participation rates have not. This aligns with national trends in most cases and is attributed closely to worker concerns about access to and eligibility for benefits as a result of employment. Overcoming the "benefits cliff" requires outreach, education, and intentional efforts at quantifying the benefits of returning to work.

Goal 2: Potential opportunities and partners

The following are opportunities that Western New York could explore to increase capacity in wraparound services and training in its targeted sectors.

▶ **Career preparation, readiness, and interview practicums, hosted by coalition and supporters.**

In conjunction with Advanced Manufacturing employers, existing coalitions can develop adult learning capacities outside of traditional higher education constructs. These programs can leverage the subject-matter experts in various industries and businesses who can provide workshops, information sessions, and literacy that can increase the ability for underrepresented workers to navigate the workforce ecosystem successfully. Programs that have been designed by a coalition of their peers are more likely to increase their access to and participation of their community.

Potential partners: Industry partners and associations, local business unrelated to manufacturing, chambers of commerce, community and faith-based organizations, social services, and municipal leadership

EY

Goal 2: Potential opportunities and partners (continued)

▶ **Training component needs assessment and focus on short-term awards.**

To better understand current and projected training needs, the components of training in Advanced Manufacturing skills should be enumerated, mapped, and assessed for missing capacities and easy identification of future opportunity. For example, machine and tool (CNC) manufacturers have very specific skill sets required for entry level positions. These skill sets will be different than employers in consumer electronics manufacturing. A defined set of skills and industry need will aid in designing the most relevant training programs for current and projected need. In addition, coordination is necessary to design the shortest possible training programs that lead to entry-level success.

The essentials of training (not including funding) include:

▶ Administration

▶ Physical space

▶ Instructors

▶ Curriculum

▶ Equipment

▶ Modalities and schedules

▶ Consumables

▶ Skills mapping

Potential partners: Industry partners and associations, community-based organizations, higher education, training entities, philanthropic organizations, Western New York REDC, and social services

▶ **Scaled case management and wraparound service capacities.**

Minority unemployment rates in Western New York are measurably higher than in white communities, demonstrating the need to continue the growth and awareness of wraparound services that impact all people seeking employment or considering re-entry to the workforce. Case management, while proven successful, is perhaps the most difficult component of designing and sustaining effective wraparound services. Social service, community, and faith-based organizations often have the most access to individuals in need of training or upskilling. Collaboration among these entities will be critical in establishing further services that impact potential job seekers and those considering entry into the workforce. Similar to training components, the following steps are essential in scaling effective wraparound services.

Similar to training components, the following steps are essential in scaling effective wraparound services:

▸ Inventory – What entities in the region provide what services? How, when, and to whom? What are the existing challenges of those services, and how are they measured for success?

▸ Funding – How are services funded? Is there opportunity to scale services by combining funding streams, grants, or philanthropic support?

▸ Selection – Based on demographics and other considerations, what services are needed most and by whom? What services can make the most immediate and profound impact on generational poverty and employment opportunity for the underserved?

▸ Deployment and collaboration – What organizations or entities are best positioned to provide the services or have administration/oversight for the program?

▸ Impact – How will results be measured? How can programs adapt to meet KPIs/metrics more successfully?

Potential partners: Social services, non-profits, employers, community and faith-based organizations, and industry partners and associations

EY

Goal 3: Effective ecosystem collaboration to map and scale employer support services

Investments in workforce and economic development have been increasing over the last decade, and exponentially so with the rollout of federal relief programs like the American Rescue Plan. This increase in funding illustrates the level of importance the nation and individual states put on solving the current talent shortage. As the focus and funding streams for workforce development increased, more organizations entered into the broader workforce ecosystem. Unfortunately, coordination and alignment of these organizations have not kept pace. While additional programming and funding is positive, it has also created confusion in the market for employers, potential jobseekers. It's important to inventory what programs exist, what funding is available, and how resources could be used more effectively.

This is also a unique time for employers. Significant industry transformation is underway; five generations are in the workforce; there are increasingly diverse populations; and many are still recovering from the pandemic. Leaders in manufacturing need a resource for understanding these various dynamics and what resources and leading practices exist to create a more competitive work environment. Enhanced industry support and regional coordination are two complementary solutions for supporting employers in Advanced Manufacturing.

Western New York specifically is home to over 500 Advanced Manufacturing businesses and represents a number of different manufacturing occupations and subsectors. To better understand the talent ecosystem, employers will need accessible, real-time information on leading practices, talent management, skills development, and other information and tools that can assist in developing strategies that focus on effective talent acquisition, career latticing and development, and comprehensive understanding of leading practices to develop competitive advantages.

Here are some considerations when scaling employers' support services:

▶ The talent challenges facing employers in Western New York will likely not be solved by one entity alone. The development of Western New York's Regional Manufacturing Partnership is a foundational step toward collaboration throughout the region.

▶ As the industry continues to grow and evolve, identifying the roles new and existing employers, training organizations and social service organizations play can help reduce inefficiencies and prevent duplication of efforts in the region.

▶ A Western New York repository of leading practices for talent acquisition and retention, pipeline development, and training within the region for employers can provide a consistent and up-to-date resource for any size manufacturing employer.

▶ Generational and cultural gaps between employers and potential new talent can result in challenges related to recruitment and talent development. Specifically in Western New York, diversity of population and diverse socio-economic factors demand that employers understand every component of the talent landscape.

Greater Detroit Surge Center
The SURGE Center in Greater Detroit, sponsored by Goodwill, provides employers and workers coaching in areas of life that impact employability and performance in the workplace. Individual coaches aid employees in meeting essential needs and help to minimize workplace disruption for employers.

EY

Assessment of employer support services in Advanced Manufacturing

Employer support services were a key element mentioned by employers and are essential in effective workforce development. **Some key discoveries include:**

► WNY REDC has helped develop a Regional Manufacturing Partnership including employers, training partners, and industry advocates. While this partnership is still new and evolving, stakeholders agree that a neutral convening body is still needed to provide guidance and coordination.

► There is a perception from outer counties that Erie County receives a bulk of funding and support and that the large players within the partnership may not fully realize the needs outside of Erie County.

► Small to medium-size manufacturing (SMM) employers reported that they often don't have the time or financial resources to invest in trainings, workshops, or research regarding talent attraction and retention.

► SMM employers have often relied on their own network of peer companies or default recruitment methods to hire the workforce they need. Some stated that because turnover rates are relatively low, there isn't a drive to increase training or hiring practices.

Goal 3: Potential opportunities and partners

The following are opportunities that Western New York could explore to increase capacity for impactful employer support services in its targeted sectors.

► **Establish a central repository of leading practices.**

Leading practices on talent acquisition and retention, pipeline development, and training within the region for employers can provide a consistent and up-to-date resource for any size manufacturing employer. This will be important specifically for small to medium-sized manufacturers (SMMs) that often have limited resources or capacity to conduct research on industry leading practices. Reducing barriers to accessing and sharing this information may promote cohesion and consistency within the industry in WNY and allow for SMMs to compete with larger enterprises more effectively to attract and retain talent.

Important leading practices include:

Potential partners: Manufacturers' associations, Western New York REDC, industry employers, training organizations, and social services organizations

► "Great place to work"	► Internships
► Earn-and-learn	► On-the-Job
► Apprenticeships	► Career readiness skills
► Direct hire	► Career latticing and development

EY

▶ **Expand existing employer-networks and coordinate agreements on talent and employer outreach.**

Growth of existing advocacy networks for manufacturing employers, including associations and leading practice support systems can promote consistency and collaboration throughout the region. Development, coordination, and sharing of training and operational agreements can enable certain employers to more easily participate in training consortiums. An information sharing agreement and/or system could also reduce the number of duplicative meetings, creating more value for employers.

Potential partners: New York Empire State Development, New York Department of Labor, major industry associations, employers, Manufacturers' Association, Western New York REDC, industry employers, training organizations, and educators

Connecticut establishes business ambassadors
The Connecticut Department of Economic and Community Development is enlisting the support of eight statewide ambassadors to conduct outreach in its target industries. These ambassadors are intended to address needs related to growth and expansion plans, talent needs and transportation access, to name a few. The program is also meant to provide a more coordinated response to industry needs so businesses are not being asked the same question by multiple entities. Data sharing, through a customer relationship management system (CRM), is one example of this more coordinated approach.

▶ **Equipping employers through in-person training or virtual information sessions on leading practices.**

Hosting in-person events for trainings and information sessions on leading practices can provide key stakeholders with up-to-date information and an offer an opportunity for organizations to network. A central convening organization can be resourced to develop the necessary capacity to do so, and help t coalesce existing resources, toolkits, and information.

Potential partners: Manufacturers associations, Regional Manufacturing Partnership, Western New York REDC, industry employers, training organizations, and social services organizations

Goal 4: Sustainable talent acquisition and retention by promoting direct hire, earn-and-learn, apprenticeship and short-term training consortiums

Contemporary placement services, career coaching, and similar efforts are common in institutions of higher education and are often utilized by employers when seeking talent. These services are valuable but are designed to assist job seekers after a training program has been completed or after an assessment of incumbent skills is completed that can match them to an opportunity. Direct-hire partnerships via several hiring mechanisms could be utilized to both ensure talent acquisition and retention.

Here are some considerations when developing talent acquisition and retention efforts via direct hire partnerships:

▶ Employers and stakeholders report that acquiring talent through traditional means is often too competitive and there is a lack of qualified candidates that matriculate through traditional training programs or two-year degrees in Advanced Manufacturing or related disciplines.

EY

Goal 4: Sustainable talent acquisition and retention by promoting direct hire, earn-and-learn, apprenticeship and short-term training consortiums (continued)

▶ Employees that are sponsored (e.g., tuition assistance, income/stipend, internship) often demonstrate a desire to stay with the organization, largely based on the affinity developed through the training and sponsorship process.

▶ Employers budget and spend significant money on staffing agencies. While effective at times, the competition for talent remains, especially in disciplines like Advanced Manufacturing. There is opportunity for employers to invest the same amount or less in developing more fruitful talent acquisition programs and training or joining a consortium of employers in sponsoring short-term training.

▶ Abundant opportunity exists to demystify direct-hire, non-traditional training, sponsorship, and apprenticeship programs that can result in far more yield in candidate supply and contribute to talent retention in the region.

Assessment of challenges in talent acquisition and retention efforts in Advanced Manufacturing

Limited understanding of non-traditional recruitment, training, and sponsorship was explored during our research on the region and in conversations with regional stakeholders.

Some key discoveries include:

▶ Apprenticeships are commonly used across the state and region but are concentrated heavily in construction and building trades and unions. They are not widely recognized as a turnkey talent solution for manufacturing employers.

▶ Employers lack a comprehensive understanding of the existing funding and initiatives that are available, especially surrounding apprenticeships, co-ops and short-term proprietary training. There are often misconceptions about their roles, rights and responsibilities as employers in deploying these models.

▶ There is not a tool or resource for employers to understand their return on investment, commitment, legal implications, obligations and/or commitments when engaging in a non-traditional talent acquisition program. Operational and financial impact for employers should be easily calculated to encourage participation.

▶ WNY REDC has helped develop a consortium of Advanced Manufacturing employers, training partners and industry advocates. The Northland Workforce Training Center (NWTC) has been identified as a leading practice in how they train and support diverse talent to be hired into the industry. Work has started in disseminating and iterating upon this model to offer shorter programs throughout the region, but further collaboration and funding are needed.

▶ More employer participation is necessary to create significant supply of technical talent in Advanced Manufacturing. Participating in income assistance, paid internships, and co-op training programs are leading practices.

EY

Goal 4: Potential opportunities and partners

The following are opportunities that Western New York employers could explore to build resilient and sustainable talent acquisition and retention efforts through promotion of direct hire opportunities.

▶ **Campaign to strengthen industry advocacy groups, encouraging participation in non-traditional Advanced Manufacturing consortiums and training.**

The Buffalo Niagara Manufacturing Alliance in partnership with the Manufacturing Association of the Southern Tier (MAST), Buffalo Niagara Partnership and Insyte Consulting currently serve as the preeminent bodies advocating for employers in the Advanced Manufacturing space in Western New York. While a strong consortium has been built within the region for the manufacturing ecosystem, momentum around direct-hire programming and short-term training programs can be supported through further engagement of members and collaboration on income assistance, wage scales, and apprenticeship sponsorship. Coupled with effective wraparound services and sharing of resources, short-term training programs can be designed, launched, and sustained more easily.

Potential partners: Industry associations, Western New York REDC, industry partners, local higher education, chambers of commerce, and non-profits

▶ **Growth and funding of wage scales in apprenticeship programs in Advanced Manufacturing.**

Today, many employers have misperceptions of apprenticeships and their potential impact on their talent needs. It is not uncommon for apprenticeships to be viewed as only effective with unions, too expensive, cumbersome, or not easily utilized in industries outside of building and construction trades. Organizations like the Federation for Advanced Manufacturing (FAME) have developed proprietary methods, strategies, and sponsorship models that enable employers to more easily develop apprenticeships in a manner that is both compliant with United States Department of Labor (USDOL) requirements and presents the best value to the employer. In recent years, new modalities, learning systems, wage scales, and sponsorship guidelines have been enacted that make apprenticeships far easier to use than ever before.

Potential partners: New York Department of Labor, major industry associations and employers, related technical instruction providers, and local higher education

▶ **Development of cooperative (co-op) education programs in manufacturing disciplines.**

Co-op programming is characterized by close collaboration between institutions of higher education or training organizations, and employers. Traditionally, co-ops combine classroom instruction in varying modalities with hands on learning as a part-time employee with an employer. It is not uncommon for co-op students to receive academic credit for demonstrated competencies during employment. Most co-ops provide financial support or sponsorship of students, sometimes in the form of stipends, allowances for tuition and books, or traditional wage scales paid by the employer. In many cases, internships have replaced co-ops, but a recent resurgence among employers seeking talent solutions has shown promise for this model.

Potential partners: New York Department of Labor, major industry associations and employers, related technical instruction providers, and local higher education

EY

Advanced Manufacturing:
Strategy Implementation

Significant momentum exists in the Western New York region in developing the coalitions, support, and vision for comprehensive workforce development in the target sectors. The annual progress report developed by the WNY REDC identified the key focus areas in Advanced Manufacturing that would be important to build upon. Key stakeholders in the workforce ecosystem were convened to contribute to the annual report and support the work in the scope of this project. Many of those stakeholders will play an essential role in the scaling of existing programs or the development of new programs that can make a positive impact in the region.

A key consideration in future strategy will be the timelines, eligibility, and organization of tasks necessary to successfully apply for grants, such as the Pay for Performance (Operating and Capacity-Building Awards) and Capital Grant programs, or any other future grant programs administered by the Office of Strategic Workforce Development.

Ideally, the WNY REDC is positioned to support the efforts of the existing coalitions and workforce ecosystems, especially in providing ongoing guidance regarding the grant programs and alignment with regional economic and workforce priorities. Other organizations have also demonstrated the ability to convene stakeholders, which will be the first and most important task in organizing the region's strategy for the target sectors. The following considerations and steps have been developed to assess the feasibility of current and future initiatives in an organized and quantifiable manner.

Project identification and considerations

In exploring future projects or initiatives, the WNY REDC, regional stakeholders, grant applicants, and others should consider:

- ▶ Does the initiative have the potential of making measurable and positive impact on the development of workforce in the target sectors?
- ▶ Does the initiative clearly demonstrate value in reaching underserved populations, displaced workers, ALICE workers, the underemployed, and similar demographics?
- ▶ Will the program include business and industry support in the form of direct placement, on-the-job training, industry credentials, or assistance in the development of training capacity?
- ▶ What steps are being taken to prevent duplication of efforts in the region? What individuals, entities, or organizations can assist in determining whether an existing project should be augmented or a new project considered?

EY

Potential implementation steps

To the extent possible, project ideas and potential collaboration could be shared with the WNY REDC to determine the best potential partners, identify existing and similar programs, and share guidance on the grant program and timelines. The WNY REDC is likely in the best position to inform potential applicants of regional, economic, and industry developments that could benefit the grant application process or achieve economies of scale in certain efforts. In some cases, project ideas may not include utilization of OSWD grant programs. Information on the two OSWD grant tracks can also be found at this link.
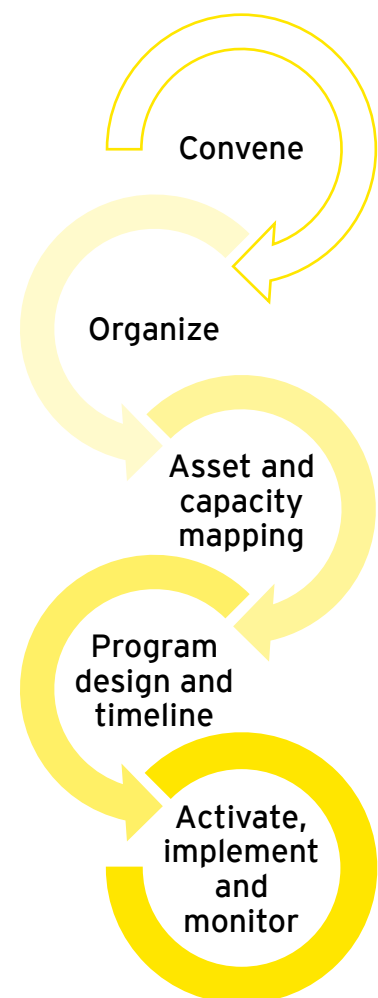
Step 1: Convene

▶ The WNY REDC has established convening ability in the region, and others have regional credibility, capacity, and interest in doing so as well.

▶ Project considerations should start with identifying the stakeholders, organizations, and/or individuals who could be included in preliminary discussions. The WNY REDC can serve as an advisor for this process.

▶ For example, the establishment of an employer-sponsored, short-term training program that focuses on the rapid upskilling of recent high school graduates would likely include the following entities in Western New York: employer, local college or university, BOCES, and local school district. Additional stakeholders including wraparound service providers, curriculum or certification bodies, or others could be included as the design of the project progresses.

▶ Once potential partners are identified, outreach could be conducted to convene project participants.

Step 2: Organize

▶ Meet to discuss the project idea, scope, and preliminary goals.

▶ Establish the projects relevance to the identified tradeable sector, based on these published guidelines and priorities.

▶ Establish a project lead, likely based on the focus of the project. For example, development of a new wraparound service could be led by an existing social service organization. The development of a new apprentice program could be led by a potential sponsor or employer.

▶ Organize all meetings to ensure communication, documentation, agenda items, and action items are documented and shared.

Step 3: Asset, capacity mapping

▶ Explore similar programs, leading practices, and enumerate required assets and capacities to launch the project or initiative.

▶ If utilizing OSWD grant programming, follow the application, documentation, and timeline guidance provided in the grant documentation.

▶ Consider what entities can contribute financial, in-kind, space, or other support that is essential for project success.

▶ Assess capacity of stakeholders, ensuring all required elements of the program are in place.

▶ Identify gaps in funding, capacity, expertise, and other assets necessary to launch the program.

▶ Conduct outreach to identify additional capacity and/or assets, utilizing the WNY REDC and other regional stakeholders as assets.

Convene

Organize

Asset and capacity mapping

Program design and timeline

Activate, implement and monitor

EY

Step 4: Program design and timeline

▶ If multiple project ideas exist, the WNY REDC can advise in prioritizing based on the needs, workforce priorities, and established leading practices in the region.

▶ Program design should account for the comprehensive lifecycle of the design, launching, administration, and monitoring of the program's impact. The exact timeline for any project will vary depending on grant requirements and stakeholders involved.

▶ Metrics of success should be determined at the beginning of a program and be human-centered and impact-focused. During the monitor portion of a program, metrics should be assessed to ensure they adequately capture intended impact and iterated upon if better metrics are identified. These metrics will vary from program to program, depending on grant requirements and the stakeholders involved.

▶ Concurrent to design, all efforts should be made to establish momentum, awareness, and inclusion of underserved populations and wraparound service providers. Both digital and grassroot efforts should be considered and employed.

▶ Specific timelines and goals should be created that account for program goals, partner capacities, and regional workforce priorities.

Step 5: Activate, implement, and monitor

▶ Consider a launch event that can draw attention and result in immediate momentum for the project. Enlist support from industry, non-profit, educational, and government leaders.

▶ Monitor progress and efficacy of the program through established guidelines in operating agreements, focusing on the administration and tracking of metrics and goals.

▶ Seek opportunities to scale the program through additional partners, assets, or marketing.

EY

Technology

A workforce development strategy for the Technology sector in Western New York

2

Technology:
Research findings

The WNY REDC and EY selected Technology as one of the two sectors conduct a workforce strategy based on its potential for unemployed, underemployed, and underserved jobseekers, as well as its ability to promote resiliency in the regional economy.

The Western New York technology sector is positioned to make an immediate impact in the regions' ability to recruit, retain, and grow both information technology talent and industry partners. Prior to the pandemic, WNY REDC established the technology sector as a key growth priority, understanding its value in the workforce and business ecosystem. Nationally, the sector has experienced challenges related to remote work implications, talent retention, and the development of short-term training programs that have the most impact on underserved communities. The Western New York region has recognized these challenges, and selected technology (information technology and related disciplines, specifically) as target sectors in developing their workforce and economy.

There are promising indicators that make the clear case for further development of the sector. After nearly a decade of falling population in Western New York, the last couple of years have seen a sizable increase. Though nearly 80% of the population in Western New York is classified as white, minority populations grew by double digits between 2016 and 2021. Workforce participation in the region has nearly recovered to pre-pandemic levels, but the participation rate in Western New York remains slightly lower than the state average. (See data appendix for more information).

Western New York has demonstrated a keen focus on the coalitions and vision that are necessary to grow the sector. In recent months, more coalition building has resulted in proposals for training programs, industry collaboration, and the scaling of non-traditional on ramps for technology talent in the region.

Potential high wages and a low job turnover rate position Technology as a key tradeable sector for the region to invest in. While there are improvements that can be made to the overall Technology ecosystem in Western New York, these changes are attainable through employer, training provider, and social service collaboration.
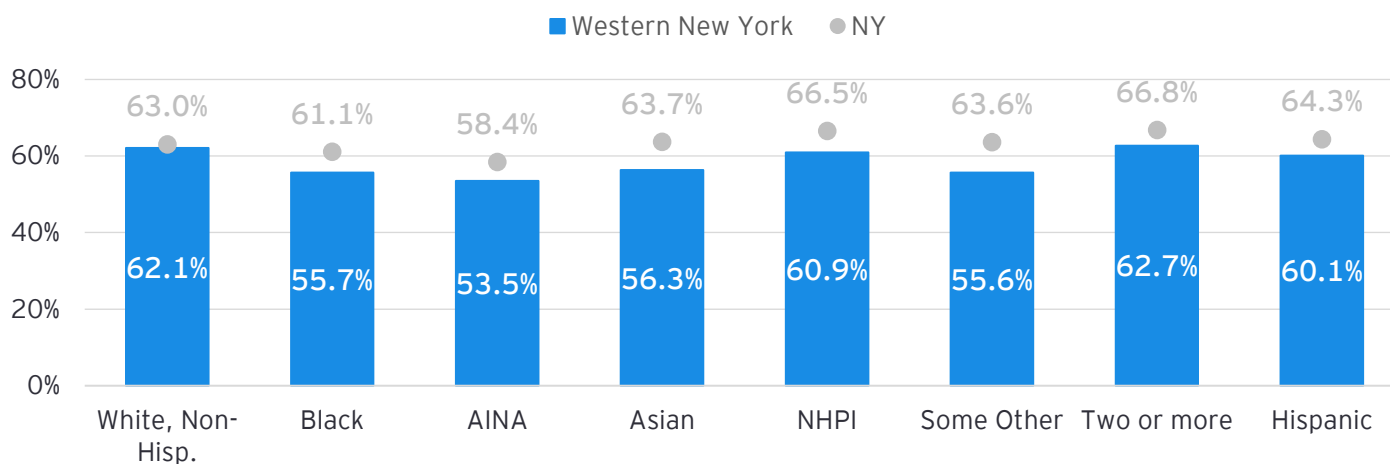
EY

Regional workforce analysis

The socioeconomic and demographic trends in WNY present several areas that are primed for opportunity. Population trends by year, age, and race/ethnicity can provide insight on the region's ability to supply the labor needed to support WNY's economy. Having a solid understanding of where the region currently stands provides a benchmark for future goals.

Unemployment and labor force participation

▶ While unemployment rates have recovered to pre-pandemic levels, the size of the labor force has not fully recovered.

▶ Unemployment rates for Black and multi-racial populations are twice as high as white unemployment; Hispanic unemployment is 50% higher while Asian unemployment is lower than white unemployment.

▶ Unemployment rates decline with higher levels of education. Less-educated workers in Western New York have higher unemployment than the state average.

▶ The labor participation rate is lower in Western New York than the state average with labor participation rates for minorities lower than the state average; adults without a high school diploma are much more likely to be out of the labor force in Western New York.

▶ Labor force participation rates increase significantly for workers with more education. Adults in Western New York without a high school diploma are much less likely to be in the labor force than the state average.

▶ Labor participation rates are highest for people in their 20s and 30s. Participation rates in Western New York are above the state average for those age 16 to 34, but below average for the 65+ population.

▶ Labor participation rates for minorities are lower than white and multi-racial populations in Western New York. Participation rates vs. state averages are lowest for minorities.

The region has an opportunity to increase minority participation in the workforce

Labor force participation rate by race/ethnicity, 2020

■ Western New York ● NY

	White, Non-Hisp.	Black	AINA	Asian	NHPI	Some Other	Two or more	Hispanic
NY	63.0%	61.1%	58.4%	63.7%	66.5%	63.6%	66.8%	64.3%
Western New York	62.1%	55.7%	53.5%	56.3%	60.9%	55.6%	62.7%	60.1%

Source:
US Census Bureau

EY

Population trends

▶ Population growth in Western New York has seen an uptick after nearly a decade of slow declines. This is attributed to growth in Erie County and by Asian and Hispanic populations. Still, the region is predominantly white and has smaller minority populations and relatively few foreign-born residents.

▶ The Western New York's region's retirement population (65+) has grown the fastest, followed by those 25 to 44. The population of all other age groups has declined.

Educational programming

A region's ability to produce talent across the entire labor spectrum is closely linked to its ability to sustain economic growth. Analyzing the output from WNY's educational programming provides insights on labor shortages, misalignment with employer needs, and clarity into workforce development investments.

General

▶ The population in Western New York is slightly less educated compared with the state, with nearly 32% of adults (25+) having a bachelor's or higher (compared with 37% for the state).

▶ The bachelor's+ educational attainment of Western New York's adult population has grown since 2015.

▶ More than 70% of all accredited certificates and degrees produced in Western New York are at the bachelor's level or higher.

▶ Accredited certificate production in Western New York is highest for one-year programs, but shorter-term program production is on par with state averages.

▶ Health, Business, and Education lead graduate production in the region. Large increases in certificates over the last five years was seen in Health and Culinary. Engineering and IT experienced increases at the bachelor's level, and Engineering and Public Administration saw increases at the master's level.

▶ Registered apprenticeships have increased significantly in the region, led by Electrician and Construction trades.

▶ Electrician programs register the most new apprentices followed by Painters, Construction and Maintenance.

Educational programming

Industry-specific

▶ Technology workers, as shown in tables in the previous pages, are focused on Information Technology (Software) occupations. The gap analysis below shows both IT workers as well as additional technician-level positions that support technology product development and manufacturing in Western New York.

▶ The table below shows occupation groups that are matched to degree programs to determine if the supply of graduates is sufficient to meet demand (measured as job openings in a year). A US comparison helps clarify if there is a gap or overproduction of graduates by comparing regional graduates to jobs with the US ratio of graduates to jobs (as shown in the right column below).

▶ In general, Western New York produces sufficient graduates to meet its Technology job openings, with a few exceptions. Graduate output of Web Developers is less than half US levels (at accredited institutions), and Network Administrators and Database Administrators have low graduate levels or no dedicated programs (respectively). Software Developers and Computer Systems/Security are oversupplied relative to demand.

Supply-Demand Gap Conditions
Technology Workers, Western New York

Gap	Occupation Group	Avg. Educ. Level	Regional 2021 Job Openings	Graduates	Regional Ratio	Supply-demand Ratio versus US	
IT-related:							
🟩	Computer Support Specialists	Associate's	209	178	85%	95%	
🟥	Web Developers	Associate's	28	11	40%	43%	
🟧	Computer Network Administrators	Bachelor's	150	10	7%	75%	
🟨	Software Developers	Bachelor's	342	293	86%	271%	
🟨	Computer Systems & Information Secur	Bachelor's	195	554	284%	313%	
🟥	Database Administrators	Bachelor's	24	0	0%	0%	
🟨	Computer Scientists	PhD	4	18	450%	485%	
Engineering Production-related:							
🟨	Electrical & Electronics Repairers	Certificate	56	54	96%	222%	
🟨	Computer Installers & Repairers	Certificate	31	25	81%	210%	
🟩	Industrial Production Technicians	Certificate	358	40	11%	118%	
🟨	Electrical / Electronics Technicians & D	Associate's	48	16	34%	124%	
🟥	Industrial Engineering Technicians	Associate's	77	32	41%	44%	
🟥	Mechanical Drafters	Associate's	30	17	56%	49%	
🟨	Science Technicians	Associate's	35	143	410%	485%	
🟨	Electrical and Electronics Engineers	Bachelor's	66	180	274%	219%	
🟩	Engineering Managers	Bachelor's	38	21	55%	106%	
🟩	Environmental Scientists & Engineers	Bachelor's	51	153	300%	117%	
🟨	Industrial Engineers	Bachelor's	151	241	159%	217%	
🟨	Mechanical Engineers	Bachelor's	91	613	677%	397%	

Lg Shortage	Shortage	In-Balance	Over-Supply	Lg Over-Supply

Source:
EY analysis of data from Lightcast and US Dept. of Education

EY

Technology industry analysis

Examining the overall trends facing Technology industry sector sheds light on the region's ability to recruit, expand, and retain high-impact businesses that contribute to the tax base. Equally important, these enterprises present an opportunity to offer high-quality, in-demand jobs for Western New York's unemployed, underserved, and underrepresented populations.

- ▶ Over 12,000 technology workers are employed in Western New York today. Employment levels dropped in 2019 and 2020 but have remained steady in 2021-2022.
- ▶ Technology workers are employed across many industries, led by Professional Services, Finance, and Government.
- ▶ Annual worker earnings in Technology occupations in Western New York are $80,500 and somewhat higher than average of all industries in the region but lag peers nationally.
- ▶ Technology workers are younger and predominantly male, and most jobs require a bachelor's degree or higher.
- ▶ Technology workers are better-paid than the average worker in the region, but only by 12%.
- ▶ The top three Technology occupations employ nearly 50% of the workforce. While most occupations require a bachelor's degree, the second most abundant position requires only some college.

Ecosystem observations

An initial framework was developed to help assess the strengths, challenges, and opportunities within the WNY's regional Technology workforce development ecosystem. This framework focused on the areas of 1) industry-informed training, 2) awareness of opportunities, and 3) wraparound services and support.

The following illustration outlines the types of work within each of those focus areas:

Industry-informed training	Awareness of opportunities	Wraparound services and support
Industry/education partnerships	Development of career lattices/pathways	Ability to navigate resources
Career readiness skills (hard and soft skills)	Marketing career pathways	Basic needs and emergency funds
Earn and learn opportunities	Awareness for training opportunities	Life skills
Expanded capacity for training	Programs for target populations	Coaches/mentors pre- and post-employment

EY

Industry-informed training

Utilizing relationships between employers and talent pipelines is a central component of OSWD's approach to workforce development. Alignment of industry needs with career readiness, job training, and upskilling activities may expand career pathways for all segments of the labor force.

- ▶ TechBuffalo serves as a neutral convener for Buffalo's Technology industry. It partners with schools, trainers, and employers to help make connections to programs, community members, key stakeholders, and funders.
- ▶ Western New York has several educational institutions and research facilities serving the Technology industry:
  - ▶ The regional ecosystem is supported by the WNY Incubator Network to assist startups, expand entrepreneurial efforts and grow wealth within the region. It includes:
    - ▶ Erie: 43North, Z80 Incubator Labs, BNMC Innovation Center, UB Incubator @ Baird, Exchange at Beverly Gray, UB Incubator @ CBLS
    - ▶ Niagara: Harrison Place, TReC
    - ▶ Chautauqua: Fredonia Technology Incubator
    - ▶ Allegany: IncubatorWorks Alfred
    - ▶ Cattaraugus: Olean Business Incubator
  - ▶ Trocaire College offers three Tech-centered degree programs (cybersecurity, data analytics and healthcare informatics), as well as 10 Tech-related workforce development programs.
  - ▶ Technology degree programs and certificates have been added to curriculum in Jamestown Community College.
  - ▶ Regional BOCES and P-Tech schools offer traditional and non-traditional students an opportunity to upskill and/or reskill to enter into various career pathways.
- ▶ Bitwise is a tech-centric company focused on real estate, consulting and workforce training. Bitwise provides Western New York resident-centered technology training programs for marginalized communities.
- ▶ Invest Niagara works to attract new employers into the Buffalo-Niagara.

Awareness of opportunities

Significant momentum and support exists today between employers and workforce entities. Yet, the number of technology occupations offered in the region has remained static for the past decade. Clear definition of stakeholder roles, the target audience, and methods of promotion may increase broader awareness and participation within the target sectors.

- ▶ Employers have an essential role in talent attraction and retention but are not as engaged in developing local pipelines.
- ▶ K-12 engagement exists within the region, but programming could strive to be more aligned with industry in offering earn-and-learn, hands-on experiences.
- ▶ Most employment within the technology industry requires a bachelor's degree, potentially disincentivizing talent from pursuing opportunities they may qualify for with a lesser degree or certificate.
- ▶ Talent that is produced within the region for the technology industry often seeks opportunities outside of the region. This may be impacted both by the wages offered in other regions for similar job positions and the lack of awareness that opportunities exist in the region. This is especially true for international students as they often cannot find employers within the region to sponsor their visa after graduation.

EY

Wraparound services and support

Socioeconomic barriers may hamper target populations' ability to retain a job in a regional tradeable sector, complete a career-advancement program, or participate in the labor force. Addressing these obstacles through services and programs may unlock opportunities for hidden talent and industry growth.

▶ A lack of available childcare spots for new children, high cost for parents, and low wages for caretakers make it difficult for some residents with children to enter the labor force.

▶ Western New York is a vehicle-reliant region, yet 69,000 individuals in the region do not own a car. Several organizations aim to mitigate this by offering ride share vouchers and bus passes, but the region's public transit system is disconnected and often does not reach key work and/or training sites within set shift schedules.

▶ Potential job seekers that have been out of the workforce often require career readiness training and mentoring once employed. Programs like WNY's Goodwill Goodskills seek to mitigate that by offering pre-employment training programs and a three-year career mentorship.

▶ New American residents' and international students' wraparound service needs are often compounded by language and cultural barriers that they must navigate.

▶ Job seekers and employers alike may struggle to navigate the wraparound resources that are available.

Florida Division of Early Learning Childcare Program
Families with low incomes in Florida who are trying to work or get training to work may be eligible for school readiness help. The School Readiness Program offers financial assistance to low-income families for early child education and care so families can become financially self-sufficient, and their young children can be successful in school in the future. Services vary based on individual need and range from extended day to extended year and school age care in some instances.

Technology:
Strategy framework

Industry overview

With the insights gathered through the background review and stakeholder engagement process, the following strategic framework was developed as the foundation of a sector-based workforce development plan.

The strategic framework comprises three goals, each with considerations that clarify the direction Technology leaders could pursue to achieve the goal. Within each goal, an assessment of activities identifies areas that are primed for change or investment. Solutions are presented as potential opportunities, which may be taken to address stated challenges and realize the goal.

Goals

1 Focus on regional outreach to grow supply of entry-level IT workers

2 Growth of information technology training inventories

3 Create a robust resource support and talent management ecosystem for employers

Target populations

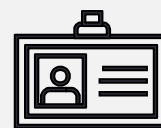| Asset-Limited, Income Constrained, Employed (ALICE) | Individuals outside of the workforce | Talent outside of college bound students | Graduates from local colleges and universities | Incumbent workforce |

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Goal 1: Focus on regional outreach to grow supply of entry-level IT workers

Today, over 12,000 IT workers are employed in Western New York. It is unclear how many of those are employed with local or regional organizations, and more data is necessary to fully understand the remote worker impact on information technology in the region. As mentioned, the population of minorities has increased by double digit percentages in recent years. In addition, 76% of technology jobs posted in the region today require a bachelor's-level education. From an economic development perspective, there is clear value in the development of non-traditional pathways into information technology.

Here are some outreach considerations when growing the supply of entry-level IT workers.

▶ Potential earnings for careers in technology is strong compared with other sectors. Annual salaries averaged over $80,000 in 2021, significantly higher than the average for all other industries.

▶ Regional inventories of K-12 information technology programming, coding and boot camps, experiential learning, and similar programs are valuable in generating interest among students and parents, but programming should strive to be applied in nature and partnered with industry.

▶ International students make up 49% of all technology graduates from the University of Buffalo yet seek job opportunities elsewhere to procure visas to remain in the US.

▶ Today, employment in the sector is predominantly male, and existing coalitions have prioritized the diversification in gender and age outreach to develop the largest possible talent pool in the sector.

▶ Approximately 2% of the total workforce in Western New York is in IT occupations, and that figure has remained static for over 10 years. Growth of the sector will require a focus on the awareness, outreach, and partnership capacities of the region.

Assessment of regional outreach and entry-level pathways in the Western New York Technology sector

Regional outreach and growth of entry-level opportunities in the technology sector was one of the key aspects of the workforce ecosystem explored during our research on the region and in conversations with regional stakeholders.

Our main takeaways from stakeholder engagement and research were:

▶ Employers have an essential role in career opportunity awareness and talent attraction. Their presence and engagement in the community, participation in career awareness events, and support of employees engaging in ambassador programs are pivotal in creating more excitement for local career opportunities. In designing their engagement, they will need to be cognizant of generational and cultural differences to capture talent that historically has not remained in Western New York.

▶ International graduates often seek employment opportunities outside of the region, as visa sponsorship from employers within the region is lacking. Stakeholders informed that while this a problem they are trying to solve, they need employer engagement and investment to help retain that talent. This factor can compound barriers to workforce entry that international students may face, such as language and cultural differences.

▶ Almost 80% of posted IT positions in Western New York require a bachelor's-level education. Stakeholders agree that significant opportunity exists to develop pathways into technology that would provide opportunity to underserved populations, as many open job positions can be competently filled by talent who possess relevant certificates or trainings. Requiring bachelor's degrees can disincentivize talent from applying for positions they are qualified for. Training that is accessible, attainable, funded, and results in direct placement has shown to be the most effective way to reach non-traditional populations, and efforts are underway today to develop more programming to address this challenge.

EY

Assessment of regional outreach and entry-level pathways in the Western New York Technology sector (continued)

▶ Today, momentum has been created through strong coalitions in Western New York that are focused on the growth of the technology sector. Specifically, several partners collaborated on the Tech Workforce Initiative, and pursued a Good Jobs Challenge grant to build outreach and training programs. Since its inception in 2017, TechBuffalo has worked to coalesce the strategies, intelligence, and employer support systems that will maintain progress in the development of IT occupations. Stakeholders agree that the strengthening of existing coalitions is essential for success.

▶ Populations in need of training may struggle with access to common support services including transportation and childcare. However, when these barriers are addressed, stakeholders report that there is often a lack of soft skills, financial literacy, and basic technology skills to successfully employ this talent. Career readiness skills such as these can be developed in partnership between social services organizations and employers. Examples of training include: Successfully Completing Job Applications, Resume Workshops, Interview Practicums, Tech Literacy, etc.

Goal 1: Potential opportunities and partners

The following are opportunities that Western New York could explore to increase awareness and excitement for career opportunities in Smart Systems.

▶ **Program to develop awareness and onramps to technology careers for K-12 and underserved populations.**

Addressing the talent shortage and projected need begins with awareness of technology careers. A campaign co-led by industry and existing coalitions could bring much-needed awareness to technology career opportunities. In collaboration with local economic development, municipal leadership, and educational institutions, common barriers to entry-level technology careers could be enumerated and addressed. Some barriers include: perceptions of training and educational requirements, common wraparound services needed by underserved populations, and knowledge of training pathways that result in entry-level careers. Elements could include expanded dual-enrollment, IT bootcamps, career awareness events, and pre-apprenticeship models. The target audiences for a program of this nature include K-12 students, administrators, parents, and community-based organizations. Funding possibilities include industry, philanthropic organizations, and appropriated public funding. This outreach effort could be led by an existing coalition already supporting the growth of the sector in Western New York.

Potential partners: Western REDC, local school districts, local higher education, employers, community-based organizations, and economic development organizations

▶ **Program to connect international talent at universities with local employment and innovation.**

Providing work visas can be a complicated process for employers. To retain international talent, employers will need guidance and support to navigate the federal requirements for applying for work visas. Partnering with higher institutions and working with international talent can give employers insight into how many work visas they will need to supply for new hires.

Potential partners: Western REDC, local school districts, local higher education, employers, community-based organizations, and economic development organizations

EY

Goal 1: Potential opportunities and partners (continued)

▶ **Program to connect wraparound service providers with employers, designing training and engagement programs with urgently needed support services.**

The untapped talent pool in Western New York has the potential to positively contribute to the success of the IT sector in the region. While training programs in varying modalities are essential, disadvantaged communities are unlikely to show interest and engagement if support systems are absent. The value proposition of training for these populations often centers around attainability, accessibility, funding, and placement. Assessing the most-needed wraparound services and partnering with training entities to embed services into training programs, is likely to yield more results in non-traditional recruitment. Additional considerations for applicants new to the technology industry include concierge application assistance, training program enrollment, and peer or success coaching.

Potential partners: Western REDC, social service providers, community-based organizations, employers, local higher education, and economic development organizations

▶ **Develop and launch a comprehensive and region wide campaign, focusing on promoting the industry, region, and value of IT careers.**

Among the most common concern cited by employers is business recruitment, talent acquisition, and talent retention in the technology community. A talent attraction campaign, highlighting the "great place to live and work" aspect of Western New York, could catalyze awareness, collaboration, and growth in the sector. This campaign could include components specifically dedicated to talent retention by coordinating activities among university students, technology and incubation centers, and employers.

Potential partners: Western REDC, community-based organizations, employers, local higher education, and economic development organizations

Maryland (Montgomery County Economic Development Corporation)
Maryland (Montgomery County Economic Development Corporation: Be Next: The campaign targets the small, minority-owned and women-owned business communities, and businesses in the life sciences, technology, real estate, hospitality, and nonprofit industries.

Goal 2: Growth of information technology training inventories

In recent years, employers have shown a willingness to adopt new training models for entry-level information technology workers in several disciplines. In Western New York, the most common occupations hired in IT are software developers (15-1252), Computer User Support Specialists (15-1232) and Computer and Network Systems Analysts (15-1211). Because IT positions often couple education with industry credentials that require experience, the development of short-term training can be complex. In addition, the updating of curriculum to keep pace with changes in technology can prove to be challenging for training entities. For that reason, efforts should be made to partner training with proprietary certification bodies like Microsoft, CompTIA, AWS, (ISC)2, etc. In addition to traditional educational pathways, the development of short-term, bootcamp, and upskilling programs that promote direct placement opportunities has merit in closing the talent gap.

EY

Here are some considerations when focused on training inventories:

▶ Today in the Western New York region, approximately 25% of information technology positions specifically require a bachelor's degree or less. Stakeholders believe that figure is a representation of outdated onboarding methods, and not consistent with the true skills requirement in many entry level IT careers.

▶ Creating a common language to use for skills and job positions within the industry can help mitigate barriers that talent may experience when translating their skills in applications and further incentivize them to apply.

▶ The industry is a rapidly evolving environment and with that, the skills necessary to compete in the job markets change as well. Mapping the most common skills and certifications required is an essential part of effective training design and can assist in determining ideal cohort sizes and guide employers in committing to placement.

▶ Misperceptions of short-term training, apprenticeships, micro-credentialing, and industry certifications can often confuse potential trainees and employers, resulting in delays in design or adoption of a new training program. Education for all stakeholders is necessary to dispel myths, especially in legacy training like apprenticeships.

▶ Technology training and resulting employment can largely be completed online. However, considerations should be made for populations that need special accommodations, access or technology needs that require assistance or guidance from training partners.

Assessment of IT training inventories in Western New York

Training inventories in the Technology sector were one of the key aspects of the workforce ecosystem explored during our research on the region and in conversations with regional stakeholders.

Some key discoveries include:

▶ Stakeholders report that hiring mid-level talent will be just as important as entry-level to support internal career pipelines and promotions. A common missing link in continuing education is the training necessary to promote an entry-level/technician role to mid-level manager.

▶ Outside of common nomenclature, there isn't a common language or taxonomy for skills and job postings within the region. Stakeholders stated that this can impede applicants from applying either because they don't believe their skills are relevant or because their training used different definitions and thresholds.

▶ A number of bootcamps exist in the region today and sharing of information regarding the efficacy and placement rates of those training programs will be important in designing similar programs in relevant skill sets.

▶ Both credit and non-credit program inventory is important in meeting industry demand. By default, institutions of higher education will normally focus on credit bearing certificates coupled with industry certifications. Non-credit bootcamps are most successful when paired with industry certifications, even at the most entry-level.

▶ Stakeholders desire more engagement from employers in building capacity, expertise, instruction, curriculum, and engagement of potential information technology trainees. In addition, there is a desire for more tangible commitments from employers in the sector regarding direct placement after completed training.

EY

Goal 2: Potential opportunities and partners

The following are opportunities that Western New York could explore to increase training inventories for career opportunities in information technology related disciplines.

- ► **Expansion of credit bearing certificate programs and information technology bootcamps.**

  Organizations including Trocaire College, the University of Buffalo, and the Buffalo Center for Arts and Technology have developed IT training programs in high-demand occupations like cybersecurity and help desk and support technology. Typically, this training is characterized by immersive classroom, virtual, and self-paced curriculum, in conjunction with required standards from accrediting bodies like CompTIA. To meet the training demand, additional resources for these or similar programs should be considered to grow cohort capacities, address technology costs, allocate necessary space, and source the instruction and curriculum that is necessary. It is important to note that these programs are designed specifically to meet entry-level demand, so most trainees will also require a degree of success coaching to facilitate completion. Engaging employers at all stages of development, and especially job placement, is important in the success of bootcamp-style programs.

  Potential partners: Local higher education, employers, industry associations, local school districts, community-based organizations, and economic development organizations

- ► **Development of less-common cooperative (co-op, credit bearing) education programs and apprenticeships in IT occupations.**

  Today, many employers have misperceptions of apprenticeships and their potential impact on their talent needs. It is not uncommon for apprenticeships to be viewed as only effective with unions, too expensive, cumbersome, or not easily utilized in industries outside of building and construction trades. In recent years, new modalities, learning systems, wage scales and sponsorship guidelines have been enacted that make apprenticeships far easier to use than ever before. Industry consortiums, training entities, and non-profits can sponsor apprenticeships, easing administrative burden on employers. While stakeholders concede this is a non-traditional approach in information technology, it does hold promise in developing non-traditional recruitment in the sector. Pairing apprenticeships with pre-apprenticeship programming in local school districts or BOCES could add additional value to this talent supply chain.

  Potential partners: New York Department of Labor, major industry associations, employers, related technical instruction providers, local higher education, and community-based organizations,

- ► **Development of an upskilling consortium, focused on identification of the most urgently needed skill sets as a guide to training development.**

  Employers report that they are consistently challenged with talent retention and skills development of IT employees. In Western New York, talent retention is especially challenging with foreign-born talent, and the upskilling of incumbent employees is seen as a pathway to increase retention in the region. Potential exists in launching a technology upskilling consortium, consolidating the capacities of employers, training providers and industry associations, that provides continuing education to incumbent IT workers in the sector. This could ease the training burden on employers while contributing to the growth of the technology ecosystem. Upskilling programs could focus on the shortest possible path to competencies in information technology program and project management.

  Potential partners: Employers, industry associations, local higher education, economic development organizations, and community-based organizations

EY

Goal 3: Create a robust resource support and talent management ecosystem for employers

Employers in Western New York report that they lack a set of comprehensive resources and guidance to navigate the talent ecosystem successfully and desire a turnkey solution that is accessible and relevant to their needs. Creating a support system for employers can be complex, in part because occupations in the sector span all industries. In Western New York today, professional services, finance and insurance, and government account for over 54% of the total IT jobs in the region, and the remaining occupations span an additional 18 industries. Additionally, success for employers can hinge on actionable information related to worker demographics, talent development and planning, and the evolution of skills and experience requirements in the sector. Almost 74% of IT workers in Western New York identify as male, compared with 49% across other industries. Over 90% of IT workers in the region are over age of 25, indicating a strong opportunity to engage with younger and local populations. Four of the five highest-paying technology occupations in the region tout an average hourly wage of well over $40, making the pursuit of Technology careers promising for workers. The data and information to support effective decision-making, and the convening and collaboration necessary to do so, will be essential to the success of the sector.

Here are some considerations when focused on the development of employer resources:

▶ To better understand the talent ecosystem, employers will need accessible, real-time information on available training programs and resources, and leading practices on talent management and retention in the sector.

▶ Mid-level managers often retain firm and industry leading practices that need to be disseminated to new hires. Unfortunately, businesses within the IT industry are experiencing a bottleneck for these positions, creating an invisible gap of knowledge that will be necessary for new talent to promote internally.

▶ Young professionals (under 25 especially) in the region have different expectations about the workplace, their contribution and roles in projects, and desire both the ability to collaborate and work remotely. Understanding generational differences is not unique to the IT sector but is important in developing the talent base that is currently underrepresented among that age group.

▶ Collaboration with wraparound service providers is infrequent, and most employers need guidance or leading practices to navigate the programming, organizations, and services that can lead to training and employment opportunities for the underserved.

Assessment of employer support ecosystem in the Western New York Technology sector

Employer support systems was one of the key aspects of the workforce ecosystem explored during our research on the region and in conversations with regional stakeholders.

Our main takeaways from stakeholder engagement and research are:

▶ Employers lack a comprehensive understanding of the existing funding and initiatives that are available, especially surrounding apprenticeships, co-ops and short-term proprietary training. There are often misconceptions about their roles, rights, and responsibilities as employers in deploying these models, and a suite of leading practices or guidance is important in accelerating adoption.

▶ There is not a central location, tool, or resource for employers to understand their return on investment, commitment, legal implications, obligations, and/or commitments when engaging in a non-traditional talent acquisition program. Operational and financial impact for employers should be easily calculated in order to encourage participation.

▶ Employers need technical assistance in defining the skill sets that are relevant to their operations. Most required skills are defined by the necessary certification or competencies required to enter into a role. However, less information is available to assist employers in the development, retention, and upskilling opportunities that can help grow their businesses.

EY

Assessment of employer support ecosystem in the Western New York Technology sector (continued)

▶ Even prior to the pandemic, remote work was not uncommon in IT related fields. Employers have been faced with the challenge of creating workplaces where collaboration, integration of new systems, and effective management of operations can be achieved in remote environments.

Goal 3: Potential opportunities and partners

The following are opportunities that Western New York could explore to develop robust employer resources and talent ecosystems.

▶ **Support for a fully resourced information technology consortium with a complete suite of concierge services for employers.**

Industry associations provide a platform for employers of all sizes to convene for discussions on leadership, talent, current skills needs, and changing industry dynamics. It can also be a platform for sharing leading practices, activating shared initiatives and enhancing overall collaboration. The support and growth of existing coalitions in Western New York are a critical priority in generating momentum for the sector.

Sample initiatives they could tackle:

  ▸ Identification and awareness for engagement opportunities (training development, networks/initiatives for diverse populations, sponsored apprenticeships and direct placement programs)

  ▸ Developing a common language for necessary skills and trainings to promote consistency for the industry and the region, including a focus on the upskilling of incumbent IT workers that will improve talent retention in the region

  ▸ Education and trainings for how to be an "employer of choice" (e.g., company culture, cultural understanding, flexible work arrangements)

  ▸ Networking and training events for IT managers, entrepreneurs, and university talent seeking to connect with industry

Potential partners: Western REDC, industry associations, employers, economic development organizations, local higher education, and community-based organizations

▶ **Creation of a digital technology talent guide or knowledge base for employers.**

Employers in the region could benefit from the establishment of an interactive virtual resource guide, published periodically, that provides real-time intelligence on trends in training, upskilling, onboarding practices, wraparound services, non-traditional recruitment, and opportunities to participate in short-term training. This guide can be developed through collaboration with local entities, contributing to the growth, training capacity, and retention in the sector.

Potential partners: Western REDC, industry associations, employers, economic development organizations, local higher education, and community-based organizations

EY

Goal 3: Potential opportunities and partners (continued)

▶ **Philanthropic and industry support to power coalitions and training capacities.**

Through a central convening organization, the establishment of a "Tech Talent" campaign could result in significant resources and momentum necessary to launch concurrent initiatives in training, employer support, and IT career awareness. The region's existing coalitions have demonstrated a deep commitment to the growth of the sector, and stakeholders are eager to grow and capitalize on the collaboration already taking place. Though progress has been made, additional work is necessary to fully realize the potential of the sector, and its impact on the economic development and underserved populations of Western New York. Recent grant funding announced through the Office of Strategic Workforce Development (OSWD) allows for matching dollars to be utilized in support of workforce training initiatives.

Example of possible funding for projects includes:

▸ Development of an "IT Ambassador" program, generating momentum and ecosystem capacity among young professionals who can gain work experience by operationally supporting K-12, IT-related events and training

▸ A training or income assistance fund, augmenting allocated training dollars in support of wraparound services, training, and equipment to grow training, outreach, and employer support services

▸ Support of university incubation or innovation hubs, incentivizing industry and students to collaborate in technology competitions, entrepreneurship, and commercialization efforts that can help increase talent retention in the region

▸ Support and development of events and programming for K-12 students, including coding camps, cyber hackathons, and similar events to drive interest in IT careers

Potential partners: NY ESD, Western REDC, IDAs, Chambers of Commerce, and industry associations

Technology:
Strategy Implementation

Significant momentum exists in the Western New York region in developing the coalitions, support, and vision for comprehensive workforce development in the target sectors. The annual progress report developed by WNY REDC identified the key focus areas in the sector that would be important to build upon. Key stakeholders in the workforce ecosystem were convened to both contribute to the annual report and support the work in the scope of this project. Many of those stakeholders will play an essential role in the scaling of existing programs or the development of new programs that can make a positive impact in the region.

A key consideration in future strategy will be the timelines, eligibility, and organization of tasks necessary to successfully apply for grants, such as the Pay for Performance (Operating and Capacity-Building Awards) and Capital Grant programs, or any other future grant programs administered by the Office of Strategic Workforce Development.

Ideally, the WNY REDC is best positioned to support the efforts of the existing coalitions and workforce ecosystems, especially in providing ongoing guidance regarding the grant programs and alignment with regional economic and workforce priorities. Other organizations have also demonstrated the ability to convene stakeholders, which will be the first and most important task in organizing the region's strategy for the target sectors. The following considerations and steps have been developed to assess the feasibility of current and future initiatives in an organized and quantifiable manner.

Project identification and considerations

▶ Does the initiative have the potential of making measurable and positive impact on the development of workforce in the target sectors? How?

▶ Does the initiative clearly demonstrate value in reaching underserved populations, displaced workers, ALICE workers, the underemployed, and similar demographics?

▶ Will the program include business and industry support in the form of direct placement, on-the-job training, industry credentials, or assistance in the development of training capacity?

▶ What steps are being taken to prevent duplication of efforts in the region? What individuals, entities, or organizations can assist in determining whether an existing project should be augmented or a new project considered?

EY

Potential implementation steps

To the extent possible, project ideas and potential collaboration could be shared with the WNY REDC to determine the best potential partners, identify existing and similar programs, and share guidance on the grant program and timelines. The WNY REDC is likely in the best position to inform potential applicants of regional, economic, and industry developments that could benefit the grant application process or achieve economies of scale in certain efforts. In some cases, project ideas may not include utilization of OSWD grant programs. Information on the two OSWD grant tracks can also be found at this link.

Step 1: Convene

▶ The WNY REDC has established convening ability in the region, and others have regional credibility, capacity, and interest in doing so as well.

▶ Project considerations should start with identifying the stakeholders, organizations, and/or individuals who could be included in preliminary discussions. The WNY REDC can serve as an advisor for this process.

▶ For example, the establishment of an employer-sponsored, short-term training program that focuses on the rapid upskilling of recent high school graduates would likely include the following entities in Western New York: employer, local college or university, BOCES, and local school district. Additional stakeholders including wraparound service providers, curriculum or certification bodies, or others could be included as the design of the project progresses.

▶ Once potential partners are identified, outreach could be conducted to convene project participants.

Step 2: Organize

▶ Meet to discuss the project idea, scope, and preliminary goals.

▶ Establish the projects relevance to the identified tradable sector, based on these published guidelines and priorities.

▶ Establish a project lead, likely based on the focus of the project. For example, development of a new wraparound service could be led by an existing social service organization. The development of a new apprentice program could be led by a potential sponsor or employer.

▶ Organize all meetings to ensure communication, documentation, agenda items, and action items are documented and shared.

Step 3: Asset, capacity mapping

▶ Explore similar programs, leading practices, and enumerate required assets and capacities to launch the project or initiative.

▶ If utilizing OSWD grant programming, follow the application, documentation, and timeline guidance provided in the grant documentation.

▶ Consider what entities have the ability to contribute financial, in-kind, space, or other support that is essential for project success.

▶ Assess capacity of stakeholders, ensuring all required elements of the program are in place.

▶ Identify gaps in funding, capacity, expertise, and other assets necessary to launch the program.

▶ Conduct outreach to identify additional capacity and/or assets, utilizing the WNY REDC and other regional stakeholders as assets.

Convene

Organize

Asset and capacity mapping

Program design and timeline

Activate, implement and monitor

EY

Step 4: Program design and timeline

▶ If multiple project ideas exist, the WNY REDC can advise in prioritizing based on the needs, workforce priorities, and established leading practices in the region.

▶ Program design should account for the comprehensive lifecycle of the design, launching, administration, and monitoring of the program's impact. The exact timeline for any project will vary depending on grant requirements and stakeholders involved.

▶ Try to determine metrics of success at the beginning of a program and be human-centered and impact-focused. During the monitor portion of a program, metrics could be assessed if they adequately capture intended impact and iterated upon if better metrics are identified. These metrics will vary from program to program, depending on grant requirements and the stakeholders involved.

▶ Concurrent to design, all efforts could be made to establish momentum, awareness, and inclusion of underserved populations and wraparound service providers. Both digital and grassroot efforts could be considered and employed.

▶ Specific timelines and goals should be created that account for program goals, partner capacities, and regional workforce priorities.

Step 5: Activate, implement, and monitor

▶ Consider a launch event that can draw attention and result in immediate momentum for the project. Enlist support from industry, non-profit, educational, and government leaders.

▶ Monitor progress and efficacy of the program through established guidelines in operating agreements, focusing on the administration and tracking of metrics and goals.

▶ Seek opportunities to scale the program through additional partners, assets, or marketing.

EY

Appendix A

Research appendix

1 Introduction

Introduction to Research Appendix

As part of the Phase II work to develop a Regional Sector-Based Workforce Development Strategy for Western New York, EY produced new research and analysis to supplement research produced by Empire State Development (ESD) and the Regional Economic Development Council (REDC) during Phase I as well as previous reports.

This Research Appendix includes data and findings on the following:

▶ Regional workforce conditions

▶ Industry and occupation analysis on the two target sectors: Advanced Manufacturing and Technology

▶ Occupational analysis of the two target sectors

▶ Educational programming that supports overall workforce development and the programming specific to the two target sectors

This supplemental research aims help to inform the workforce development planning process and the development of strategies for each of the target sectors.

EY

2

Regional workforce conditions

About this chapter

In this chapter, we seek to understand the social and economic trends within the region, as well as validate potential barriers facing the community. We examine components of population growth, economic indicators, potential barriers to employment and regional migration. Key metrics in this chapter include:

- ▶ Population trends by year, age, and race/ethnicity
- ▶ Monthly unemployment rate
- ▶ Size of labor force by month
- ▶ Potential barriers to employment

- ▶ Migration trends
- ▶ Unemployment by year, age, race/ethnicity, and education level
- ▶ Labor force participation rate by year, age, race/ethnicity, and education level

Insights from this analysis can provide a high-level understanding of the talent pipeline and the region's ability to supply the labor needed to support Western's economy.

Key findings

- ▶ Population growth has been attributed to growth in Erie County and by Asian and Hispanic populations.

- ▶ Still, the region is predominantly White and has smaller minority populations and relatively few foreign-born residents.

- ▶ The Western region's retirement population (65+) has grown the fastest, followed by populations between 25 and 44 years.

- ▶ While unemployment rates have recovered to pre-pandemic levels, the size of the labor force has not fully recovered.

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2 Regional workforce conditions

Key findings, *continued*

▸ Unemployment rates for Black and multi-racial populations are twice as high as White unemployment; Hispanic unemployment is 50% higher while Asian unemployment is lower than White unemployment.

▸ The labor participation rate is lower in Western New York than the state average with labor participation rates for minorities lower than the state average; adults without a high school diploma are much more likely to be out of the labor force in Western New York.

▸ Poverty levels are on-par with the state average (about 14%) but the region has a higher percentage of population with a disability.

▸ Relatively few residents commute out of the region to find work, but Western New York imports more workers than it exports each day. The region has a net inflow of commuters in Health Professions, Office Support, and Production talent.

▸ The employment base in Western New York is still 8% below pre-pandemic levels. The industries that have lost the most jobs in Western New York are Accommodation and Food Services, Health Care and Government.

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Population growth in Western New York has seen an uptick after nearly a decade of slow declines.

Population growth, 2010 - 2021

Annual estimates are re-benchmarked to Decennial Census.

1,500,000

1,450,000

1,398,386   1,394,722   1,388,791   1,411,675
1,400,000   1,382,069   1,377,094

1,399,541   1,395,481   1,393,140   1,384,140   1,380,307   1,416,210
1,350,000

1,300,000

1,250,000

2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021

Source:
US Census Bureau
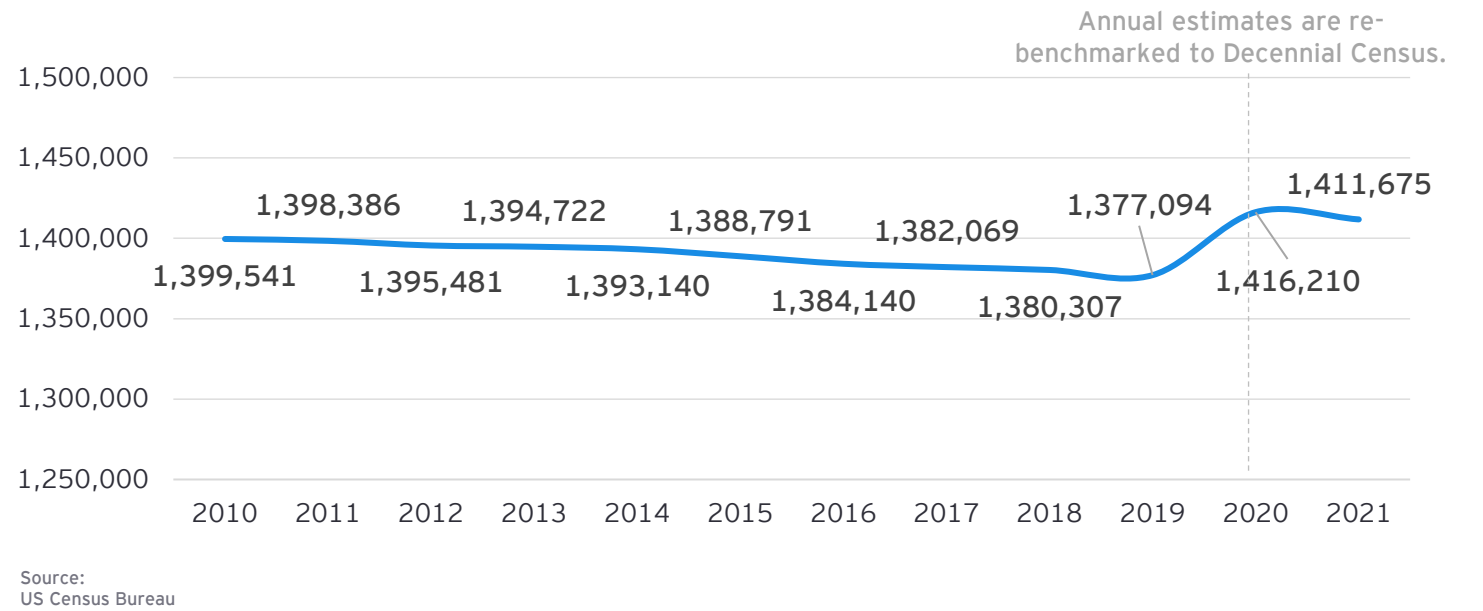
Erie County experienced the most population growth over the last decade, while other counties within Western New York experienced small declines.

Population, 2021

1,000,000

500,000

0

			950,683	211,653
46,106	76,426	126,807		
Allegany	Cattaraugus	Chautauqua	Erie	Niagara
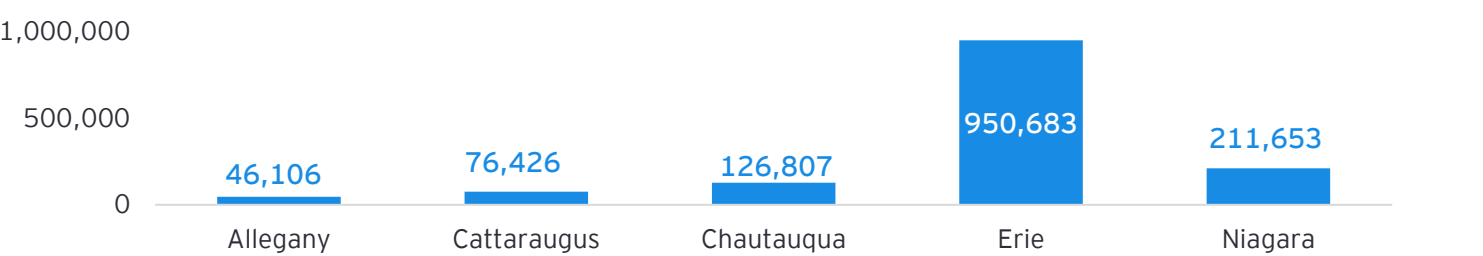
Population growth, 2011 to 2021

5%

0%

-5%

-10%

| -5.5% | -4.2% | -5.5% | 3.4% | -1.9% |
| Allegany | Cattaraugus | Chautauqua | Erie | Niagara |

Source:
US Census Bureau

EY
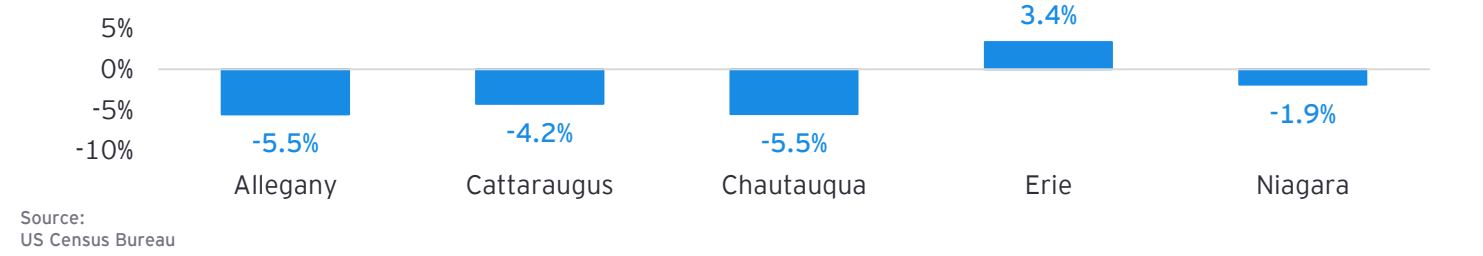
The population of Western New York lacks diversity, with Asian and Hispanic populations the least represented compared to state averages.

Population by race/ethnicity, 2021

■ Western New York   ● NY

80%

50%

20%

-10%

| | White | Black | Asian | Other | Hispanic |

78.5%
53.5%
13.4%
10.0%
8.6%
3.2%
2.8%
1.2%
19.5%
5.5%
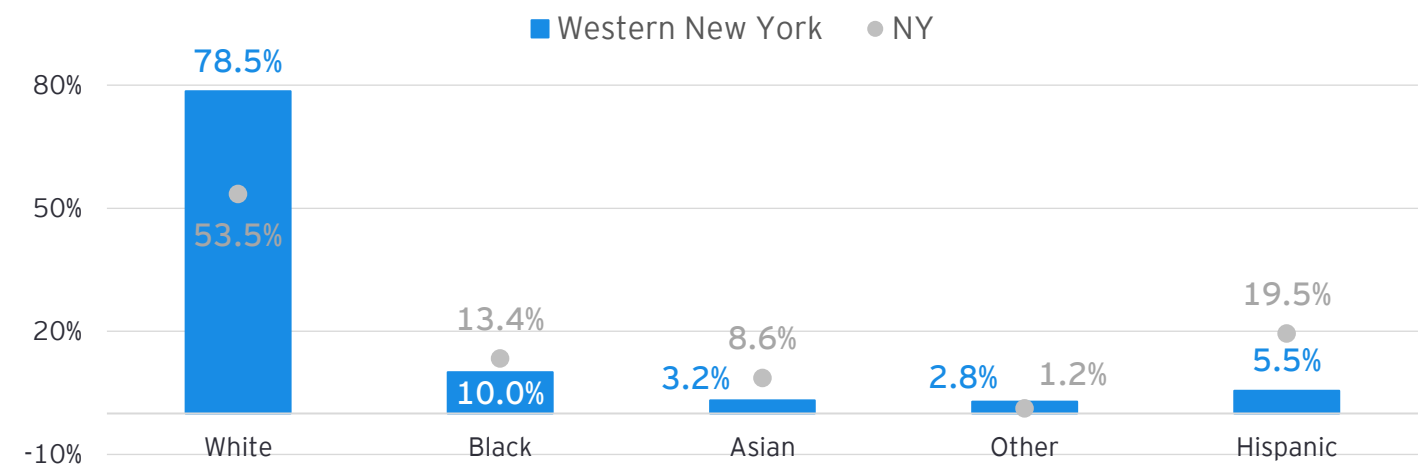
Source:
US Census Bureau

However, Asian, Hispanic and Other populations are growing quickly within Western New York. At the same time, the White (non-Hispanic) population is declining, and Black population is slightly declining.

Population growth by race/ethnicity cohort as share of total population, 2016 - 2021

30%

20%

10%

0%

-10%

White   Black   Asian   Other   Hispanic

-1.8%   -0.4%   24.6%   10.4%   12.3%

Source:
US Census Bureau

EY
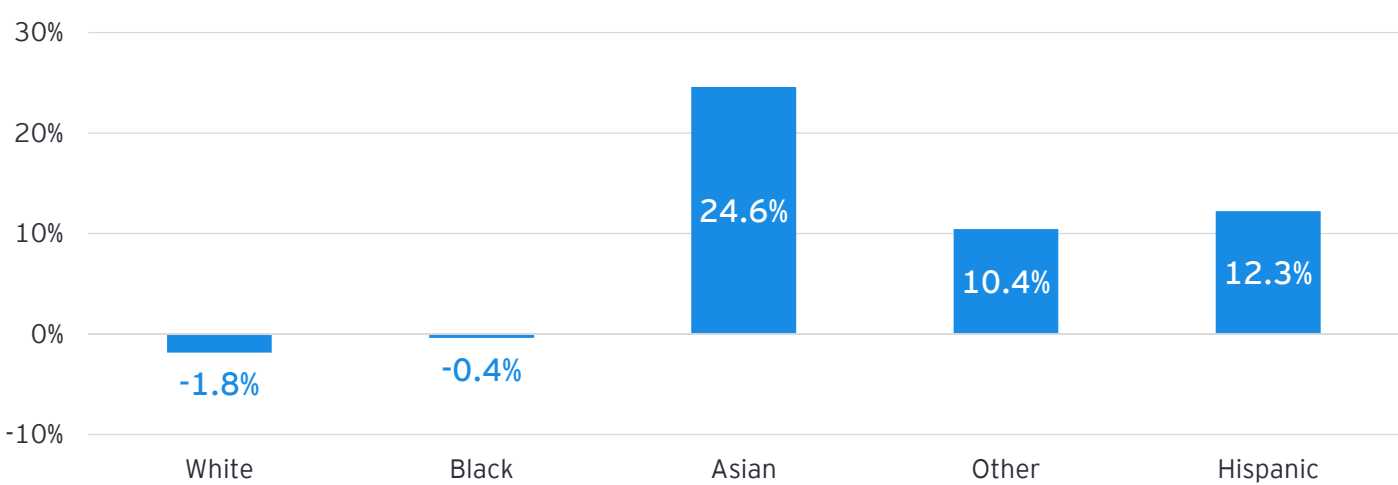
Western New York has a higher share of older populations (45+) than the statewide average and a lower share of young professionals (25-44).

Population by age, 2021

■ Western New York ● NY

Age group	Western New York	NY
<14 years	16.7%	17.1%
15 to 24 years	12.4%	12.4%
25 to 44 years	25.3%	27.0%
45 to 64 years	26.4%	26.0%
65+ years	19.3%	17.5%
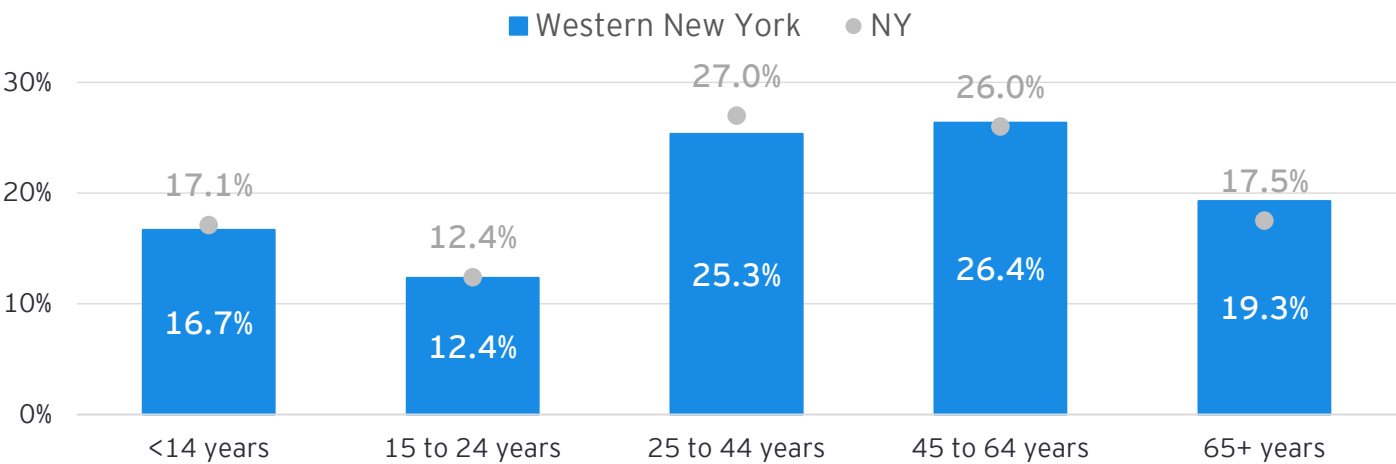
Source:
US Census Bureau

Western New York's retirement age population (65+) has grown the fastest, followed by populations between 25 and 44 years. All other age groups have declined.

Population growth by age, 2016 - 2021

Age group	Growth
<14 years	-0.8%
15 to 24 years	-7.1%
25 to 44 years	5.0%
45 to 64 years	-6.4%
65+ years	9.5%

Source:
US Census Bureau

EY

Workforce
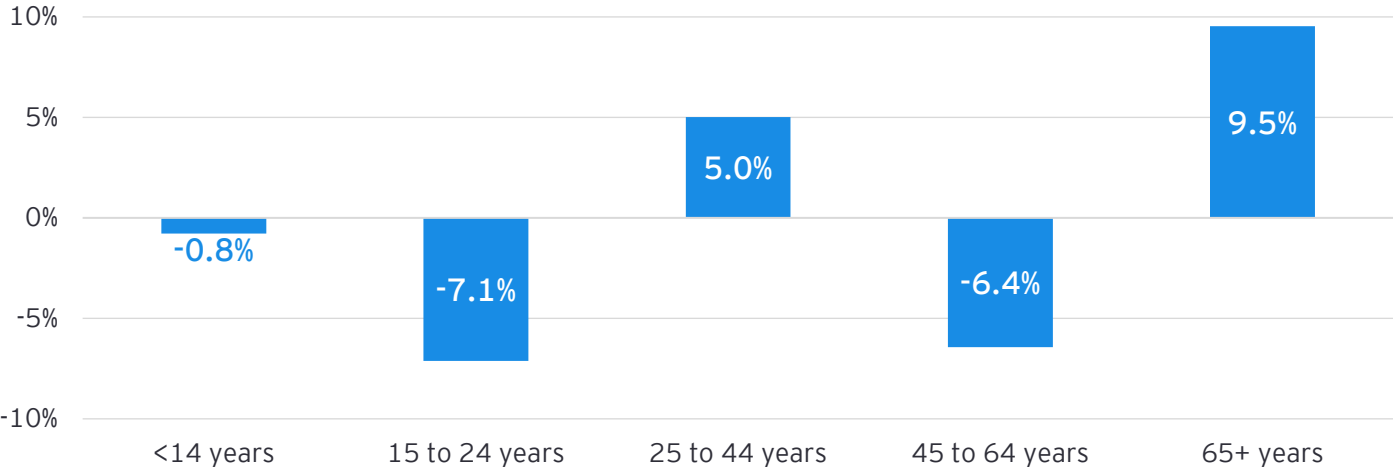
The unemployment rate in Western New York has fallen below pre-pandemic levels.

Unemployment rate by month, Jan. 2019 – July 2022

Western New York

21.1%

2019 Average

5.1%

4.3%

4.0%

3.6%

20%

10%

0%

Mar-'19 Jun-'19 Sep-'19 Dec-'19 Mar-'20 Jun-'20 Sep-'20 Dec-'20 Mar-'21 Jun-'21 Sep-'21 Dec-'21 Mar-'22 Jun-'22

Source:
US Bureau of Labor Statistics
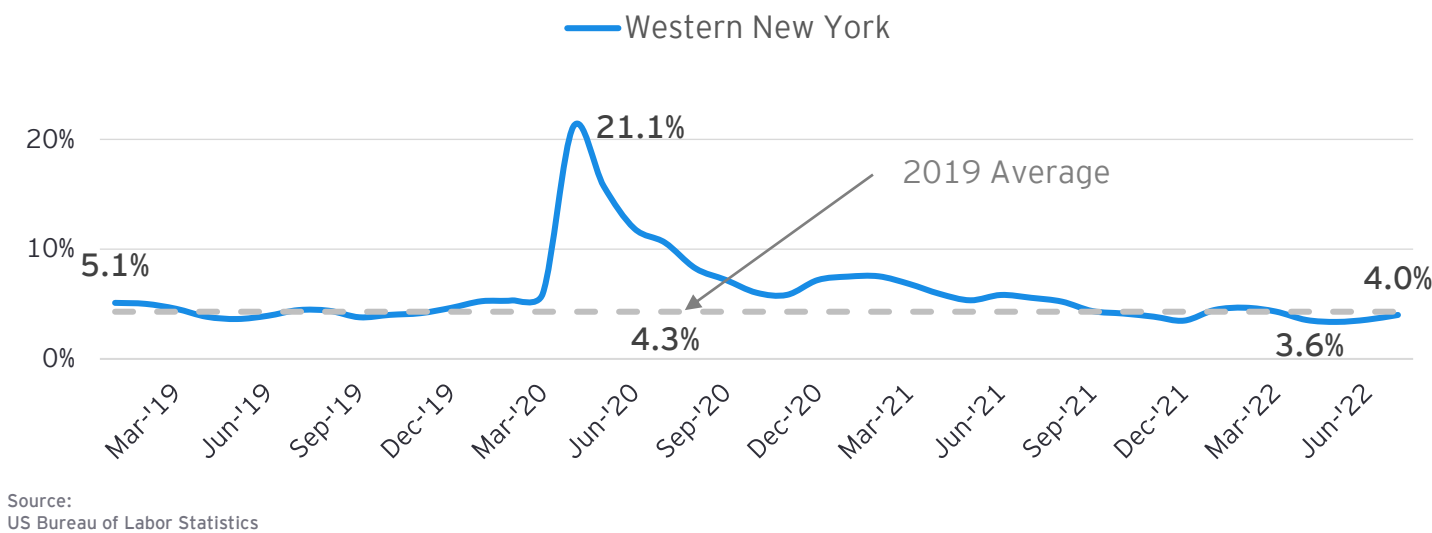
The labor force (those working or looking for work) in Western New York has nearly recovered to pre-pandemic levels.

Labor force size by month, Jan. 2019 – July 2022

Western New York

2019 Average

667,815

663,041

654,935

664,620

648,356

626,695

700,000

675,000

650,000

625,000

600,000

Mar-'19 Jun-'19 Sep-'19 Dec-'19 Mar-'20 Jun-'20 Sep-'20 Dec-'20 Mar-'21 Jun-'21 Sep-'21 Dec-'21 Mar-'22 Jun-'22

Source:
US Bureau of Labor Statistics

EY

Workforce
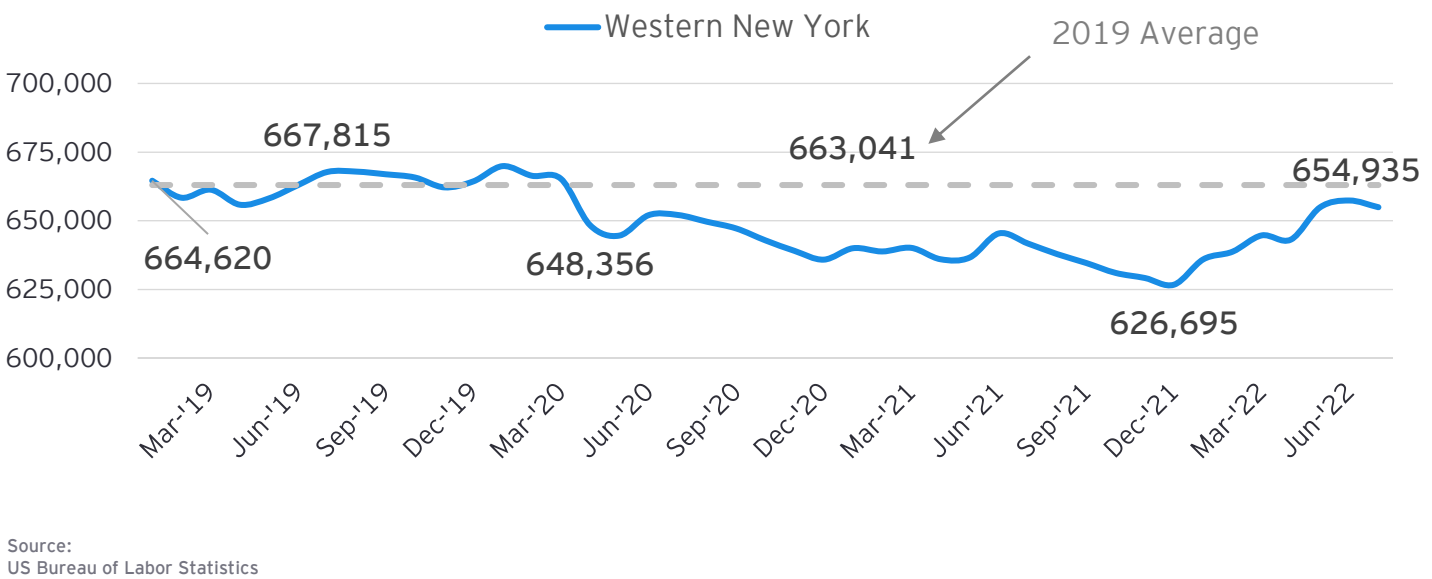
The foreign-born population in Western New York has grown slightly from 2015 to 2020 and comprises 6% of total population.

Foreign born as % share of population, 2015 - 2020

■ Western New York ● NY

- 30%
- 22.5%
- 22.4%
- 20%
- 10%
- 5.4%
- 5.8%
- 0%
- 2015
- 2020
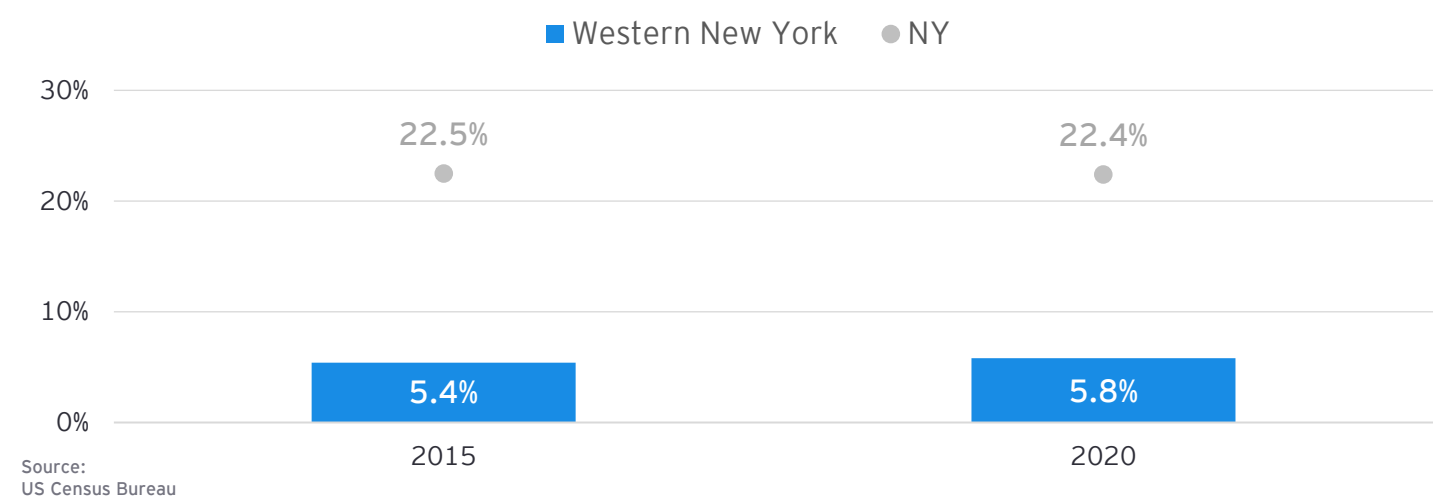
The number of non-U.S. citizens in Western New York is relatively low compared to the state average.

Non-citizens as % share of population, 2015 - 2020

■ Western New York ● NY

- 12%
- 10.4%
- 9.3%
- 8%
- 4%
- 2.7%
- 2.6%
- 0%
- 2015
- 2020

EY
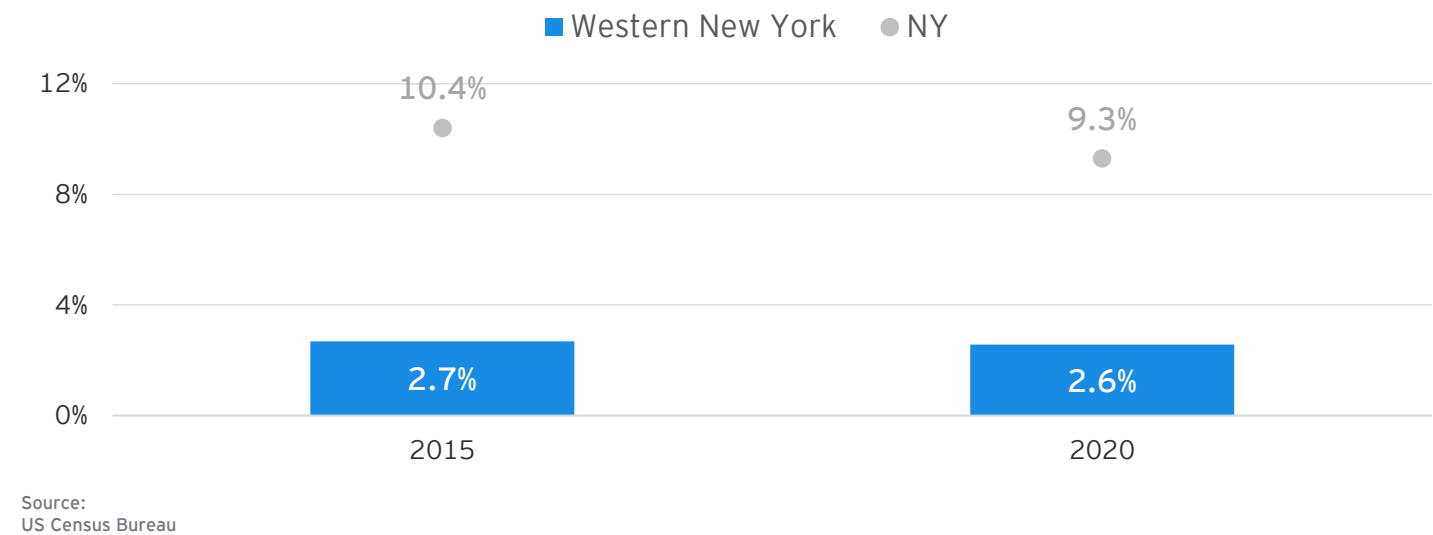
The number of people in Western New York speaking a language other than English is approaching 10% but is relatively low compared to the state average.

% of population that speaks a language other that English at home, 2015 - 2020

■ Western New York   ● NY

```
40%

30%              30.4%              30.3%

20%

10%
                 8.5%               9.0%
0%
                 2015               2020
```

Source:
US Census Bureau
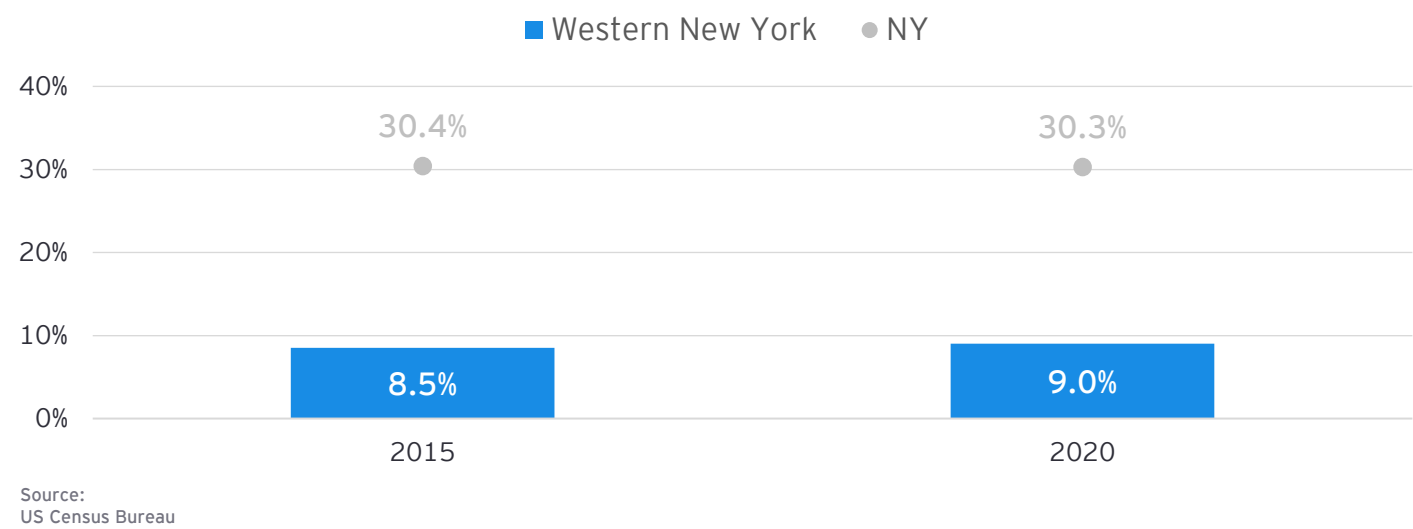
Western New York commuters are heavily dependent on cars for their commute.

Modes of transportation to work, 2020

■ Western New York   ● NY

```
        80.4%

80%

        52.3%
60%

40%                26.2%

20%                                           14.6%
                              5.2%   6.9%      11.9%
                   2.5%
0%
        Vehicle    Public      Worked from    Other
                   transportation   home
```

Source:
US Census Bureau

EY

Workforce
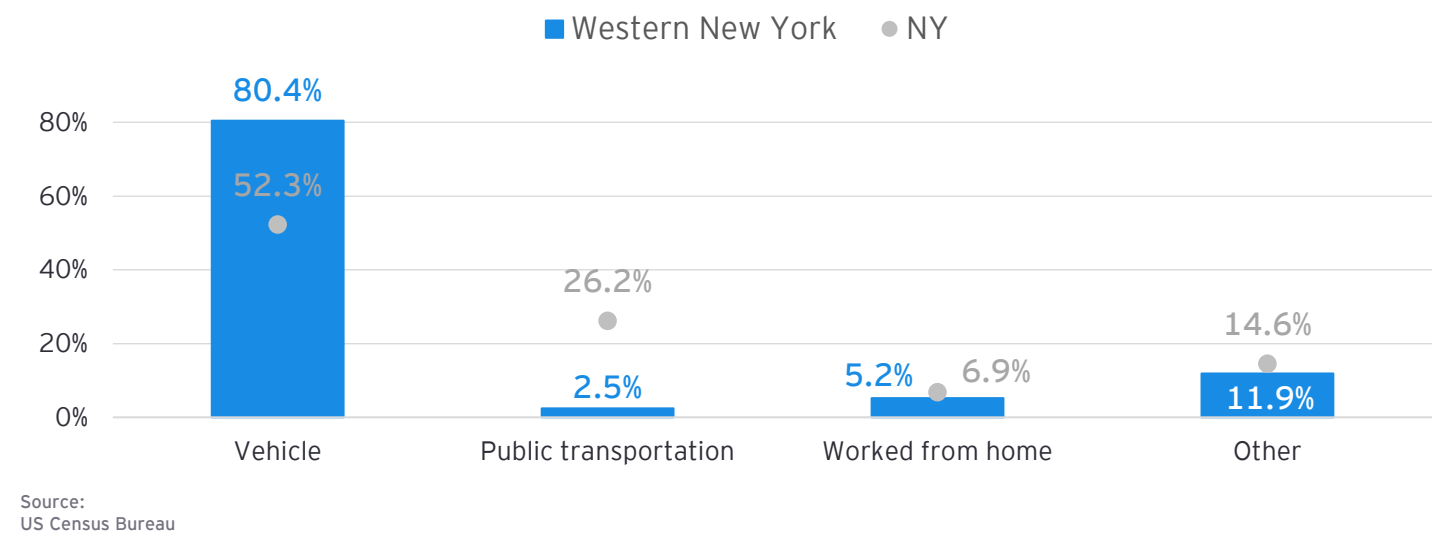
Western New York commuters using public transportation mostly use the bus.

Types of public transportation used as share of total public transportation, 2020

Bus: 91.9% (20.5%)
Subway or elevated rail: 5.6% (68.6%)
Long-distance rail: 1.0% (10.0%)

Source:
US Census Bureau
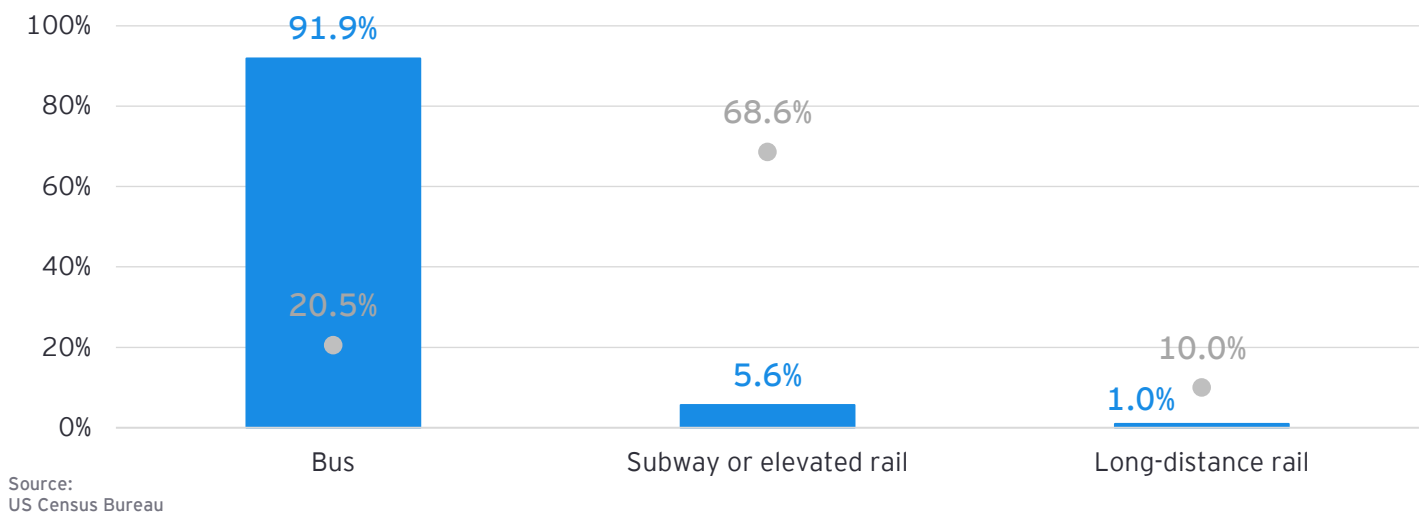
Three-quarters of Western New York commuters have a commute of 30 minutes or less, and commute times across counties are relatively consistent.

Share of commutes less than 30 minutes, 2020

Region Average 74.3%

Allegany	Cattaraugus	Chautauqua	Erie	Niagara
72.3%	72.1%	79.4%	75.4%	67.9%

Source:
US Census Bureau

EY
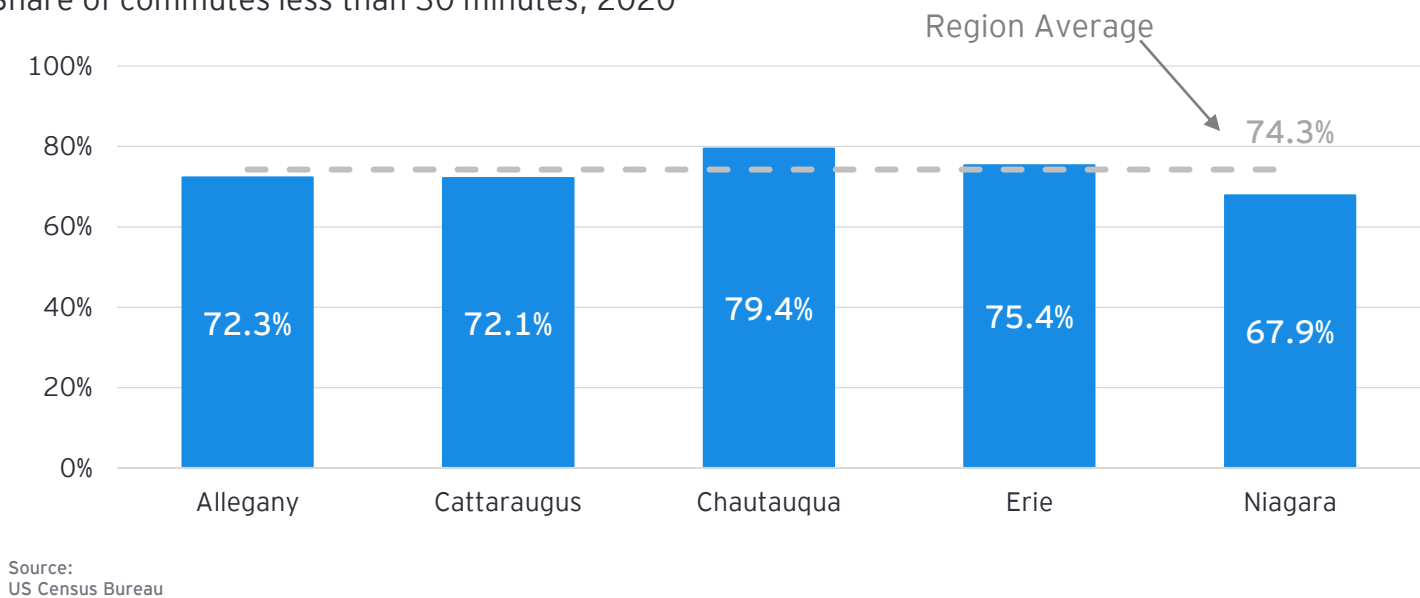
Poverty levels are decreasing slightly in Western New York and are on par with the state average.

% of residents living in poverty, 2020

■ Western New York   ● NY

	2015	2020
Western New York	15.4%	14.2%
NY	15.7%	13.6%
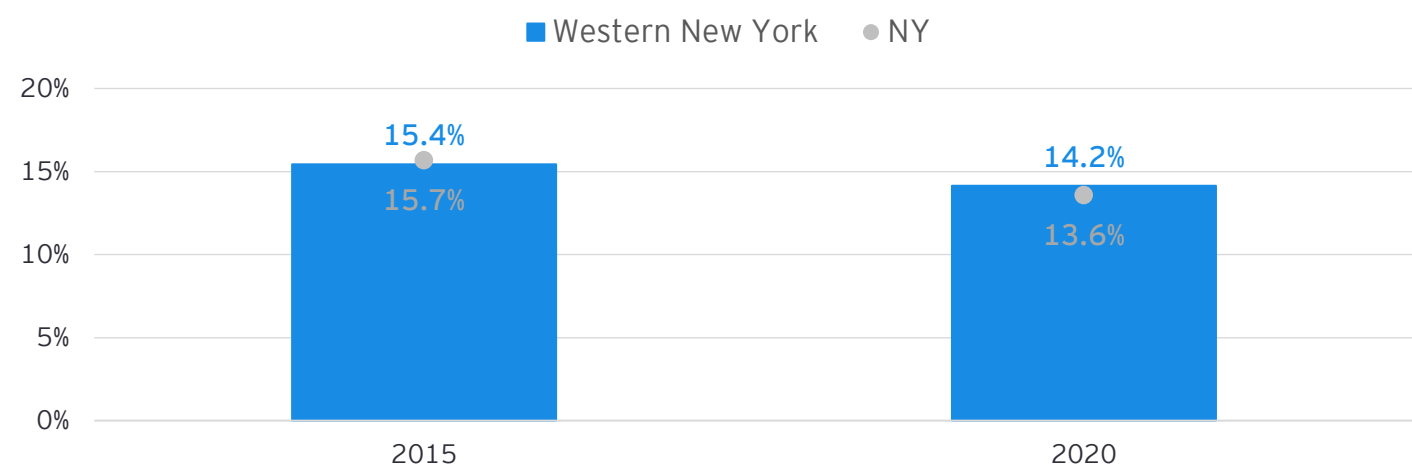
Source:
US Census Bureau

Twelve percent (12%) of Western New York residents have a disability, a higher share than the state average.

Percentage of population with a disability, 2015 - 2020

■ Western New York   ● NY

	2015	2020
Western New York	11.2%	11.5%
NY	8.6%	8.8%

Source:
US Census Bureau

EY
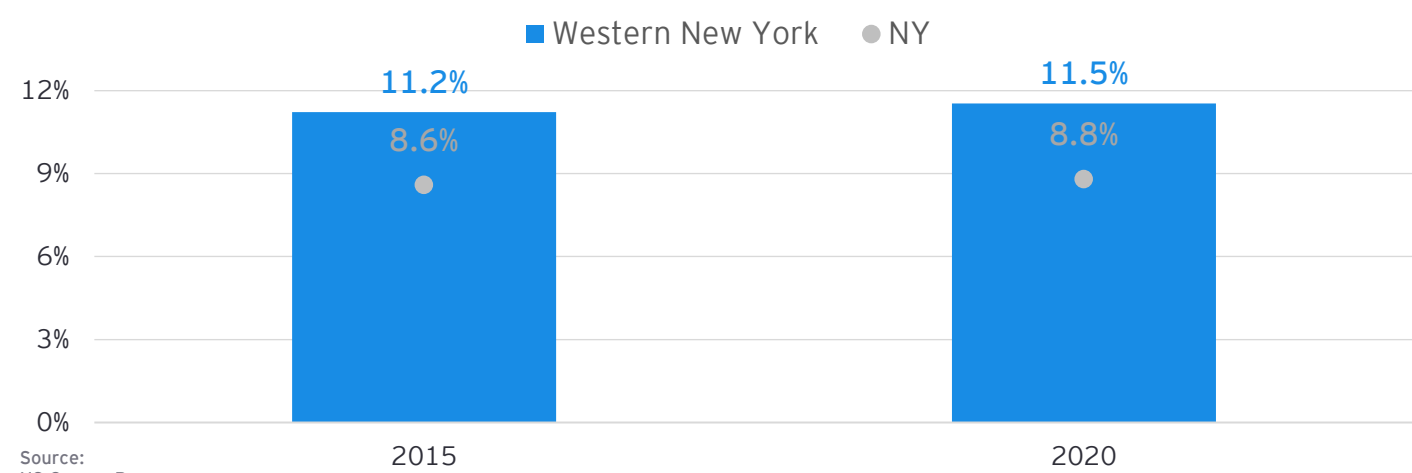
The labor participation rate is slightly lower in Western New York than the state average. Nearly two-thirds of residents of working age (16+) are in the labor force (either working or looking for work).

Civilian labor force participation rate 16+ years of age, 2015 - 2020

Western New York   NY

	2015	2020
NY	63.3%	62.9%
Western New York	62.0%	61.1%

Source:
US Census Bureau
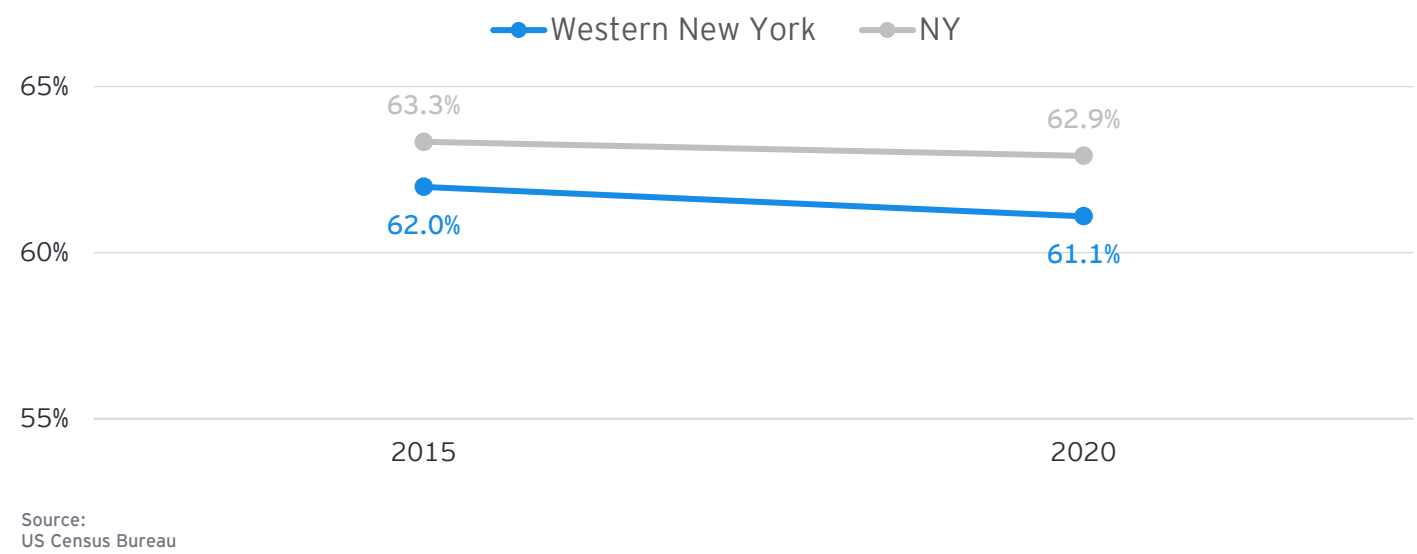
The unemployment rate in Western New York has decreased from 2015 to 2020 and is lower than the state average.

Unemployment rate 16+ years of age, 2015 - 2020
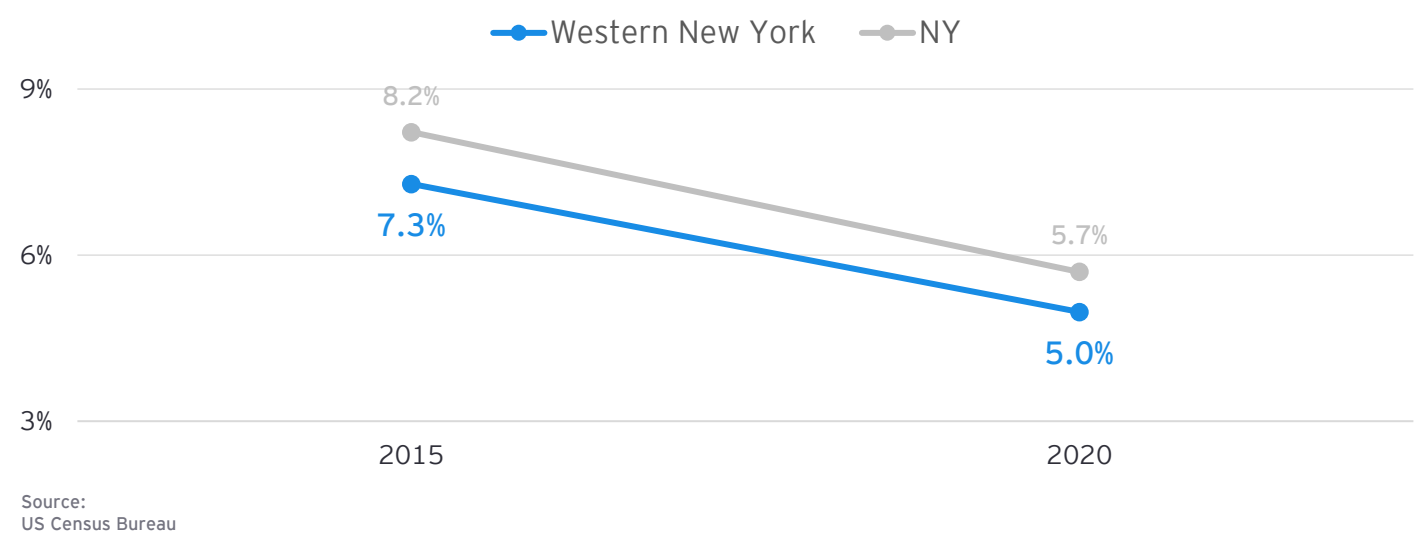
Western New York   NY

	2015	2020
NY	8.2%	5.7%
Western New York	7.3%	5.0%

Source:
US Census Bureau

EY

Labor participation rates are highest for people in their 20s and 30s. Participation rates in Western New York are above than state averages for those aged 16 to 34, but below-average for the 65+ population.

Labor force participation rate by age, 2020

■ Western New York ● NY

Age	Western New York	NY
16 to 24	59.8%	52.0%
25 to 34	84.2%	83.7%
35 to 54	81.7%	82.3%
55 to 64	64.7%	66.8%
65+	15.9%	19.1%
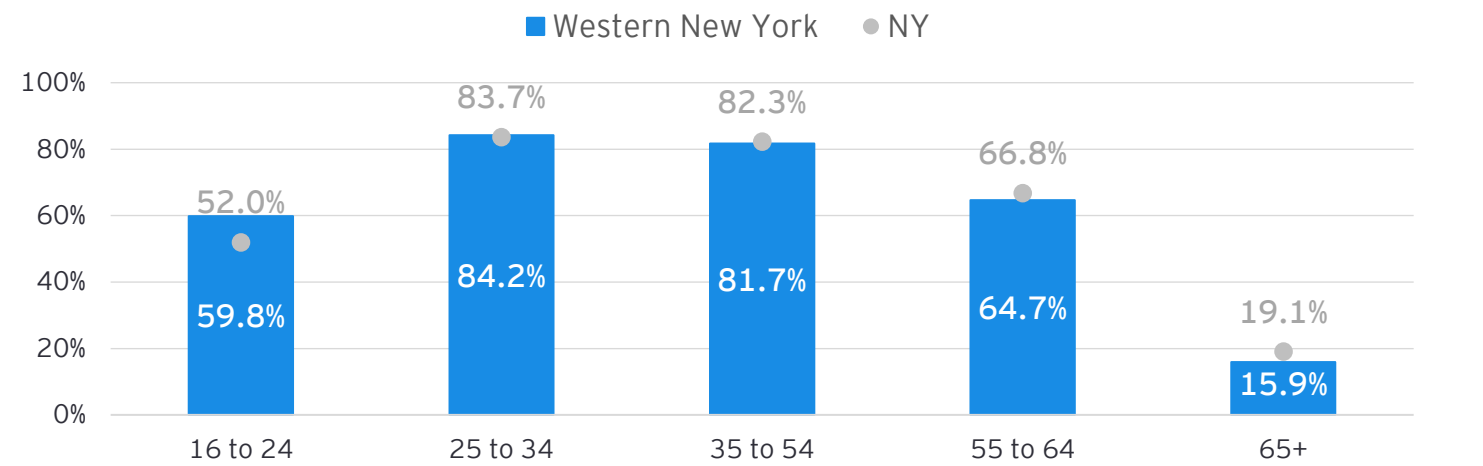
Source:
US Census Bureau

The unemployment rate in Western New York declines as people get older, and unemployment in the region is lower than the state average for all age groups.

Unemployment rate by age, 2020
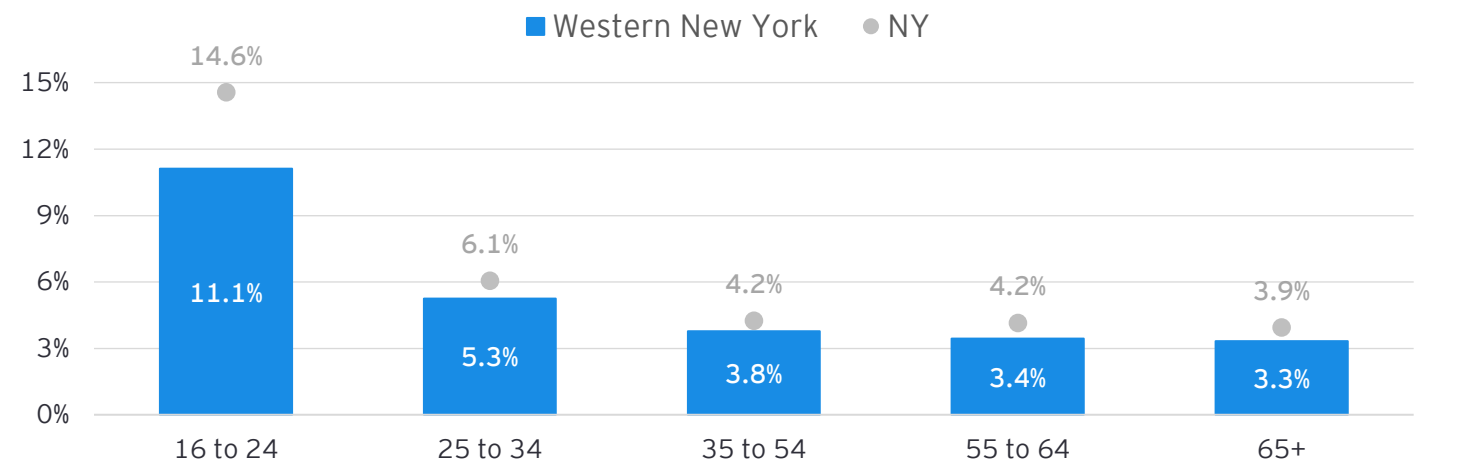
■ Western New York ● NY

Age	Western New York	NY
16 to 24	11.1%	14.6%
25 to 34	5.3%	6.1%
35 to 54	3.8%	4.2%
55 to 64	3.4%	4.2%
65+	3.3%	3.9%

Source:
US Census Bureau

EY

Workforce

Labor participation rates for minorities are lower than White and multi-racial populations in Western New York. Participation rates versus state averages are lowest for minorities.

Labor force participation rate by race/ethnicity, 2020

■ Western New York ● NY

Category	Western New York	NY
White, Non-Hisp.	62.1%	63.0%
Black	55.7%	61.1%
AINA	53.5%	58.4%
Asian	56.3%	63.7%
NHPI	60.9%	66.5%
Some Other	55.6%	63.6%
Two or more	62.7%	66.8%
Hispanic	60.1%	64.3%
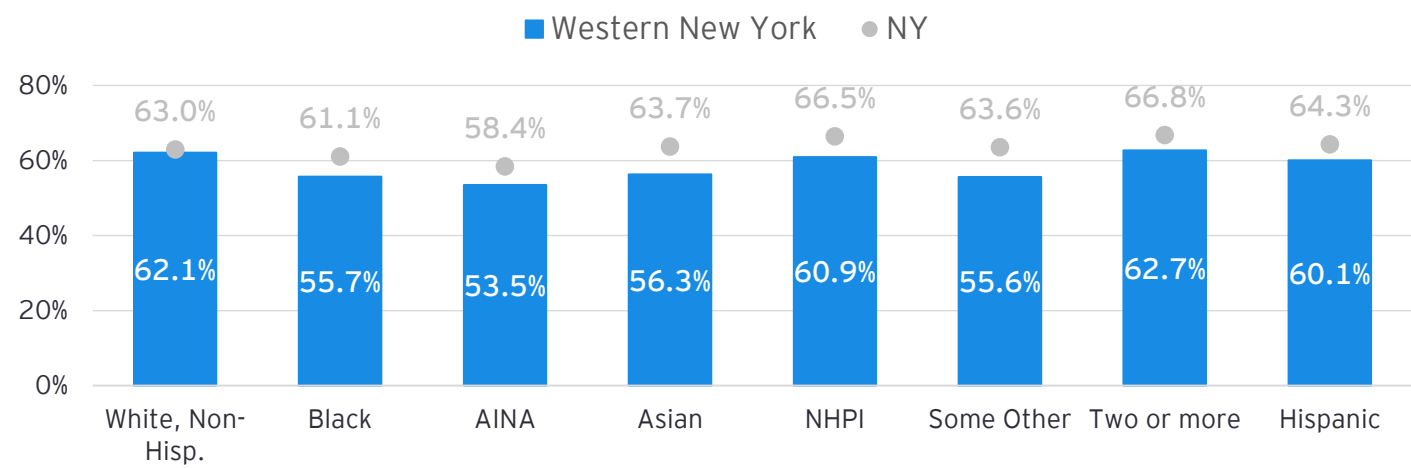
Source:
US Census Bureau

Unemployment rates for minorities in Western New York are twice as high as White unemployment. Hispanic unemployment is only somewhat higher than White and is below the state average.

Unemployment rate by race/ethnicity, 2020

■ Western New York ● NY

Category	Western New York	NY
White, Non-Hisp.	4.3%	4.4%
Black	9.8%	8.9%
AINA	9.8%	9.8%
Asian	3.9%	4.9%
NHPI		6.2%
Some Other	7.4%	7.9%
Two or more	9.7%	8.5%
Hispanic	6.8%	7.4%

Source:
US Census Bureau

EY

Unemployment rates decline with higher levels of education. Less-educated workers in Western New York have higher unemployment than the state average.

Unemployment rate by educational attainment, 2020

■ Western New York ● NY

	< HS	HS or equivalent	Some college or associate degree	Bachelor's +
Western New York	10.7%	5.8%	4.0%	2.3%
NY	8.5%	6.2%	5.2%	3.2%
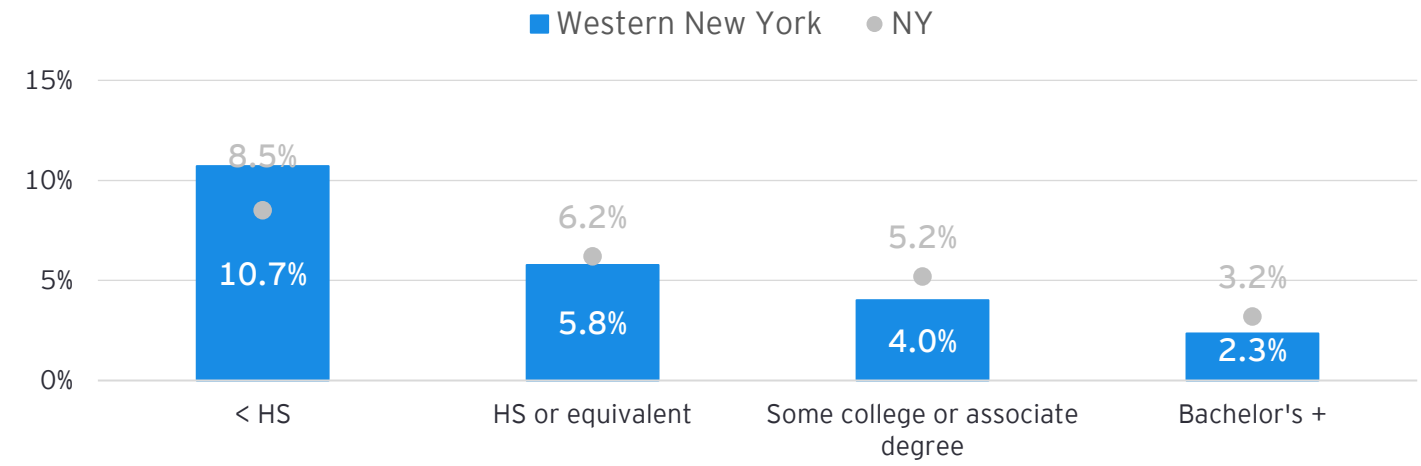
Source:
US Census Bureau

Labor force participation rates increase significantly for workers with more education. Adults in Western New York without a HS diploma are much less likely to be in the labor force than the state average.

Labor force participation rate by educational attainment (aged 25 to 64), 2020

■ Western New York ● NY

	< HS	HS or equivalent	Some college or associate degree	Bachelor's +
Western New York	48.9%	70.4%	78.6%	88.3%
NY	59.6%	72.3%	79.4%	88.0%

Source:
US Census Bureau

EY
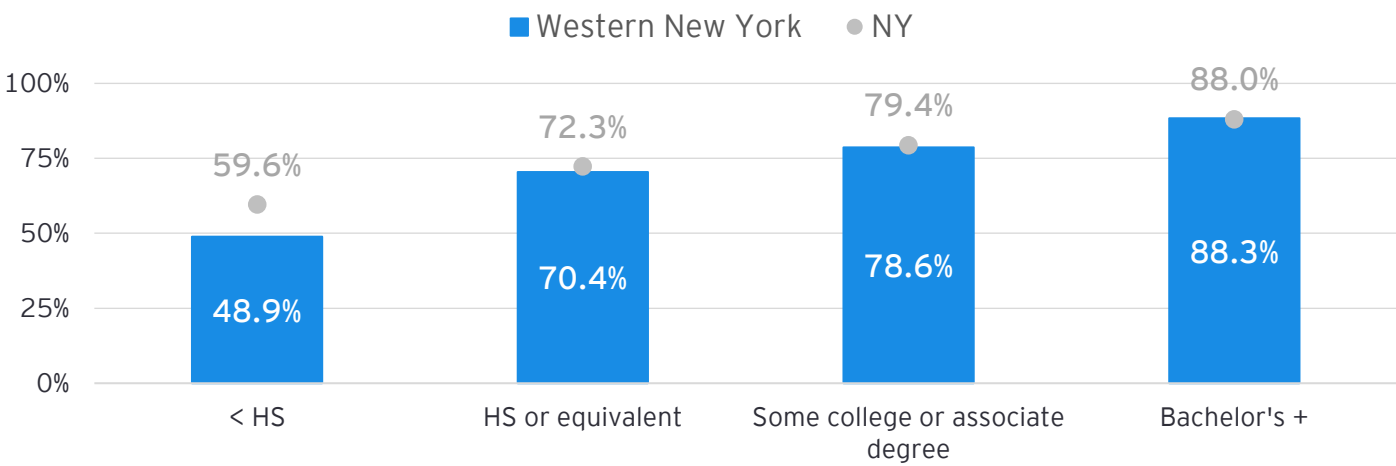
Workforce

Relatively few (11%) of residents commute out of Western New York for jobs. The region imports slightly more people than it exports every day for jobs.

Talent inflow/outflow, 2019

Employed in region, live outside

73,722

Live and work in region,
526,688

Live in
region, employed outside

67,143

EY
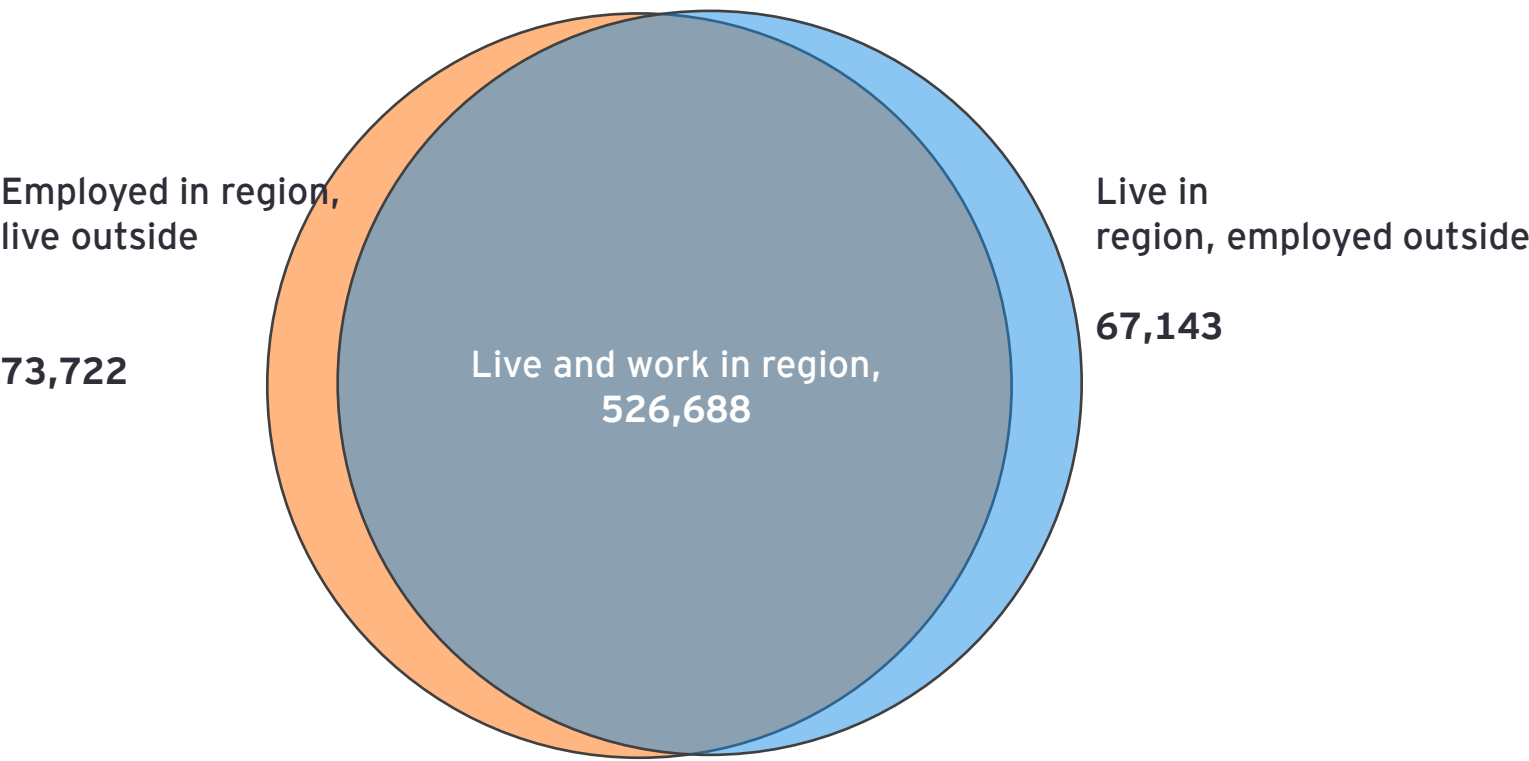
Workforce

Workers of diverse education levels commute out as well as in. Most workers that commute <u>into</u> Western New York for jobs are Healthcare Professionals, Office Support, Production and Educators. Smaller numbers of workers commute out, primarily in Protective Services, Business and IT.

Occupation groups with the most net workers commuting INTO Western New York, 2021

Share of Total Jobs

Occupation	Net workers	Share of Total Jobs
Healthcare Practitioners and Technical	1,198	2.9%
Office and Administrative Support	985	1.2%
Production	966	2.5%
Educational Instruction and Library	881	2.1%
Construction and Extraction	811	3.9%
Personal Care and Service	325	2.7%
Installation, Maintenance, and Repair	325	1.4%
Transportation and Material Moving	320	0.7%
Healthcare Support	294	1.1%
Food Preparation and Serving Related	240	0.5%

Occupation groups with most net workers commuting OUT OF Western New York, 2021

Share of Total Jobs

Occupation	Net workers	Share of Total Jobs
Protective Service	-339	2.4%
Business and Financial Operations	-266	0.8%
Management	-176	0.6%
Computer and Mathematical	-153	1.3%

Source: Lightcast

EY

Wage & Salary employment in Western New York has not yet recovered to pre-pandemic levels.

Employment by year, 2012 – 2022
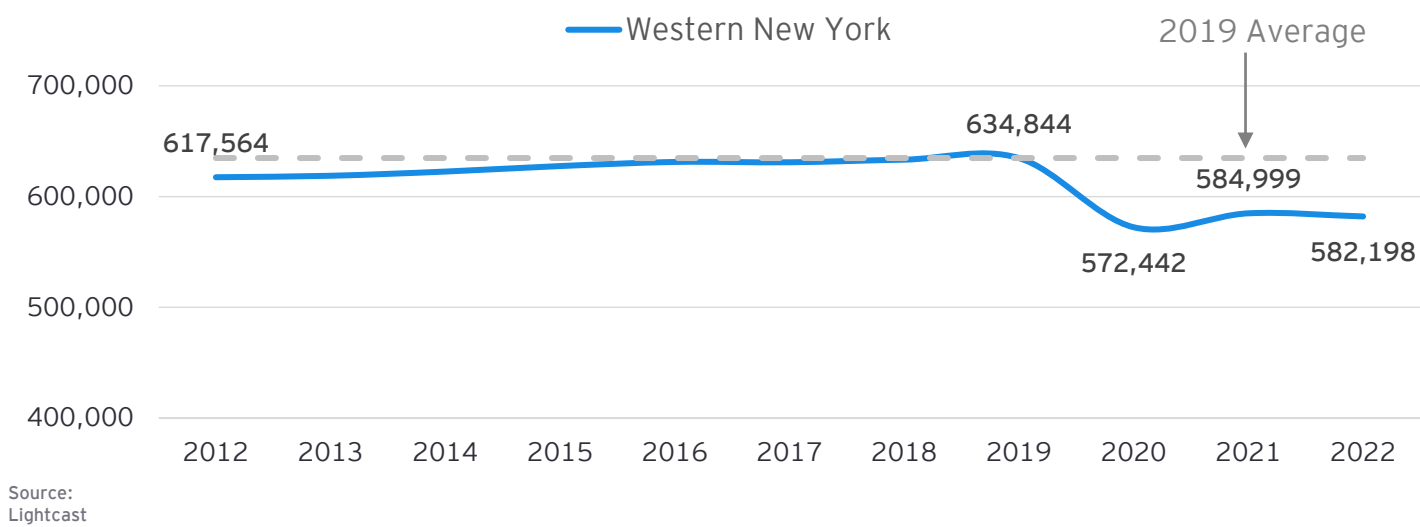
Source: Lightcast

The industries that have lost the most jobs in Western New York are Accommodation and Food Services, Health Care and Government. The Top 5 industries lost nearly 35,000 jobs.

Top industries by net job loss, 2019 - 2022   % Change in jobs, 2019 - 2022

Industry	Net job loss	% Change
Accommodation and Food Services	-11,472	-6.8%
Health Care and Social Assistance	-7,807	-8.4%
Government	-7,338	-6.8%
Retail Trade	-4,737	-5.2%
Other Services	-3,510	-19.2%

Source: Lightcast

EY
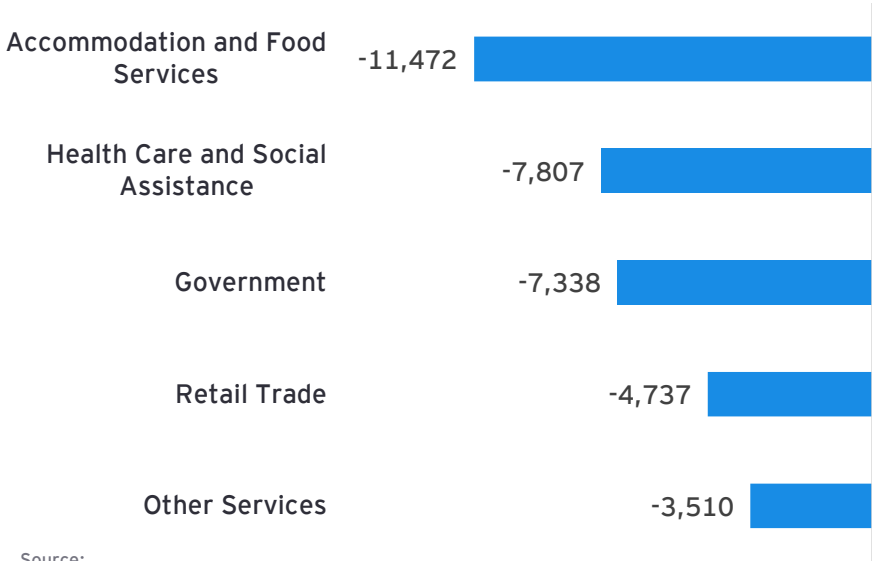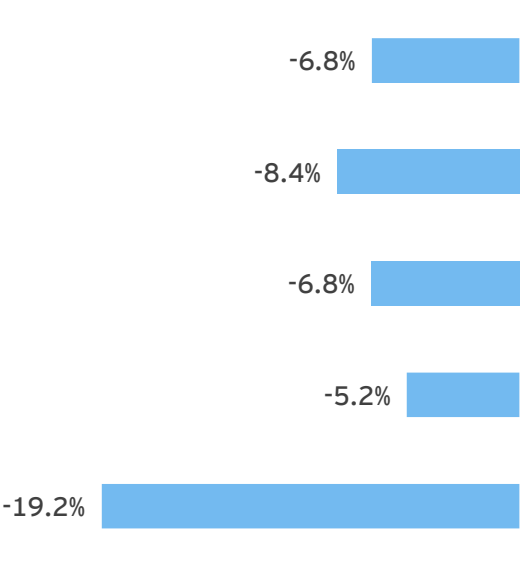
Advanced Manufacturing:
Industry and occupational analysis

About this chapter

Building off the research started during Phase I, we examine overall trends for each of the target sectors identified for Western New York. We also examine the specific make-up of each target sector's workforce by age, sex, educational attainment, and explore sector wages compared to other industries.

The analysis can help understand the larger economic trends impacting the sector and help to inform sector-specific stakeholder engagement throughout the project. Key metrics in this chapter include:

▶ Industry employment by year

▶ Number of businesses by year

▶ Employment snapshot by NAICS

▶ Business snapshot by NAICS

▶ Average annual earnings

▶ Industry workforce by sex

▶ Industry workforce by age

Key findings

▶ 500 Advanced Manufacturing employers are in Western New York, employing nearly 30,000 workers.

▶ Eleven subsectors employ 1,000 or more workers in the region, but only Pharmaceuticals, Electrical Equipment, and Electronic Components are growing.

▶ Industry wages are 50% higher than the regional average, and the sector offers low barriers to entry. Most jobs only require a high school diploma or equivalent.

▶ Sector employment is heavily weighted toward males and older workers.

EY

Advanced Manufacturing | Definition

Cluster definitions for the Advanced Manufacturing (4-digit NAICS) used as part of Phase II analysis for the Western region were provided to EY by the New York State Department of Labor and Empire State Development. For some data, All Manufacturing is shown.

ESD Advanced Manufacturing NAICS definition

NAICS Code	NAICS Description
3241	Petroleum and Coal Products Manufacturing
3251	Basic Chemical Manufacturing
3252	Resin, Synthetic Rubber, and Artificial and Synthetic Fibers and Filaments...
3253	Pesticide, Fertilizer, and Other Agricultural Chemical Manufacturing
3254	Pharmaceutical and Medicine Manufacturing
3259	Other Chemical Product and Preparation Manufacturing
3271	Clay Product and Refractory Manufacturing
3279	Other Nonmetallic Mineral Product Manufacturing
3311	Iron and Steel Mills and Ferroalloy Manufacturing
3313	Alumina and Aluminum Production and Processing
3315	Foundries
3331	Agriculture, Construction, and Mining Machinery Manufacturing
3332	Industrial Machinery Manufacturing
3333	Commercial and Service Industry Machinery Manufacturing
3336	Engine, Turbine, and Power Transmission Equipment Manufacturing
3339	Other General Purpose Machinery Manufacturing
3341	Computer and Peripheral Equipment Manufacturing
3342	Communications Equipment Manufacturing
3343	Audio and Video Equipment Manufacturing
3344	Semiconductor and Other Electronic Component Manufacturing
3345	Navigational, Measuring, Electromedical, and Control Instruments Man...
3346	Manufacturing and Reproducing Magnetic and Optical Media
3351	Electric Lighting Equipment Manufacturing
3352	Household Appliance Manufacturing
3353	Electrical Equipment Manufacturing
3359	Other Electrical Equipment and Component Manufacturing
3361	Motor Vehicle Manufacturing
3362	Motor Vehicle Body and Trailer Manufacturing
3363	Motor Vehicle Parts Manufacturing
3364	Aerospace Product and Parts Manufacturing
3365	Railroad Rolling Stock Manufacturing
3366	Ship and Boat Building
3369	Other Transportation Equipment Manufacturing
3391	Medical Equipment and Supplies Manufacturing
3399	Other Miscellaneous Manufacturing

Western REDC All Mfg Definition

NAICS Code	NAICS Description
31 - 33	Manufacturing

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Advanced Manufacturing employment in Western New York has been steady over the last ten years but has faced recent declines.

Advanced Manufacturing employment by year, 2012 – 2022
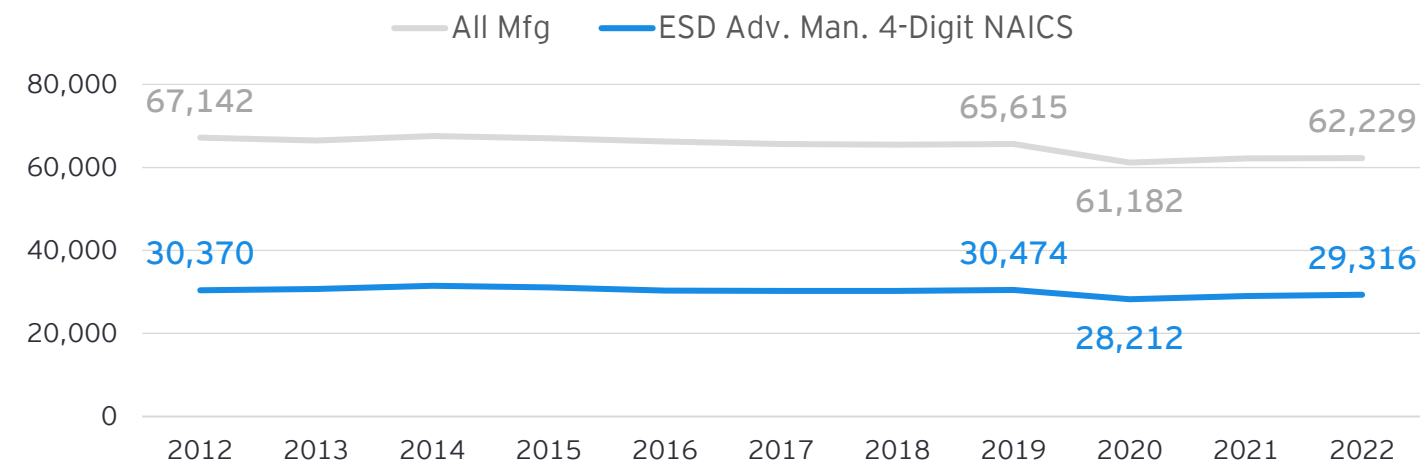
Source: Lightcast

Despite the decline, over 500 Advanced Manufacturing businesses are found in Western New York today.

Number of payrolled business locations in Advanced Manufacturing, 2012 - 2021

Source: Lightcast

EY

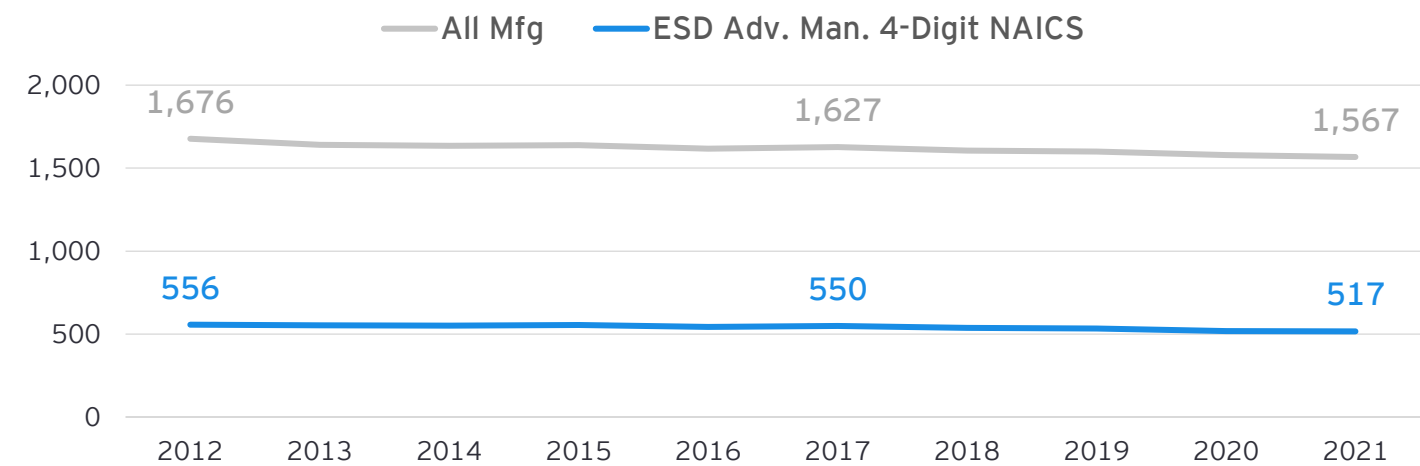**Motor Vehicle Parts Manufacturing is the largest Advanced Manufacturing subsector with nearly 13% of total jobs, followed by Pharmaceuticals, General Machinery, and Electric Equipment. The largest ten subsectors are responsible for nearly 75% of total employment.**

Western New York Advanced Manufacturing jobs, 2016 - 2021

NAICS Code	NAICS Description	No. of Jobs (2021)	Growth in No. of Jobs (2016-2021)	% Growth in No. of Jobs (2016-2021)
3363	Motor Vehicle Parts Manufacturing	3,731	-731	-16.4%
3254	Pharmaceutical and Medicine Manufacturing	2,745	732	36.3%
3339	Other General Purpose Machinery Manufacturing	2,505	-1,047	-29.5%
3353	Electrical Equipment Manufacturing	2,472	824	50.0%
3251	Basic Chemical Manufacturing	1,968	-290	-12.8%
3344	Semiconductor and Other Electronic Component Manufacturing	1,879	688	57.8%
3399	Other Misc. Manufacturing	1,691	-17	-1.0%
3345	Navigational, Measuring, Electromedical, and Control...	1,639	49	3.1%
3336	Engine, Turbine, and Power Transmission Equip. Manufacturing	1,531	-767	-33.4%
3391	Medical Equipment and Supplies Manufacturing	1,458	-707	-32.7%
3279	Other Nonmetallic Mineral Product Manufacturing	1,073	-126	-10.5%
3364	Aerospace Product and Parts Manufacturing	911	371	68.8%
3271	Clay Product and Refractory Manufacturing	798	-182	-18.6%
3359	Other Electrical Equipment and Component Manufacturing	739	-217	-22.7%
3332	Industrial Machinery Manufacturing	563	-68	-10.8%
3331	Agriculture, Construction, and Mining Machinery Manufacturing	536	218	68.6%
3362	Motor Vehicle Body and Trailer Manufacturing	504	424	529.9%
3241	Petroleum and Coal Products Manufacturing	494	-133	-21.2%
3342	Comm. Equipment Manufacturing	317	-111	-25.8%
3252	Resin, Synthetic Rubber, & Artificial and Synthetic Fibers...	257	-92	-26.3%
3341	Computer and Peripheral Equipment Manufacturing	234	30	14.6%
3311	Iron and Steel Mills and Ferroalloy Manufacturing	223	-263	-54.1%
3259	Other Chemical Product and Preparation Manufacturing	216	-16	-6.8%
3351	Electric Lighting Equipment Manufacturing	176	124	241.2%
3313	Alumina and Aluminum Production and Processing	85	66	351.3%
3365	Railroad Rolling Stock Manufacturing	75	2	2.8%
3352	Household Appliance Manufacturing	48	48	--
3315	Foundries	47	-48	-50.7%
3343	Audio and Video Equipment Manufacturing	41	41	--
3253	Pesticide, Fertilizer, and Other Ag. Chemical Manufacturing	22	22	--
3366	Ship and Boat Building	15	--	-0.3%
3333	Commercial and Service Industry Machinery Manufacturing	--	-176	-100.0%
3369	Other Transportation Equipment Manufacturing	--	--	--
3346	Manufacturing and Reproducing Magnetic and Optical Media	--	-11	-100.0%
3361	Motor Vehicle Manufacturing	--	--	--
	Total jobs	**28,994**	**-1,364**	**-4.5%**

Source: Lightcast

EY

Advanced Manufacturing | Industry analysis

Miscellaneous Manufacturing has the largest number of businesses (69) within the region, accounting for more than 13% of businesses, followed by Medical Equipment and General Machinery. Mineral Product Manufacturing has gained the most new firms.

Western New York Advanced Manufacturing businesses, 2016 - 2021

NAICS Code	NAICS Description	No. of Businesses (2021)	Growth in No. of Businesses (2016-2021)	% Growth in No. of Businesses (2016-2021)
3399	Other Miscellaneous Manufacturing	69	-8	-10.5%
3391	Medical Equipment and Supplies Manufacturing	56	-8	-11.8%
3339	Other General Purpose Machinery Manufacturing	46	-9	-16.3%
3279	Other Nonmetallic Mineral Product Manufacturing	32	5	19.4%
3345	Navigational, Measuring, Electromedical, and Control...	32	2	6.8%
3363	Motor Vehicle Parts Manufacturing	24	2	8.0%
3353	Electrical Equipment Manufacturing	23	-4	-14.0%
3344	Semiconductor and Other Electronic Component Manufacturing	22	-4	-13.7%
3251	Basic Chemical Manufacturing	21	1	2.5%
3241	Petroleum and Coal Products Manufacturing	20	--	--
3332	Industrial Machinery Manufacturing	20	-1	-5.9%
3259	Other Chemical Product and Preparation Manufacturing	16	-2	-11.1%
3336	Engine, Turbine, and Power Transmission Equip. Manufacturing	15	1	8.9%
3254	Pharmaceutical and Medicine Manufacturing	15	-1	-3.2%
3342	Communications Equipment Manufacturing	14	-1	-8.3%
3271	Clay Product and Refractory Manufacturing	14	-4	-22.5%
3359	Other Electrical Equipment and Component Manufacturing	13	3	29.3%
3311	Iron and Steel Mills and Ferroalloy Manufacturing	9	-1	-10.0%
3331	Agriculture, Construction, and Mining Machinery Manufacturing	8	--	--
3362	Motor Vehicle Body and Trailer Manufacturing	8	3	60.0%
3364	Aerospace Product and Parts Manufacturing	5	2	66.7%
3253	Pesticide, Fertilizer, and Other Ag. Chemical Manufacturing	5	--	--
3252	Resin, Synthetic Rubber, and Artificial & Synthetic Fibers...	5	-1	-16.7%
3315	Foundries	4	--	--
3343	Audio and Video Equipment Manufacturing	4	1	33.3%
3333	Commercial and Service Industry Machinery Manufacturing	3	-1	-25.0%
3341	Computer and Peripheral Equipment Manufacturing	3	-1	-29.4%
3313	Alumina and Aluminum Production and Processing	3	1	50.0%
3365	Railroad Rolling Stock Manufacturing	3	--	--
3351	Electric Lighting Equipment Manufacturing	2	-2	-46.7%
3352	Household Appliance Manufacturing	1	-1	-37.5%
3366	Ship and Boat Building	1	--	--
3346	Manufacturing and Reproducing Magnetic and Optical Media	1	-2	-60.0%
3361	Motor Vehicle Manufacturing	1	1	--
3369	Other Transportation Equipment Manufacturing	0	--	--
	Total number of payrolled business locations	517	-27	-5.0%

Source: Lightcast

EY

Advanced Manufacturing | Industry analysis

The fastest-growing Advanced Manufacturing subsector in Western New York is Electrical Equipment Appliance & Component Manufacturing, which is also the most concentration (highest per capita jobs). Computer and Chemicals (incl. Pharma) are growing, but several other subsectors are declining.

Priority sector performance by jobs, 3-Digit Level NAICS, 2016 and 2021
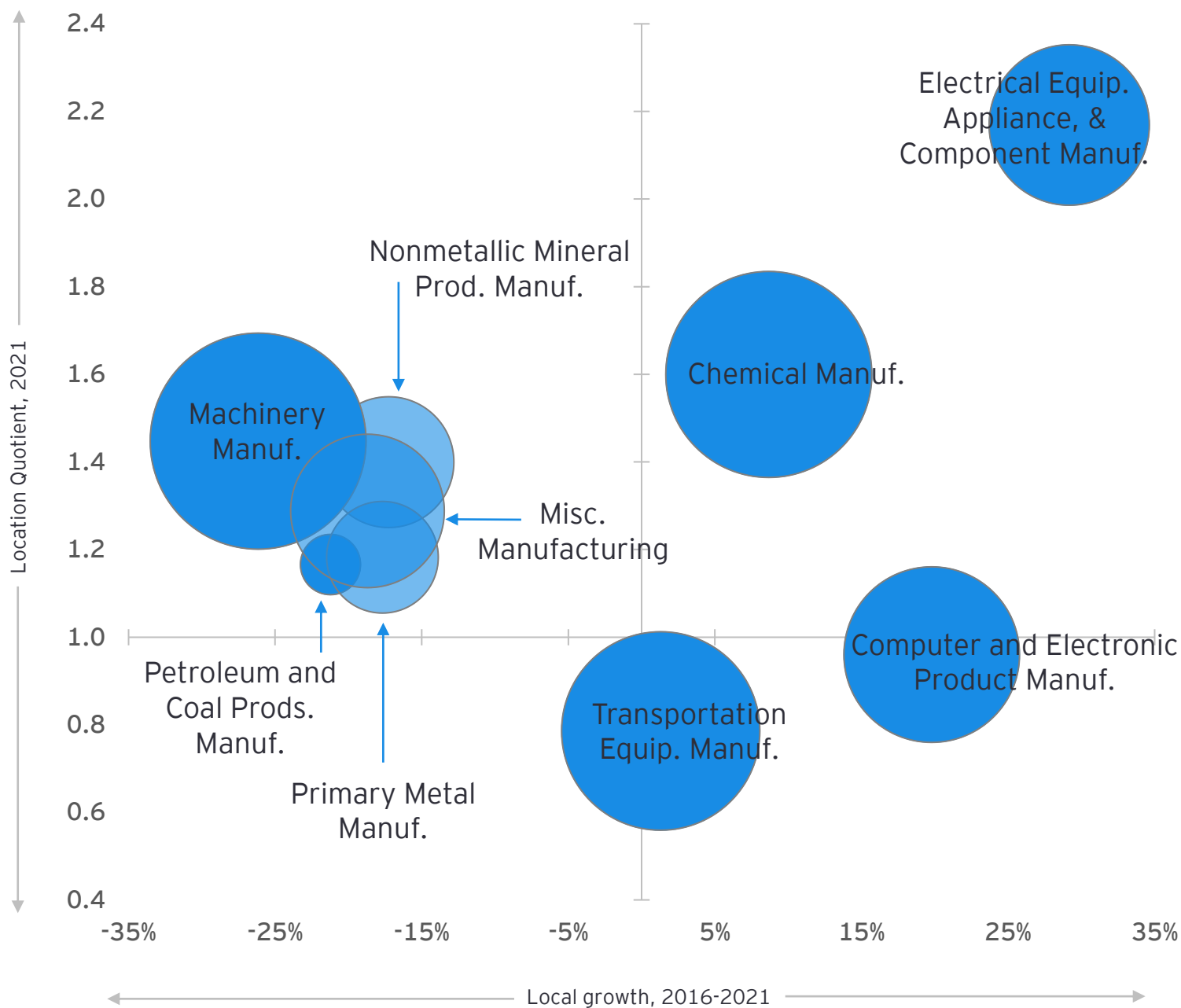
Source: Lightcast, Empire State Development cluster definitions

EY

Advanced Manufacturing | Industry analysis

Western New York worker earnings in Advanced Manufacturing are higher than average of all industries.

Average annual earnings, 2010 – 2021

— All Mfg   — All Industries   — ESD 4-Digit NAICS

$103,569
$89,413
$80,024
$68,791
$50,261
$56,616
$79,471
$83,123
$62,929
$71,720

2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021
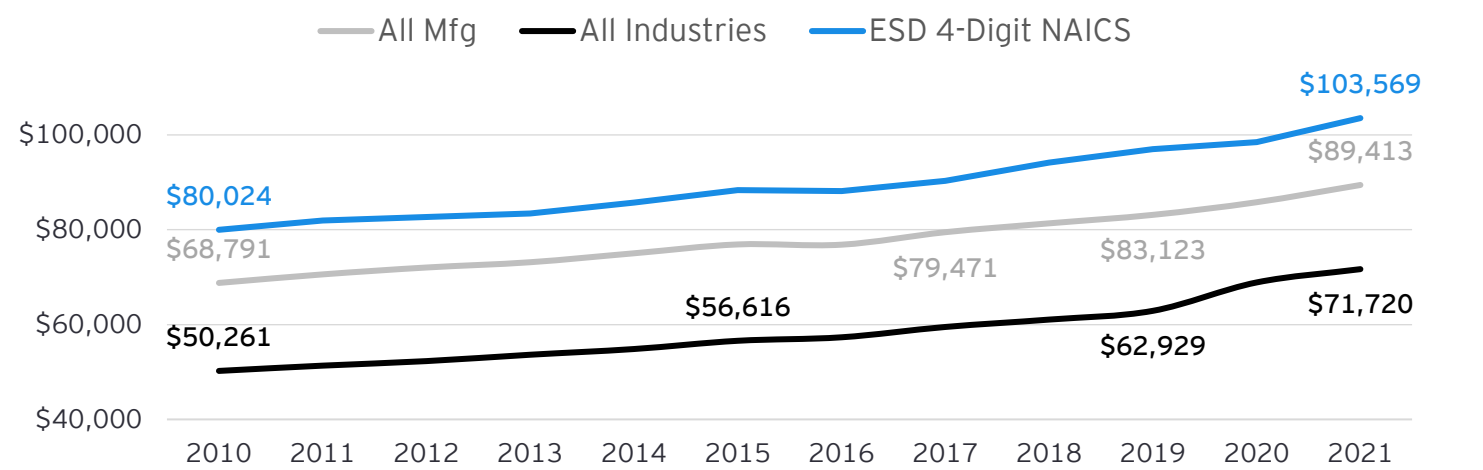
Source: Lightcast

About 25% of all Advanced Manufacturing jobs in Western New York require a bachelor's degree or higher. Still, two-thirds of all jobs only require a high school education.

Total jobs by typical entry-level education requirement, Advanced Manufacturing, 2021

■ 2021 Total Jobs   ● % Share of Total Jobs

Education	2021 Total Jobs	% Share
< HS	1,277	4.5%
HS or equiv.	18,297	64.0%
Cerificate or some college	1,095	3.8%
Associate	918	3.2%
Bachelor's	6,890	24.1%
Graduate+	127	0.4%

Source: Lightcast

EY

Advanced Manufacturing | Industry analysis
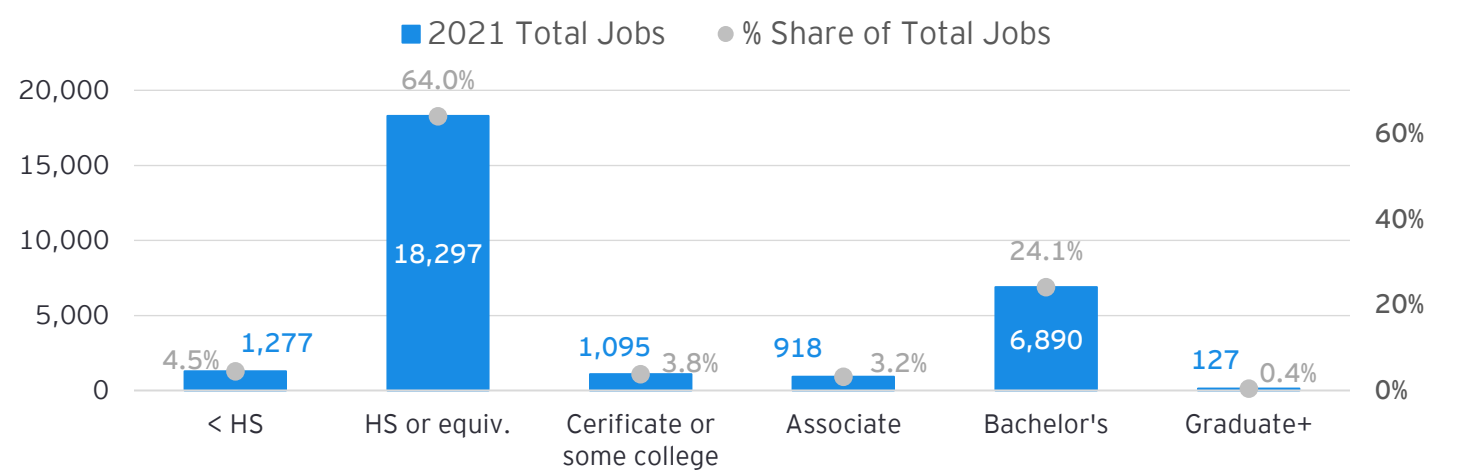
Male workers in Western New York account for a much higher share of Advanced Manufacturing workers.

Employment within sector, by sex, 2021

■ Male ■ Female

	Advanced Man. 4-Digit	All Manufacturing	All Industries
Female	26.0%	25.0%	50.5%
Male	74.0%	75.0%	49.5%
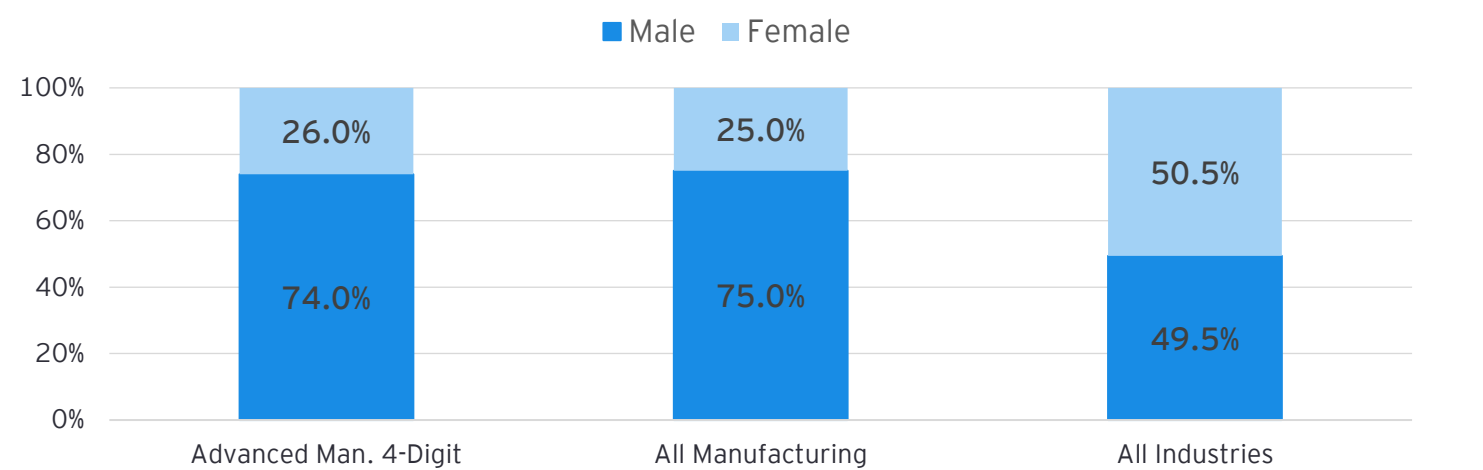
Source:
Lightcast

Older workers (45+) comprise a much higher share of the Advanced Manufacturing workforce in Western New York, which could signal more retirements of workers in coming years.

Employment within sector, by age, 2021
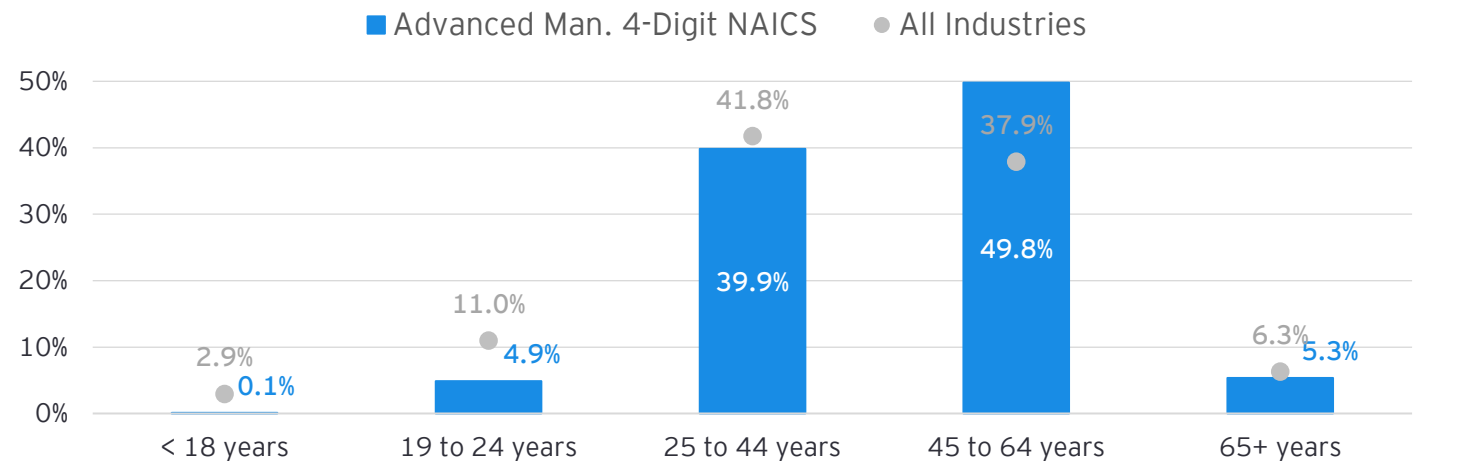
■ Advanced Man. 4-Digit NAICS ● All Industries

	< 18 years	19 to 24 years	25 to 44 years	45 to 64 years	65+ years
All Industries	2.9%	11.0%	41.8%	37.9%	6.3%
Advanced Man. 4-Digit NAICS	0.1%	4.9%	39.9%	49.8%	5.3%

Source:
Lightcast

EY

Advanced Manufacturing: Occupational analysis

A large number of workers in Advanced Manufacturing in Western New York are assemblers, inspectors, supervisors and machine operators. Bachelor's level demand is concentrated in engineering, operations managers, and accountants.

Top 25 Advanced Manufacturing occupations with entry-level educational requirements and median hourly earnings, 2021

SOC Code	SOC Description	No. of Jobs (2021)	Median Hourly Earnings (2021)	Typical Entry Level Edu. Req. (2021)
51-2098	Misc. Assemblers and Fabricators	2,300	$14.93	HS diploma or equiv.
51-2028	Electrical, Electronic, and Electromechanical Assemblers,…	1,550	$17.09	HS diploma or equiv.
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	1,080	$19.76	HS diploma or equiv.
17-2112	Industrial Engineers	994	$45.07	Bachelor's degree
51-1011	First-Line Supervisors of Production and Operating Workers	948	$29.93	HS diploma or equiv.
51-9011	Chemical Equipment Operators and Tenders	828	$27.80	HS diploma or equiv.
51-4041	Machinists	763	$23.12	HS diploma or equiv.
43-5061	Production, Planning, and Expediting Clerks	755	$22.84	HS diploma or equiv.
11-1021	General and Operations Managers	681	$45.60	Bachelor's degree
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	638	$17.27	No formal education
51-2031	Engine and Other Machine Assemblers	586	$30.95	HS diploma or equiv.
41-4012	Sales Reps., Wholesale and Man., Except Technical…	561	$29.07	HS diploma or equiv.
49-9071	Maintenance and Repair Workers, General	560	$19.04	HS diploma or equiv.
51-4081	Multiple Machine Tool Setters, Ops, & Tenders, Metal & Plastic	524	$18.35	HS diploma or equiv.
51-9111	Packaging and Filling Machine Operators and Tenders	500	$17.19	HS diploma or equiv.
51-4121	Welders, Cutters, Solderers, and Brazers	467	$22.98	HS diploma or equiv.
49-9041	Industrial Machinery Mechanics	462	$28.77	HS diploma or equiv.
51-4031	Cutting, Punching, & Press Machine Setters, Ops., & Tenders…	411	$18.08	HS diploma or equiv.
53-3032	Heavy and Tractor-Trailer Truck Drivers	388	$23.18	Postsec. Nondegree
17-2141	Mechanical Engineers	388	$38.77	Bachelor's degree
43-5071	Shipping, Receiving, and Inventory Clerks	386	$17.82	HS diploma or equiv.
13-2011	Accountants and Auditors	372	$36.84	Bachelor's degree
43-4051	Customer Service Representatives	357	$17.99	HS diploma or equiv.
13-1028	Buyers and Purchasing Agents	346	$29.88	Bachelor's degree
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	326	$21.91	HS diploma or equiv.
	Total jobs in top 25 occupations	17,171	$25.37	

EY

Advanced Manufacturing: Occupational analysis

For those with a high school diploma or equivalent, most jobs in Advanced Manufacturing in Western New York are in assembly, inspectors, supervisors, equipment operators, and machinists.

Top 25 Advanced Manufacturing occupations with entry-level educational requirements of high school diploma or less with median hourly earnings, 2021

SOC Code	SOC Description	No. of Jobs (2021)	Median Hourly Earnings (2021)	Typical Entry Level Edu. Req. (2021)
51-2098	Miscellaneous Assemblers and Fabricators	2,300	$14.93	HS diploma or equiv.
51-2028	Electrical, Electronic, and Electromechanical Assemblers,…	1,550	$17.09	HS diploma or equiv.
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	1,080	$19.76	HS diploma or equiv.
51-1011	First-Line Supervisors of Production and Operating Workers	948	$29.93	HS diploma or equiv.
51-9011	Chemical Equipment Operators and Tenders	828	$27.80	HS diploma or equiv.
51-4041	Machinists	763	$23.12	HS diploma or equiv.
43-5061	Production, Planning, and Expediting Clerks	755	$22.84	HS diploma or equiv.
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	638	$17.27	No formal education
51-2031	Engine and Other Machine Assemblers	586	$30.95	HS diploma or equiv.
41-4012	Sales Reps., Wholesale & Man., Except Technical…	561	$29.07	HS diploma or equiv.
49-9071	Maintenance and Repair Workers, General	560	$19.04	HS diploma or equiv.
51-4081	Multiple Machine Tool Setters, Ops., and Tenders, Metal…	524	$18.35	HS diploma or equiv.
51-9111	Packaging and Filling Machine Operators and Tenders	500	$17.19	HS diploma or equiv.
51-4121	Welders, Cutters, Solderers, and Brazers	467	$22.98	HS diploma or equiv.
49-9041	Industrial Machinery Mechanics	462	$28.77	HS diploma or equiv.
51-4031	Cutting, Punching, & Press Machine Setters, Ops., & Tenders…	411	$18.08	HS diploma or equiv.
43-5071	Shipping, Receiving, and Inventory Clerks	386	$17.82	HS diploma or equiv.
43-4051	Customer Service Representatives	357	$17.99	HS diploma or equiv.
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	326	$21.91	HS diploma or equiv.
51-9161	Computer Numerically Controlled Tool Operators	314	$18.36	HS diploma or equiv.
51-9081	Dental Laboratory Technicians	280	$18.17	HS diploma or equiv.
43-6014	Secretaries & Admin. Assistants, Ex. Legal, Medical, & Exec.	275	$18.24	HS diploma or equiv.
43-9061	Office Clerks, General	269	$17.28	HS diploma or equiv.
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool…	177	$18.31	HS diploma or equiv.
51-9041	Extruding, Forming, Pressing, and Compacting Machine…	176	$22.61	HS diploma or equiv.
	Total jobs in top 25 occupations	**15,492**	**$21.11**	

Source: Lightcast

EY

Advanced Manufacturing: Occupational analysis

For positions requiring some college, a certificate or an associate's degree, most jobs in Advanced Manufacturing in Western New York are for drivers, technicians, and clerks.

Top 25 Advanced Manufacturing occupations with mid-level educational requirements of certificate through associate degree with median hourly earnings, 2021

SOC Code	SOC Description	No. of Jobs (2021)	Median Hourly Earnings (2021)	Typical Entry Level Edu. Req. (2021)
53-3032	Heavy and Tractor-Trailer Truck Drivers	388	$23.18	Postsec. Nondegree
17-3026	Industrial Engineering Technologists and Technicians	282	$28.98	Associate degree
43-3031	Bookkeeping, Accounting, and Auditing Clerks	240	$21.73	Some college
51-4111	Tool and Die Makers	191	$26.51	Postsec. Nondegree
17-3023	Electrical and Electronic Engineering Technologists and…	168	$23.34	Associate degree
19-4031	Chemical Technicians	137	$23.43	Associate degree
15-1232	Computer User Support Specialists	101	$23.46	Some college
17-3013	Mechanical Drafters	98	$29.13	Associate degree
17-3027	Mechanical Engineering Technologists and Technicians	84	$25.54	Associate degree
51-9162	Computer Numerically Controlled Tool Programmers	62	$24.31	Postsec. Nondegree
17-3029	Engineering Technologists and Technicians, Except Drafters,…	48	$27.91	Associate degree
49-2094	Electrical and Electronics Repairers, Commercial & Ind…	38	$28.81	Postsec. Nondegree
17-3012	Electrical and Electronics Drafters	27	$28.97	Associate degree
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and…	26	$27.67	Postsec. Nondegree
15-1231	Computer Network Support Specialists	22	$29.86	Associate degree
43-4151	Order Clerks	19	$17.83	Some college
19-4099	Life, Physical, and Social Science Technicians, All Other	19	$23.07	Associate degree
43-4161	Human Resources Assistants, Except Payroll and Timekeeping	17	$21.94	Associate degree
49-3011	Aircraft Mechanics and Service Technicians	16	$30.50	Postsec. Nondegree
17-3024	Electro-Mechanical and Mechatronics Technologists and…	16	$26.37	Associate degree
49-3023	Automotive Service Technicians and Mechanics	13	$22.01	Postsec. Nondegree
49-2022	Telecomm. Equip. Installers & Repairers, Except Line Installers	<10	$37.23	Postsec. Nondegree
49-2021	Radio, Cellular, and Tower Equipment Installers and Repairers	<10	$32.65	Associate degree
49-2091	Avionics Technicians	<10	$30.31	Associate degree
49-2093	Electrical and Electronics Installers and Repairers,…	<10	$44.47	Postsec. Nondegree
	Total jobs in top 25 occupations	**2,013**	**$27.17**	

Source: Lightcast

EY

Advanced Manufacturing: Occupational analysis

For positions requiring a bachelor's degree, most jobs in Advanced Manufacturing in Western New York are for engineers, operations managers, buyers and accountants, and software developers.

Top 25 Advanced Manufacturing occupations with high-level educational requirements of bachelor's and above with median hourly earnings, 2021

SOC Code	SOC Description	No. of Jobs (2021)	Median Hourly Earnings (2021)	Typical Entry Level Edu. Req. (2021)
17-2112	Industrial Engineers	994	$45.07	Bachelor's degree
11-1021	General and Operations Managers	681	$45.60	Bachelor's degree
17-2141	Mechanical Engineers	388	$38.77	Bachelor's degree
13-2011	Accountants and Auditors	372	$36.84	Bachelor's degree
13-1028	Buyers and Purchasing Agents	346	$29.88	Bachelor's degree
11-3051	Industrial Production Managers	308	$55.65	Bachelor's degree
15-1252	Software Developers	293	$47.30	Bachelor's degree
17-2071	Electrical Engineers	246	$46.70	Bachelor's degree
13-1082	Project Management Specialists	236	$45.48	Bachelor's degree
13-1161	Market Research Analysts and Marketing Specialists	208	$30.97	Bachelor's degree
13-1071	Human Resources Specialists	184	$29.81	Bachelor's degree
11-9041	Architectural and Engineering Managers	169	$68.97	Bachelor's degree
19-2031	Chemists	144	$38.04	Bachelor's degree
11-2022	Sales Managers	134	$65.42	Bachelor's degree
13-1041	Compliance Officers	124	$39.07	Bachelor's degree
11-3031	Financial Managers	124	$69.50	Bachelor's degree
41-4011	Sales Reps, Wholesale and Man., Technical & Scientific Prod.	124	$40.66	Bachelor's degree
13-1199	Business Operations Specialists, All Other	102	$30.33	Bachelor's degree
13-2051	Financial and Investment Analysts	93	$37.87	Bachelor's degree
27-1024	Graphic Designers	88	$23.06	Bachelor's degree
13-1151	Training and Development Specialists	83	$28.46	Bachelor's degree
15-1244	Network and Computer Systems Administrators	80	$38.13	Bachelor's degree
11-3021	Computer and Information Systems Managers	78	$66.65	Bachelor's degree
17-2199	Engineers, All Other	76	$37.79	Bachelor's degree
13-1111	Management Analysts	76	$38.44	Bachelor's degree
	Total jobs in top 25 occupations	**5,751**	**$42.98**	

Source:
Lightcast

EY

Advanced Manufacturing firms, as shown in tables in the previous pages, require diverse occupations and skill levels to fill jobs in their facilities. The gap analysis below shows that Western New York is well-served by its graduate production across most occupations. Some exceptions are at the Certificate and Associate's levels, where Industrial Technicians, Maintenance, and Machinist have too few graduates for the regional economy.

The table below shows occupation groups that are matched to degree programs to determine if the supply of graduates is sufficient to meet demand (measured as job openings in a year). A US comparison helps clarify if there is a gap or overproduction of graduates by comparing regional graduates to jobs with the US ratio of graduates to jobs (as shown in the right column below).

Certificate and Associate's-level positions are relatively well-served by local graduate output. Relative to the US, Western New York produces a high number of graduates in **Heavy Vehicle Mechanics**, **Electrical/Electronics Technicians**, and **Mechanical Engineering Technicians**.

Supply-Demand Gap Conditions
Advanced Manufacturing, Western New York

Gap	Occupation Group	Avg. Educ. Level	Regional 2021 Job Openings	Graduates	Regional Ratio	Supply-demand Ratio versus US	
	Heavy Vehicle Mechanics (not Aero)	Certificate	173	57	33%	151%	
	General Machinist	Certificate	424	20	5%	44%	
	Industrial Production Technicians	Certificate	358	40	11%	118%	
	Industrial Machinery Maintenance	Certificate	215	0	0%	0%	
	Welders	Certificate	168	120	71%	90%	
	Chemical Technicians	Associate's	32	21	65%	106%	
	Electrical / Electronics Technicians & Dr	Associate's	48	16	34%	124%	
	Industrial Engineering Technicians	Associate's	77	32	41%	44%	
	Mechanical Drafters	Associate's	30	17	56%	49%	
	Mechanical Engineering Technicians	Associate's	22	102	470%	189%	
	Computer Support Specialists	Associate's	209	178	85%	95%	
	Executives & Management Analysts	Bachelor's	1,808	2,176	120%	187%	
	Chemists	Bachelor's	34	115	342%	151%	
	Electrical and Electronics Engineers	Bachelor's	66	180	274%	219%	
	Engineering Managers	Bachelor's	38	21	55%	106%	
	Industrial Engineers	Bachelor's	151	241	159%	217%	
	Mechanical Engineers	Bachelor's	91	613	677%	397%	
	Supply Chain Managers & Analysts	Bachelor's	41	6	15%	38%	

Legend: Lg Shortage | Shortage | In-Balance | Over-Supply | Lg Over-Supply

EY

Graduate output is in balance for **Industrial Production Technicians**, **Welders**, **Chemical Technicians**, and **Computer Support Specialists**. However, output is far too low for **Machinists**, which have a large number of jobs in the region. **Industrial Machinery Maintenance** programs are not available at accredited institutions, and **Industrial Engineering** and **Mechanical Engineering** at the Associate's levels are relatively low (which can be due to a lack of 2+2 orientation to let students get an Associate's on their way to a Bachelor's). Bachelor's level graduate output for several **Engineering** fields is relatively high compared to local job openings and US output. **Supply Chain Managers** have few Bachelor's graduates.

More on the Methodology

"Job openings" in 2021 is used to determine demand, which is a combination of workforce turnover and retirement as well as net new jobs. Regional job openings are compared to regional graduate output using an SOC-CIP taxonomy that accounts for education levels. (For example, a Bachelor's in Psychology is not matched with a Psychologist occupation because a Master's or PhD is required.)

Furthermore, the "supply-demand gap" doesn't hold true as a 1:1 ratio for all occupations. Therefore, we compare the regional ratio to the US ratio to determine if regional graduate output is relatively high or low. This Regional-to-US ratio also compensates for "non-accredited" programs that may exist but aren't in the data (e.g. for-profits that aren't required to report their enrollment data to the government). For example, non-profits may train Home Health Aides which aren't in the data, but the regional comparison of "accredited" graduates to the US does help inform if a local gap may exist.

We determine the regional gap or oversupply in the right column ("ratio vs. US"). If regional graduate output is less than 50% of the US ratio, then we determine there is a large shortage and color the first "Gap" column a dark red. See the legend for colors and their ranges below.

Why does graduate output not always match job openings evenly? Graduates sometimes choose other occupations: Welding may need more graduates since many may finish the program and then choose other jobs, or an Electrical Engineering graduate with a minor in Business may choose a sales but not engineering job. Some positions, like Executive Secretaries or Logistics Clerks are helped by Certificates but many workers learn their skill on the job.

Data is sourced from US Dept. of Education's IPEDS programs (graduate output) and Lightcast/EMSI (job openings by occupation by county). We use a custom taxonomy allocates 1,000 occupation codes and 10,000 graduate program codes (CIP+AwardLevel combinations) into 310 occupation groups. Some degree programs aren't matched if they don't align with jobs in the SOC system or if more education is needed to enter the occupation.

Gap Legend and Ratio Ranges:

High Shortage	Shortage	In Balance	Over-Supply	Large Over-Supply
Less than 50% of US Ratio	50% up to 80%	80% up to 120% (About even w/US)	120% up to 200%	200% or higher than US Ratio

EY

Technology:
Occupational analysis

About this chapter

Building off the research started during Phase I, we examine overall trends for each of the target sectors identified for Western New York. For this section on Technology, we focus on a definition based on occupations and employment across all industries. The definition of Technology workers includes computer systems analysts, software and web developers, data scientists, network security and other information technology occupations.

We examine the make-up of Technology workforce by age, sex, educational attainment, and wages compared to other industries. This analysis can help explain the larger economic trends impacting the sector and help to inform sector-specific stakeholder engagement throughout the project. Key metrics in this chapter include:

▶ Occupational employment by year ▶ Occupational workforce by sex

▶ Employment snapshot by NAICS ▶ Occupational workforce by age

▶ Average annual earnings

Key findings

▶ Over 12,000 technology workers are employed in Western New York today. Employment levels dropped in 2019 and 2020 but have remained steady in 21/22.

▶ Technology workers are employed across many industries, led by Professional Services, Finance, and Government.

▶ Technology workers are younger and predominantly male, and most jobs require a Bachelor's degree or higher.

▶ Technology workers are better-paid than the average worker in the region, but only by 12%.
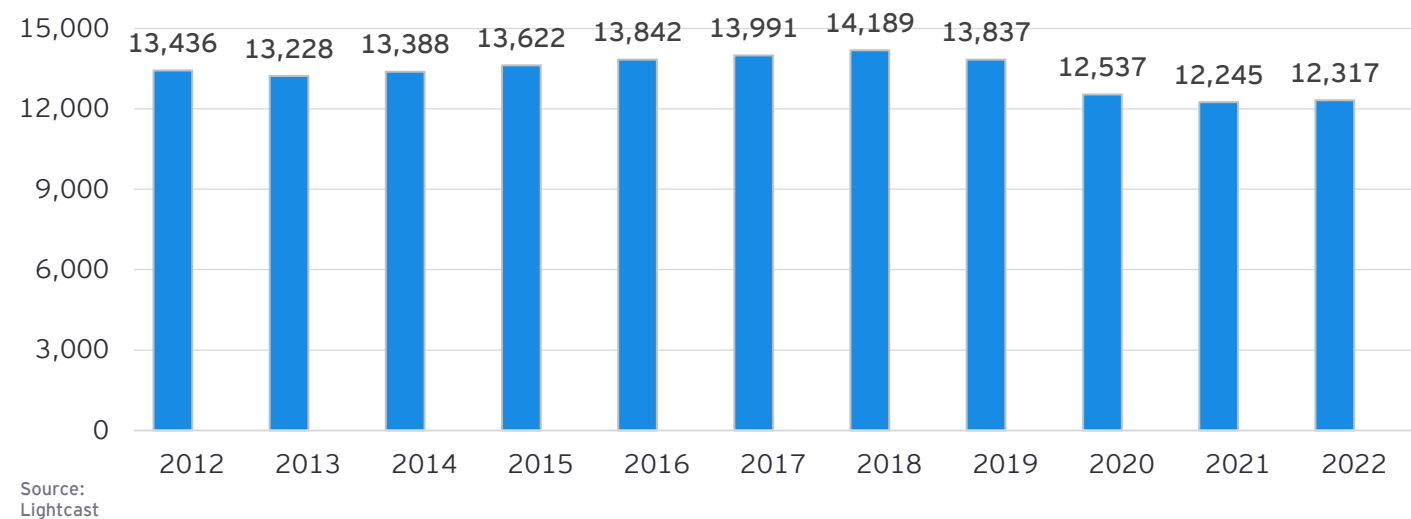
EY

Cluster definitions for the Technology sector used as part of Phase II analysis for Western New York were provided to EY by the Western REDC and support New York State Development's Information Technology clusters.

Technology SOC definition

SOC Code	SOC Description
15-1211	Computer Systems Analysts
15-1212	Information Security Analysts
15-1221	Computer and Information Research Scientists
15-1231	Computer Network Support Specialists
15-1232	Computer User Support Specialists
15-1241	Computer Network Architects
15-1242	Database Administrators
15-1243	Database Architects
15-1244	Network and Computer Systems Administrators
15-1251	Computer Programmers
15-1252	Software Developers
15-1253	Software Quality Assurance Analysts and Testers
15-1254	Web Developers
15-1255	Web and Digital Interface Designers
15-1299	All Other Computer Occupations
15-2051	Data Scientists
15-2099	All Other Mathematical Science Occupations

EY

Technology | Occupational Analysis

The number of employees in Technology occupations (focused on Information Technology) has experienced cycles of growth and recent decline. Over 12,000 Technology workers are employed in Western New York today.

Technology employment by year, 2012 – 2022

Year	Employment
2012	13,436
2013	13,228
2014	13,388
2015	13,622
2016	13,842
2017	13,991
2018	14,189
2019	13,837
2020	12,537
2021	12,245
2022	12,317

Source: Lightcast

Technology workers as a share of total employment in Western New York has remained steady over the past 10 years.

Technology workers as share of total workers, 2012 - 2021

Year	Share
2012	2.2%
2013	2.1%
2014	2.2%
2015	2.2%
2016	2.2%
2017	2.2%
2018	2.2%
2019	2.2%
2020	2.2%
2021	2.1%
2022	2.1%

Source: Lightcast

EY

Technology | Industry Analysis
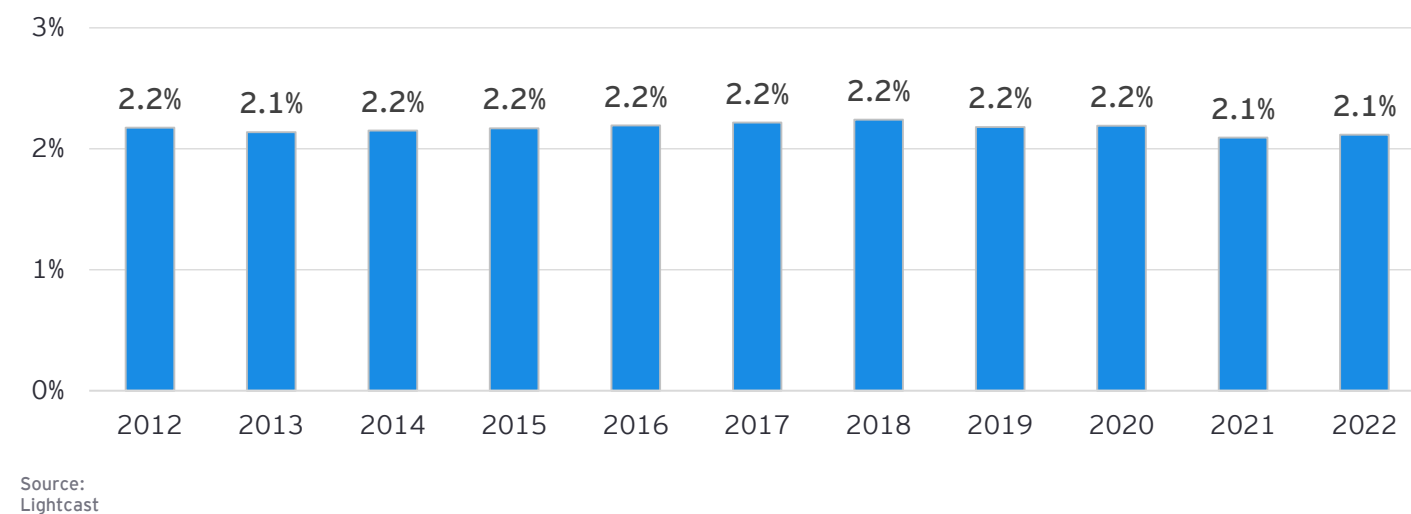
Technology workers in Western New York are employed in numerous industries, with the Professional, Scientific and Technical Services industry accounting for the largest share of Technology jobs, followed by Finance and Government.
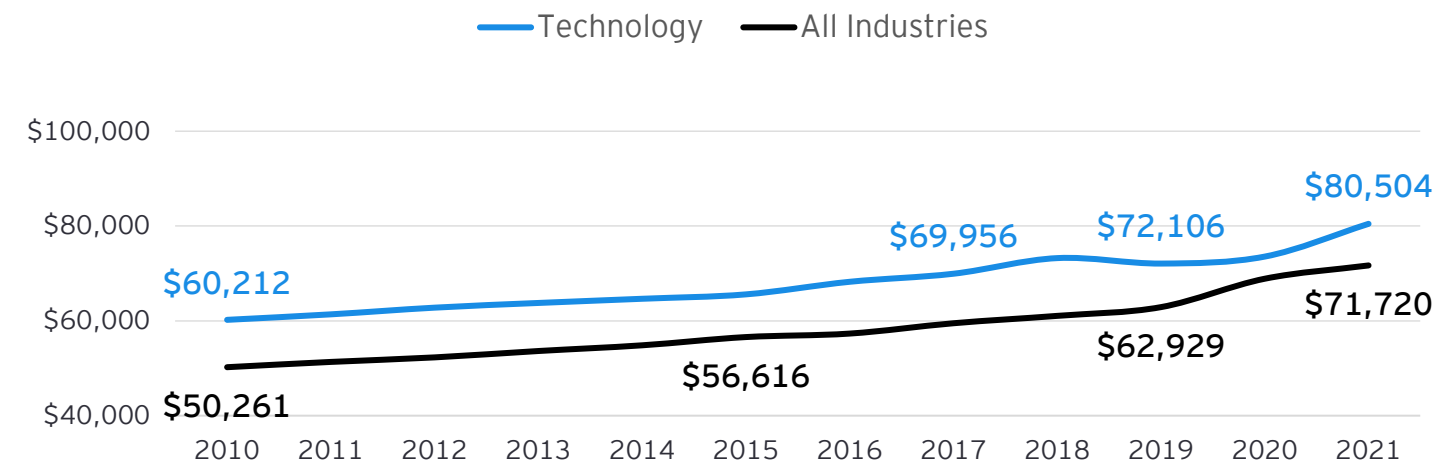
Western New York Technology occupations by NAICS, 2016 - 2021

NAICS Code	NAICS Description	No. of Tech Jobs (2021)	% Share of Total Tech Jobs (2021)	% Share of Total Ind. Jobs (2021)
54	Professional, Scientific, and Technical Services	3,637	29.7%	13.3%
52	Finance and Insurance	1,609	13.1%	5.9%
90	Government	1,439	11.8%	1.4%
55	Management of Companies and Enterprises	1,246	10.2%	10.3%
51	Information	1,086	8.9%	17.5%
31	Manufacturing	1,048	8.6%	1.7%
42	Wholesale Trade	578	4.7%	2.9%
56	Admin. & Support & Waste Man. & Remediation Services	564	4.6%	2.0%
62	Health Care and Social Assistance	303	2.5%	0.4%
61	Educational Services	260	2.1%	1.6%
81	Other Services (except Public Administration)	141	1.1%	0.7%
44	Retail Trade	97	0.8%	0.1%
48	Transportation and Warehousing	65	0.5%	0.3%
99	Unclassified Industry	46	0.4%	3.9%
53	Real Estate and Rental and Leasing	40	0.3%	0.6%
22	Utilities	37	0.3%	2.7%
23	Construction	29	0.2%	0.1%
71	Arts, Entertainment, and Recreation	14	0.1%	0.2%
72	Accommodation and Food Services	<10	0.1%	0.0%
11	Agriculture, Forestry, Fishing and Hunting	<10	0.0%	0.0%
21	Mining, Quarrying, and Oil and Gas Extraction	--	--	--
	Total jobs	**12,238**		

Source:
Lightcast

EY

Annual worker earnings in Technology occupations in Western New York are $80,500 and somewhat higher than average of all industries.
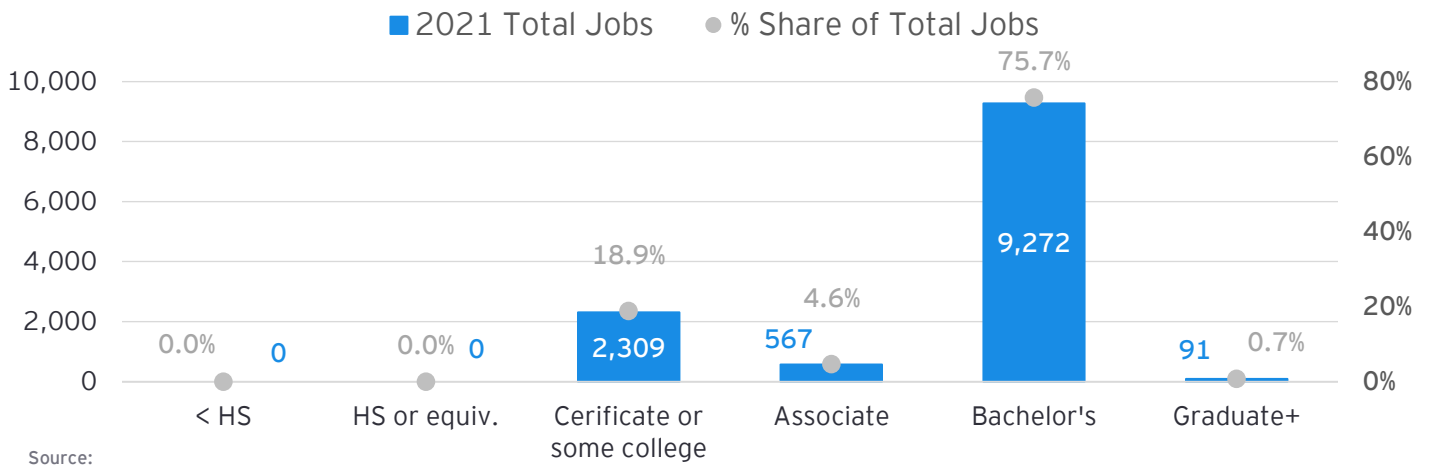
Average annual earnings, 2010 - 2021

Technology — All Industries

$100,000
$80,000
$60,000
$40,000

$60,212
$69,956
$72,106
$80,504

$50,261
$56,616
$62,929
$71,720

2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021

Source:
Lightcast

More than 76% of Technology workers in Western New York are in jobs requiring a bachelor's degree or higher. Still, nearly 25% of jobs require less than a Bachelor's.

Total jobs by typical entry-level education requirement, Technology occupations, 2021

■ 2021 Total Jobs   ● % Share of Total Jobs

10,000   80%
8,000   60%
6,000   40%
4,000   20%
2,000   0%
0

	< HS	HS or equiv.	Cerificate or some college	Associate	Bachelor's	Graduate+
% Share	0.0%	0.0%	18.9%	4.6%	75.7%	0.7%
Total Jobs	0	0	2,309	567	9,272	91

Source:
Lightcast

EY

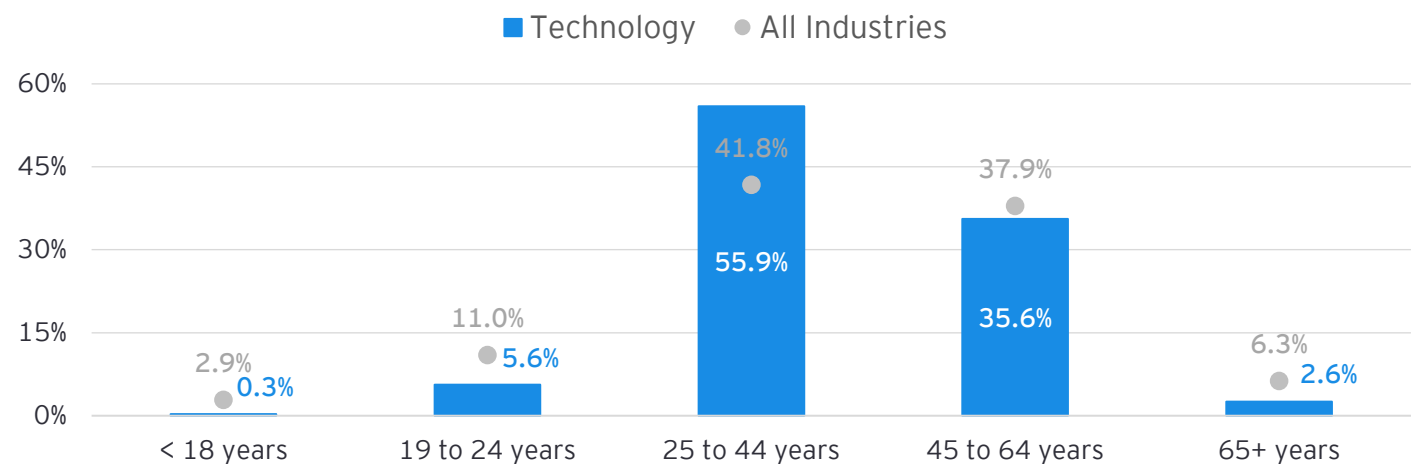The gender split within Technology occupations in Western New York is skewed heavily towards male employment.

Employment within sector, by sex, 2021

■ Male ■ Female

	Technology	All Industries
Female	26.1%	50.5%
Male	73.9%	49.5%
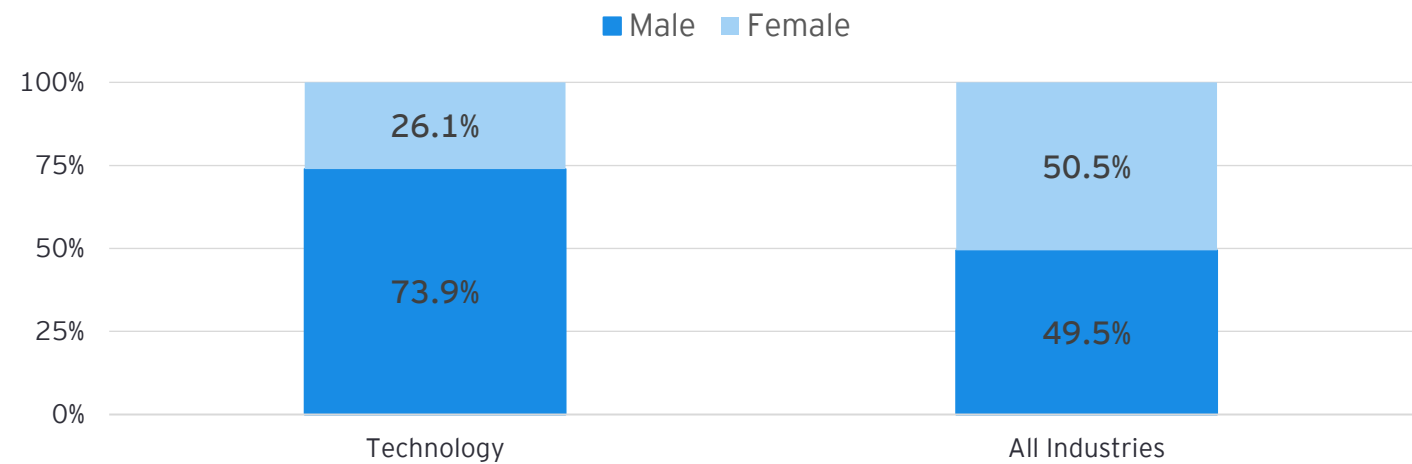
Source: Lightcast

The majority of Technology workers in Western New York are in the 25-44 age range, a higher share than seen across all industries.

Employment within sector, by age, 2021

■ Technology ● All Industries

	< 18 years	19 to 24 years	25 to 44 years	45 to 64 years	65+ years
All Industries	2.9%	11.0%	41.8%	37.9%	6.3%
Technology	0.3%	5.6%	55.9%	35.6%	2.6%

Source: Lightcast

EY

Technology | Occupational Analysis

The top three Technology occupations employs nearly 50% of the workforce. While the majority of occupations require a bachelor's degree, the second most abundant position only requires some college.

Technology (5-Digit NAICS) occupations with entry-level educational requirements and median hourly earnings, 2021

SOC Code	SOC Description	No. of Jobs (2021)	Median Hourly Earnings (2021)	Typical Entry Level Edu. Req. (2021)
15-1252	Software Developers	2,450	$47.07	Bachelor's degree
15-1232	Computer User Support Specialists	2,309	$26.28	Some college
15-1211	Computer Systems Analysts	1,275	$44.67	Bachelor's degree
15-1244	Network and Computer Systems Administrators	1,205	$41.48	Bachelor's degree
11-3021	Computer and Information Systems Managers	920	$74.56	Bachelor's degree
15-1251	Computer Programmers	793	$40.12	Bachelor's degree
15-1231	Computer Network Support Specialists	567	$32.16	Associate degree
15-1241	Computer Network Architects	550	$51.24	Bachelor's degree
15-1299	Computer Occupations, All Other	441	$37.37	Bachelor's degree
15-1253	Software Quality Assurance Analysts and Testers	373	$41.82	Bachelor's degree
15-1212	Information Security Analysts	308	$47.50	Bachelor's degree
15-1242	Database Administrators	269	$40.54	Bachelor's degree
15-2051	Data Scientists	216	$47.12	Bachelor's degree
15-1254	Web Developers	215	$29.06	Bachelor's degree
15-1255	Web and Digital Interface Designers	146	$37.35	Bachelor's degree
15-1243	Database Architects	110	$50.38	Bachelor's degree
15-1221	Computer and Information Research Scientists	91	$57.83	Master's degree
15-2099	Mathematical Science Occupations, All Other	<10	Insf. Data	Bachelor's degree
	Total jobs in top 25 occupations	**12,245**	**$43.91**	

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Technology workers, as shown in tables in the previous pages, are focused on Information Technology (Software) occupations. The gap analysis below shows both IT workers as well as additional technician-level positions that support technology product development and manufacturing in Western New York.

The table below shows occupation groups that are matched to degree programs to determine if the supply of graduates is sufficient to meet demand (measured as job openings in a year). A US comparison helps clarify if there is a gap or overproduction of graduates by comparing regional graduates to jobs with the US ratio of graduates to jobs (as shown in the right column below).

In general, Western New York produces sufficient graduates to meet its Technology job openings, with a few exceptions. Graduate output of **Web Developers** is less than half US levels (at accredited institutions), and **Network Administrators** and **Database Administrators** have low graduate levels or no dedicated programs (respectively). **Software Developers** and **Computer Systems/Security** are oversupplied relative to demand.

Supply-Demand Gap Conditions
Technology Workers, Western New York

Gap	Occupation Group	Avg. Educ. Level	Regional 2021 Job Openings	Graduates	Regional Ratio	Supply-demand Ratio versus US	
IT-related:							
🟩	Computer Support Specialists	Associate's	209	178	85%	95%	
🟥	Web Developers	Associate's	28	11	40%	43%	
🟧	Computer Network Administrators	Bachelor's	150	10	7%	75%	
🟨	Software Developers	Bachelor's	342	293	86%	271%	
🟨	Computer Systems & Information Secu	Bachelor's	195	554	284%	313%	
🟥	Database Administrators	Bachelor's	24	0	0%	0%	
🟨	Computer Scientists	PhD	4	18	450%	485%	
Engineering Production-related:							
🟨	Electrical & Electronics Repairers	Certificate	56	54	96%	222%	
🟨	Computer Installers & Repairers	Certificate	31	25	81%	210%	
🟩	Industrial Production Technicians	Certificate	358	40	11%	118%	
🟨	Electrical / Electronics Technicians & Di	Associate's	48	16	34%	124%	
🟥	Industrial Engineering Technicians	Associate's	77	32	41%	44%	
🟥	Mechanical Drafters	Associate's	30	17	56%	49%	
🟨	Science Technicians	Associate's	35	143	410%	485%	
🟨	Electrical and Electronics Engineers	Bachelor's	66	180	274%	219%	
🟩	Engineering Managers	Bachelor's	38	21	55%	106%	
🟨	Environmental Scientists & Engineers	Bachelor's	51	153	300%	117%	
🟨	Industrial Engineers	Bachelor's	151	241	159%	217%	
🟨	Mechanical Engineers	Bachelor's	91	613	677%	397%	

Lg Shortage	Shortage	In-Balance	Over-Supply	Lg Over-Supply

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For technician-levels positions, the region generally produces a level of graduates that is sufficient or exceeds demand. However, **Industrial Engineering Technicians** and **Mechanical Drafters** have too few graduates (or lack programs that are 2+2, providing an Associate's degree for students on their way to a Bachelor's). Bachelor's-level **Industrial**, **Mechanical**, and **Computer Engineering** programs produce sufficient graduates. High levels of graduate production relative to job openings indicates that many students likely plan to leave after graduation (or will need to leave) for jobs.

More on the Methodology

"Job openings" in 2021 is used to determine demand, which is a combination of workforce turnover and retirement as well as net new jobs. Regional job openings are compared to regional graduate output using an SOC-CIP taxonomy that accounts for education levels. (For example, a Bachelor's in Psychology is not matched with a Psychologist occupation because a Master's or PhD is required.)

Furthermore, the "supply-demand gap" doesn't hold true as a 1:1 ratio for all occupations. Therefore, we compare the regional ratio to the US ratio to determine if regional graduate output is relatively high or low. This Regional-to-US ratio also compensates for "non-accredited" programs that may exist but aren't in the data (e.g. for-profits that aren't required to report their enrollment data to the government). For example, non-profits may train Home Health Aides which aren't in the data, but the regional comparison of "accredited" graduates to the US does help inform if a local gap may exist.

We determine the regional gap or oversupply in the right column ("ratio vs. US"). If regional graduate output is less than 50% of the US ratio, then we determine there is a large shortage and color the first "Gap" column a dark red. See the legend for colors and their ranges below.

Why does graduate output not always match job openings evenly? Graduates sometimes choose other occupations: Welding may need more graduates since many may finish the program and then choose other jobs, or an Electrical Engineering graduate with a minor in Business may choose a sales but not engineering job. Some positions, like Executive Secretaries or Logistics Clerks are helped by Certificates but many workers learn their skill on the job.

Data is sourced from US Dept. of Education's IPEDS programs (graduate output) and Lightcast/EMSI (job openings by occupation by county). We use a custom taxonomy allocates 1,000 occupation codes and 10,000 graduate program codes (CIP+AwardLevel combinations) into 310 occupation groups. Some degree programs aren't matched if they don't align with jobs in the SOC system or if more education is needed to enter the occupation.

Gap Legend and Ratio Ranges:

High Shortage	Shortage	In Balance	Over-Supply	Large Over-Supply
Less than 50% of US Ratio	50% up to 80%	80% up to 120% (About even w/US)	120% up to 200%	200% or higher than US Ratio

EY

Educational programming

About this chapter

The educational programming chapter explores the overall educational attainment levels within the region, the typical entry-level educational attainment requirements by target sector, and the educational pipeline for the region. With this analysis, we seek to understand the talent supply within the region and the opportunity for employment within a target sector at various educational attainment levels. Key metrics in this chapter include:

- ▶ Educational attainment levels
- ▶ Degree production by award type
- ▶ Enrollment by level and full-time status
- ▶ Type of certificate production
- ▶ Jobs by typical entry-level educational requirement by target sector
- ▶ Apprenticeships

Key findings

- ▶ Western New York's adult population is slightly less educated than the state's, but educational attainment is improving in the region.

- ▶ Of the 123,000 postsecondary students in Western New York, three-quarters are full-time undergraduates, more than the state average.

- ▶ Nearly three-quarters of postsecondary graduates get a Bachelor's or Advanced degree. Most certificates produced in the region are at the 1-year/less than 2-year level.
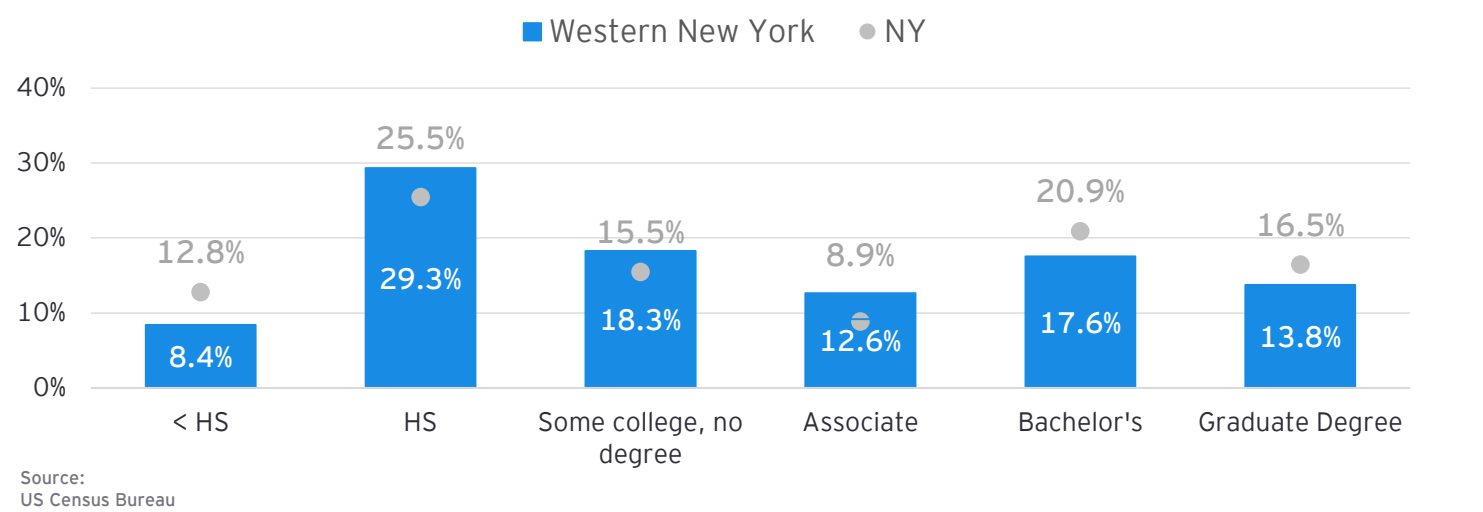
EY

Educational programming

Key findings, continued

▶ Health, Business, and Education lead graduate production in the region. Large increases in Certificates over the last 5 years was seen in Health and Culinary. Engineering and IT experienced increases at the Bachelor's level, and Engineering and Public Administration saw increases at the Master's level.

▶ Registered apprenticeships have increased significantly in the region, led by Electrician and Construction trades.
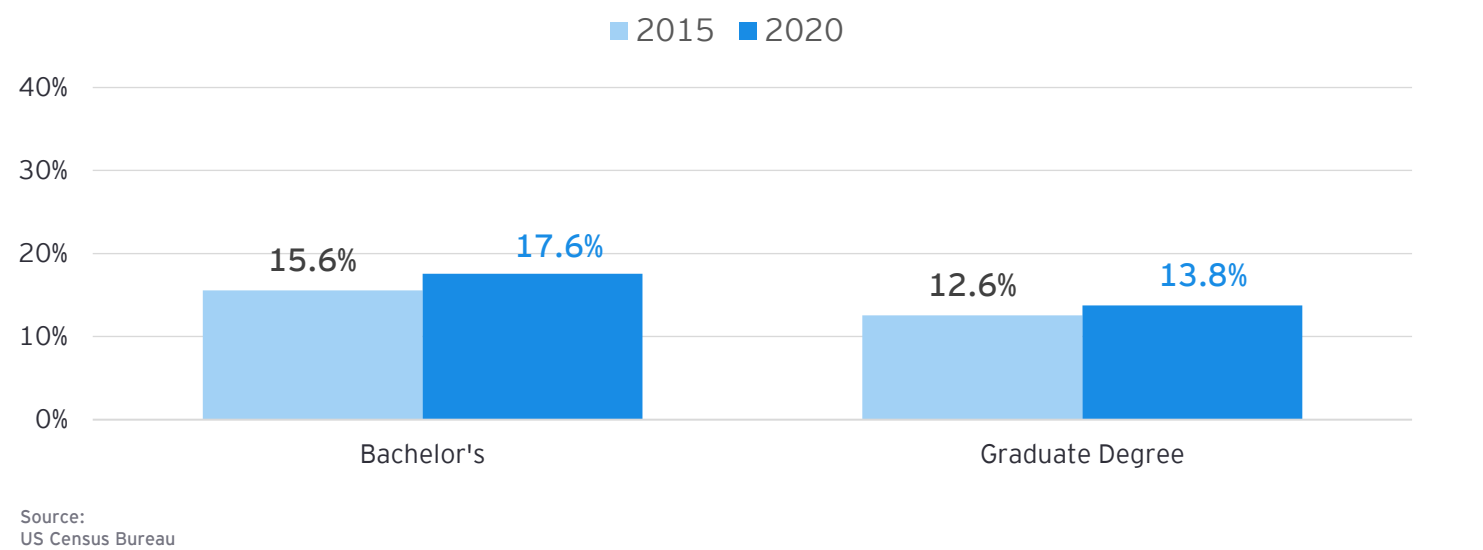
Educational Programming

The population in Western New York is slightly less educated compared to the state, with nearly 32% of adults (25+) having a bachelor's or higher (compared to 37% for the state).

Educational attainment of population age 25 and older, 2020

■ Western New York ● NY

| Category	Western New York	NY
< HS	8.4%	12.8%
HS	29.3%	25.5%
Some college, no degree	18.3%	15.5%
Associate	12.6%	8.9%
Bachelor's	17.6%	20.9%
Graduate Degree	13.8%	16.5%

Source:
US Census Bureau

The bachelor's+ educational attainment of Western New York's adult population has grown since 2015.

Educational attainment for population age 25 and older, 2015 vs. 2020

■ 2015 ■ 2020

Category	2015	2020
Bachelor's	15.6%	17.6%
Graduate Degree	12.6%	13.8%

Source:
US Census Bureau

EY

Most students in Western New York are full-time undergraduates. Over 123,000 postsecondary students are enrolled in Western New York institutions.
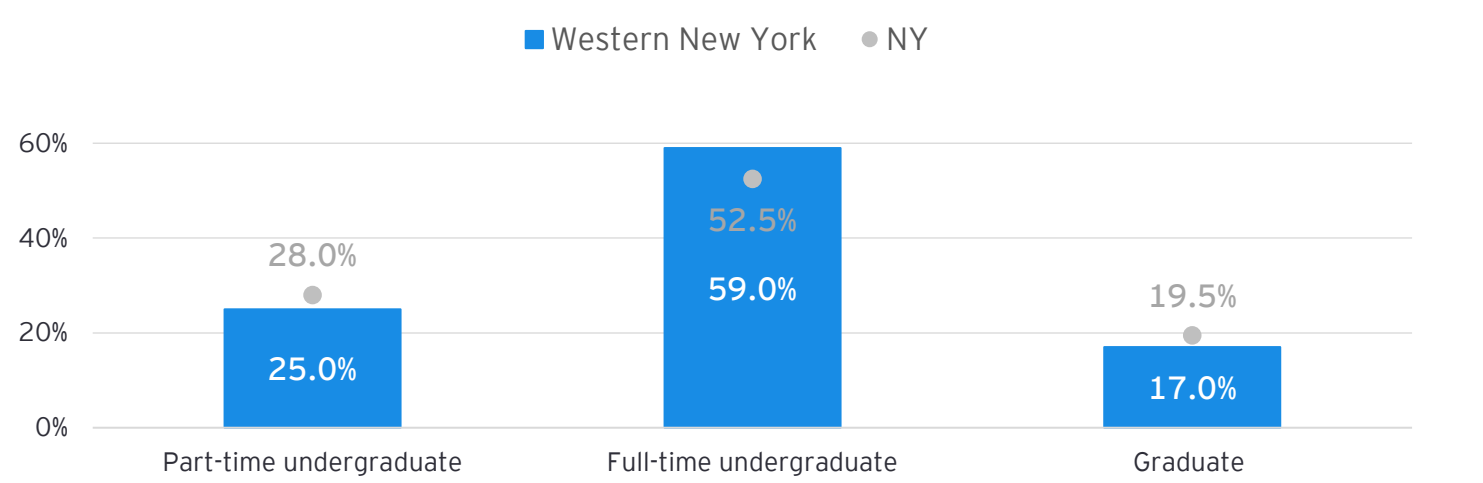
Enrollment in higher education institutions by level, 2020 – 2021 academic year

Part-time undergraduate	30,171
Full-time undergraduate	72,368
Graduate	20,523
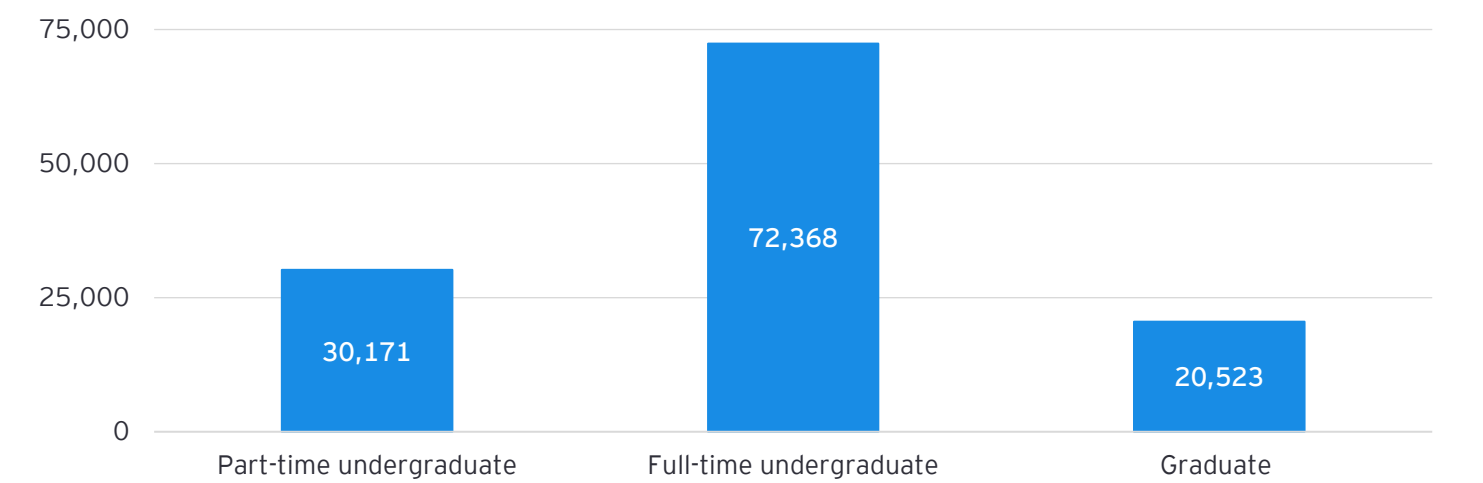
Source:
National Science Foundation, IPEDS Survey

More than 75% of postsecondary students in Western New York are full-time undergraduates and graduates.
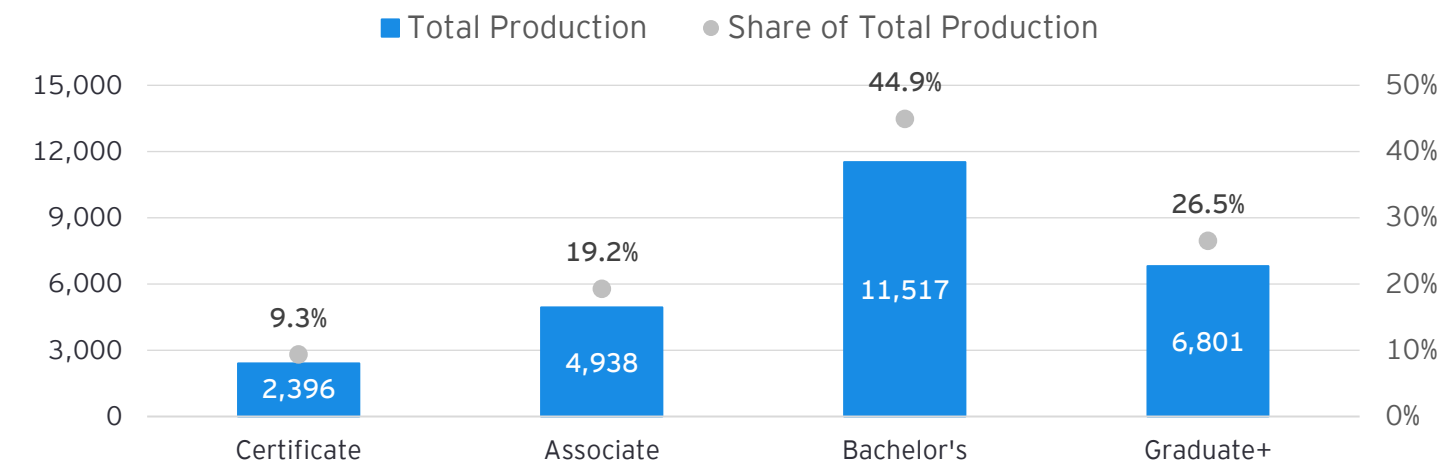
Share of enrollment in higher education institutions by level, 2020 – 2021 academic year

■ Western New York　● NY

	Western New York	NY
Part-time undergraduate	25.0%	28.0%
Full-time undergraduate	59.0%	52.5%
Graduate	17.0%	19.5%

Source:
National Science Foundation, IPEDS Survey

EY

More than 70% of all accredited certificates and degrees produced in Western New York are at the Bachelor's level or higher.
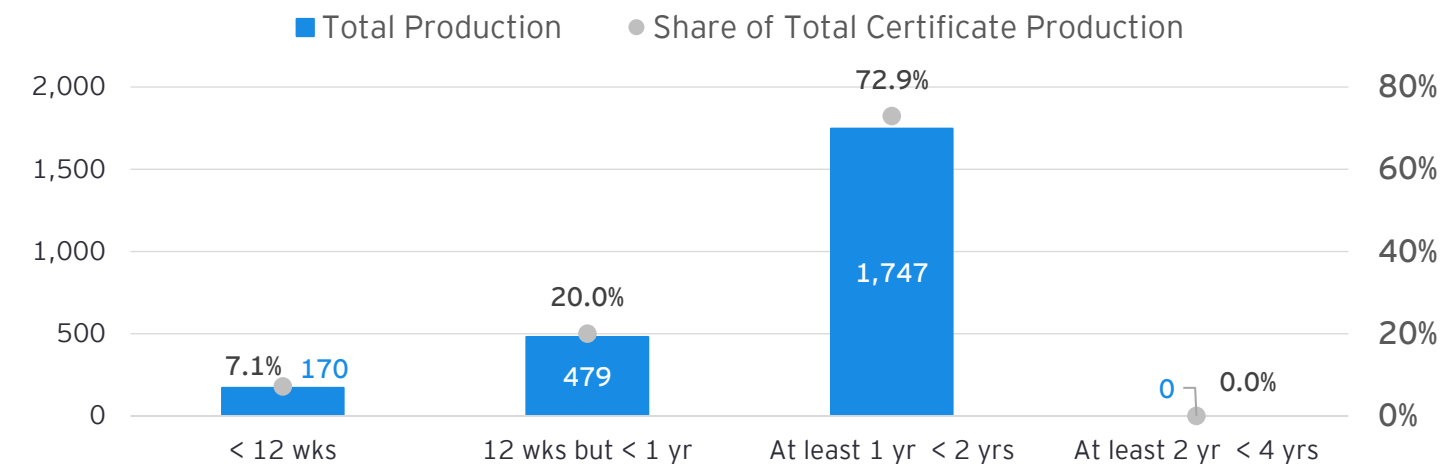
Graduate production by award level, 2020 – 2021 academic year

■ Total Production   ● Share of Total Production

	Certificate	Associate	Bachelor's	Graduate+
Total Production	2,396	4,938	11,517	6,801
Share of Total Production	9.3%	19.2%	44.9%	26.5%

Source:
National Science Foundation, IPEDS Survey

Accredited certificate production in Western New York is highest for 1-year programs, but shorter-term program production is on par with state averages.

Certificate production, 2020 – 2021 academic year

■ Total Production   ● Share of Total Certificate Production

	< 12 wks	12 wks but < 1 yr	At least 1 yr < 2 yrs	At least 2 yr < 4 yrs
Total Production	170	479	1,747	0
Share of Total Certificate Production	7.1%	20.0%	72.9%	0.0%

Source:
NSF HERD

EY

Health programs in Western New York produced the highest number of graduates and produced graduates at each award level from certificates to doctorates. Business programs produce the next highest number of graduates, followed by Education and Engineering.

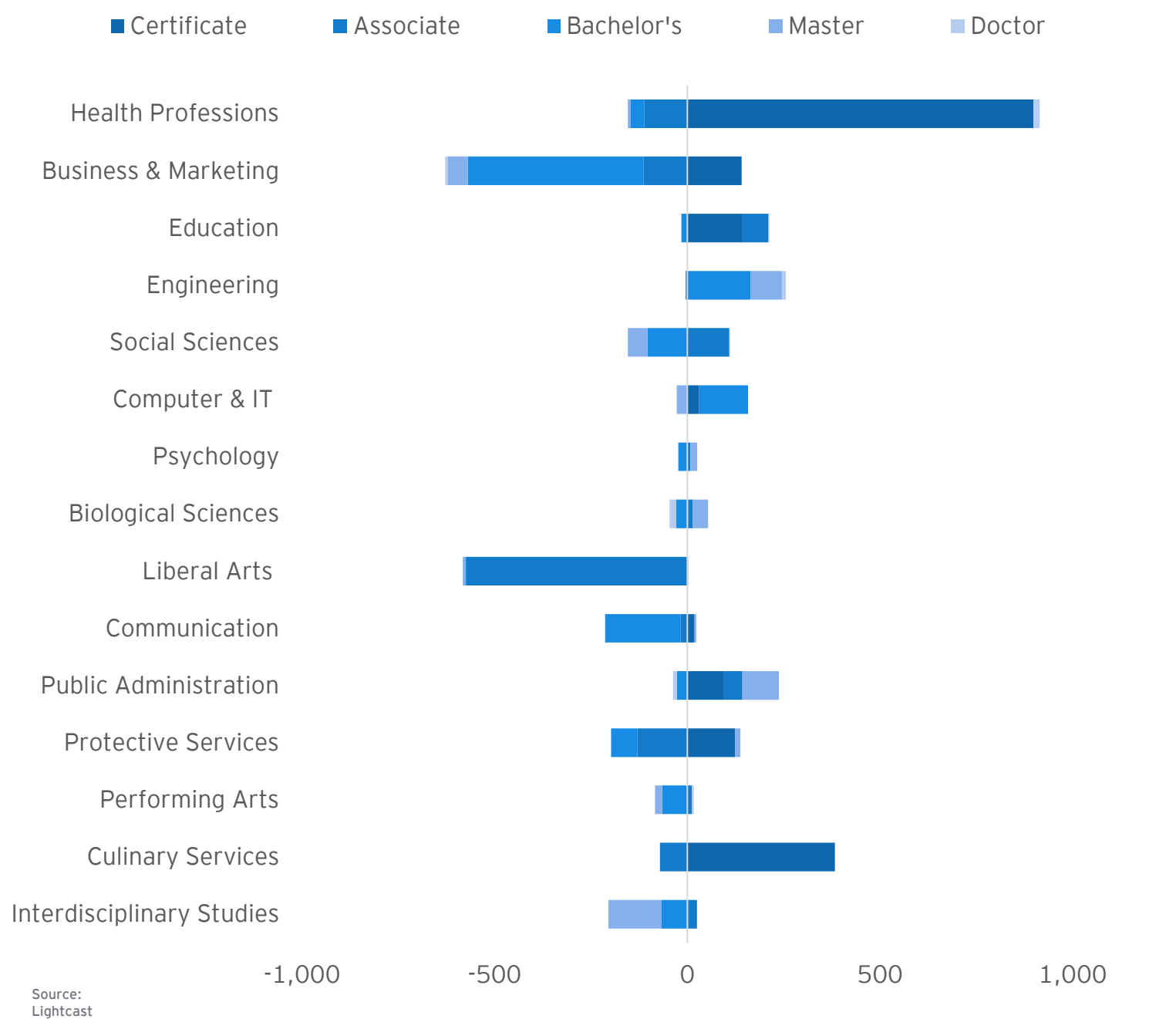Top 15 degrees by award level by CIP, 2020-2021 academic year
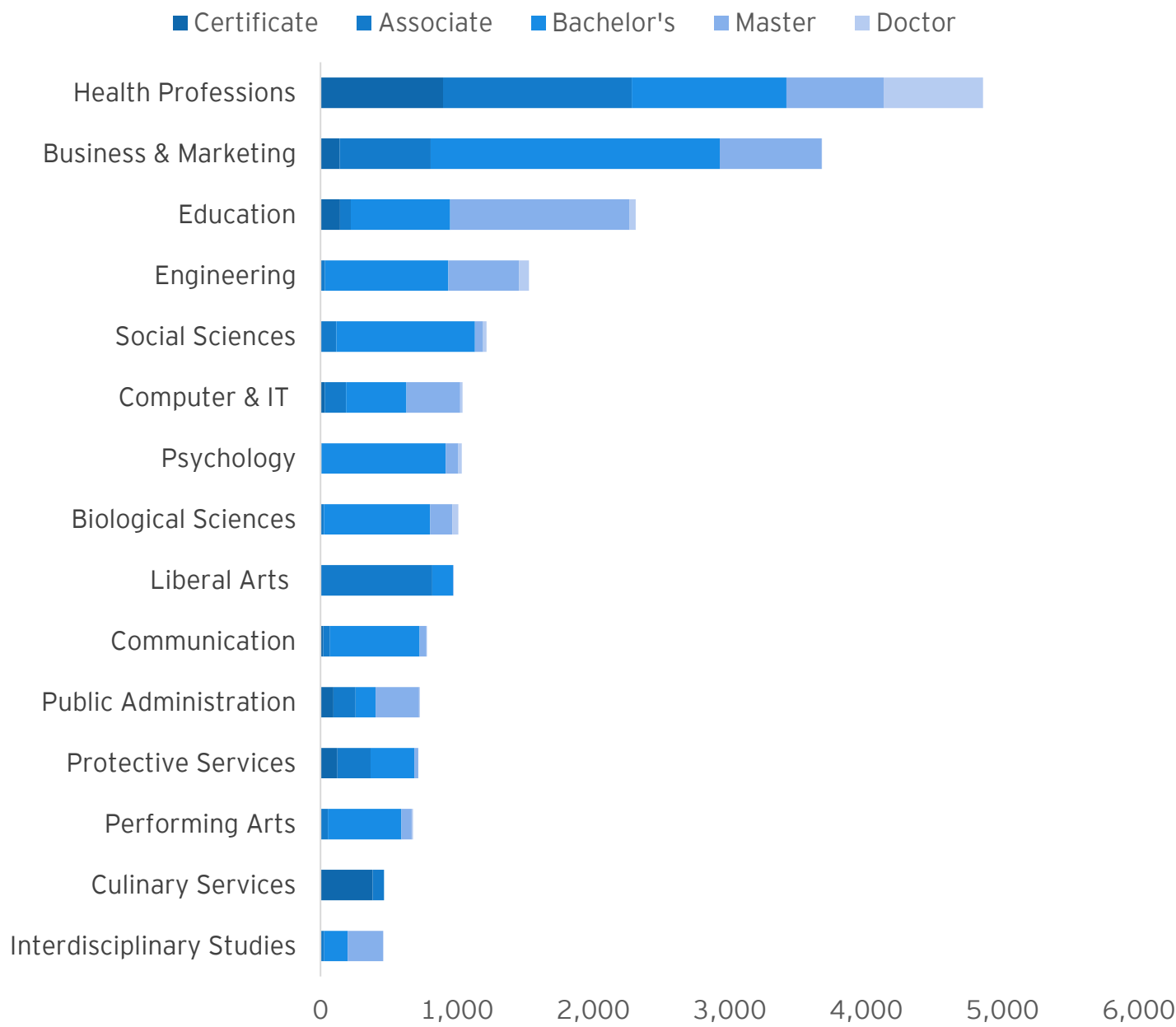
Source: Lightcast

Educational Programming

The increase in the number of graduates in Western New York was led by certificate production for Health Professions (900 new certificate graduates). Some increase was seen in certificate production in Culinary Services (400 new certificate graduates). At the bachelor's level, Engineering (+165) and Computer & IT (+127) saw the largest increase in the number of graduates. Master's increased in Engineering and Public Administration.

Change in top 15 degrees by award level by CIP, 2015-2016 to 2020-2021 academic year

■ Certificate　■ Associate　■ Bachelor's　■ Master　■ Doctor

Health Professions
Business & Marketing
Education
Engineering
Social Sciences
Computer & IT
Psychology
Biological Sciences
Liberal Arts
Communication
Public Administration
Protective Services
Performing Arts
Culinary Services
Interdisciplinary Studies

-1,000　　-500　　0　　500　　1,000

Source: Lightcast

EY

Educational Programming

New registered apprentices in Western New York have more than doubled since 2016. However, new apprentices experienced a 10% decline in 2021 due to the pandemic.
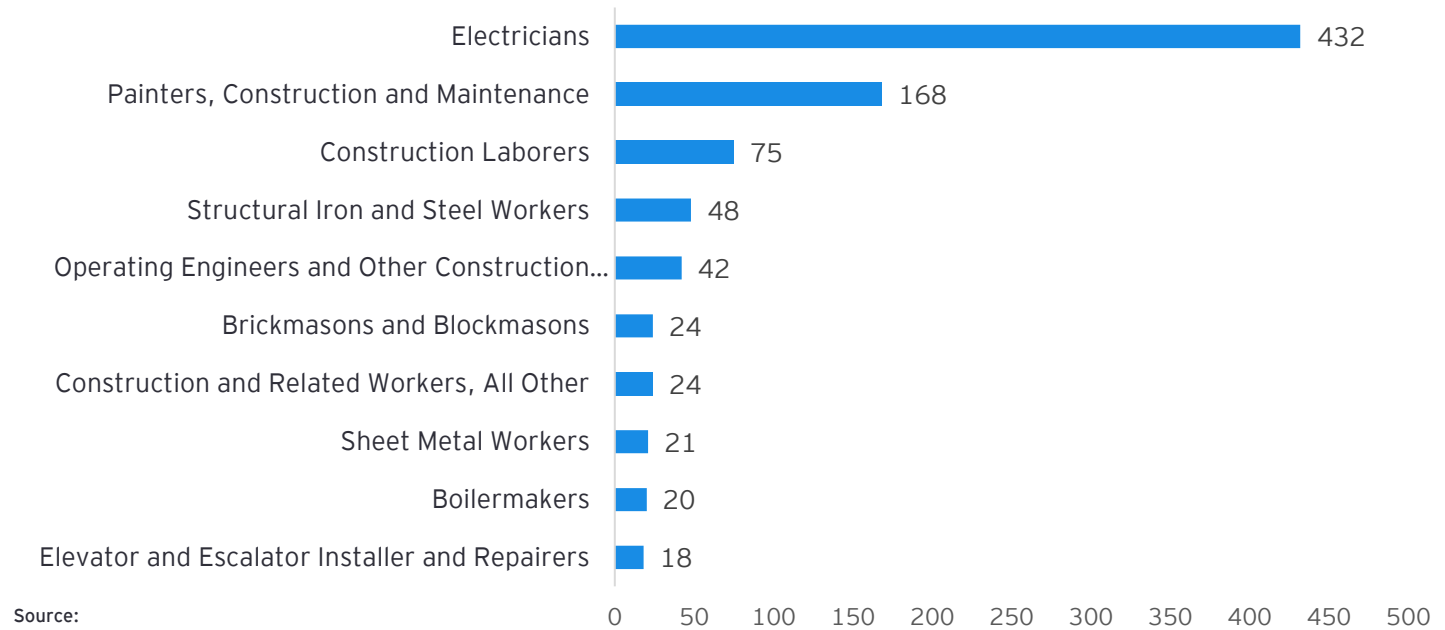
New Registered Apprentices in Western New York, 2016-2021

Year	New Registered Apprentices
2016	384
2017	752
2018	936
2019	852
2020	1,102
2021	996
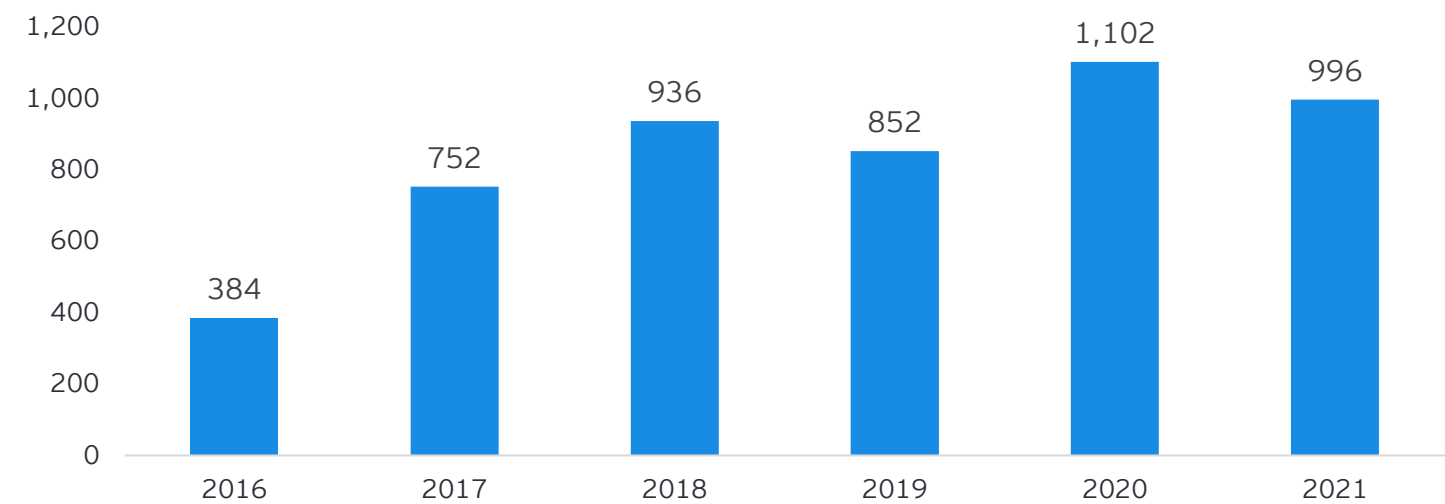
Source:
DOL RAPIDS

Electrician programs register the most new apprentices followed by Painters, Construction and Maintenance.

New Registered Apprentices by Occupation in Western New York, 2021

Occupation	New Registered Apprentices
Electricians	432
Painters, Construction and Maintenance	168
Construction Laborers	75
Structural Iron and Steel Workers	48
Operating Engineers and Other Construction...	42
Brickmasons and Blockmasons	24
Construction and Related Workers, All Other	24
Sheet Metal Workers	21
Boilermakers	20
Elevator and Escalator Installer and Repairers	18

Source:
DOL RAPIDS

EY

Sources

Data sources used as part of the research appendix.

Population and components of population
US Census Bureau, Population Estimates

Population by race
US Census Bureau, ACS 5-year estimates

Population by age cohort
US Census Bureau, ACS 5-year estimates

Unemployment rate
Bureau of Labor Statistics, LAUS

Labor force
US Bureau of Labor Statistics, QCEW
Bureau of Labor Statistics, LAUS

Foreign-born population
US Census Bureau, ACS 5-year estimates

Non-Citizen population
US Census Bureau, ACS 5-year estimates

Language other than English
US Census Bureau, ACS 5-year estimates

Modes of transportation and commute times
US Census Bureau, ACS 5-year estimates

Poverty rate
US Census Bureau, ACS 5-year estimates

Population with disability
US Census Bureau, ACS 5-year estimates

Civilian labor force participation rate 16+ years
US Census Bureau, ACS 5-year estimates

Unemployment rate 16+ years
US Census Bureau, ACS 5-year estimates

Labor force by age, race/ethnicity, and education
US Census Bureau, ACS 5-year estimates

Unemployment rate by age, race/ethnicity, and education
US Census Bureau, ACS 5-year estimates

Talent inflow/outflow
US Census Bureau, OnTheMap

Resident worker migration
Lightcast

Employment
US Census Bureau, ACS 5-year estimates
US Bureau of Labor Statistics, QCEW
Lightcast

Top industries by employment
Lightcast

Employment by industry
Lightcast

Number of payrolled business locations
Lightcast

Average annual earnings by industry
Lightcast

Typical entry-level education by industry
Lightcast

Sector employment by age and sex
Lightcast

Educational attainment of residents aged 25 and older
US Census Bureau, ACS 5-year estimates

Enrollment in higher education
National Science Foundation, IPEDS Survey

Post-secondary degree production
National Science Foundation, IPEDS Survey

Degree production by award level and CIP
National Science Foundation, IPEDS Survey

Apprenticeships data
US Department of Labor, RAPIDS

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