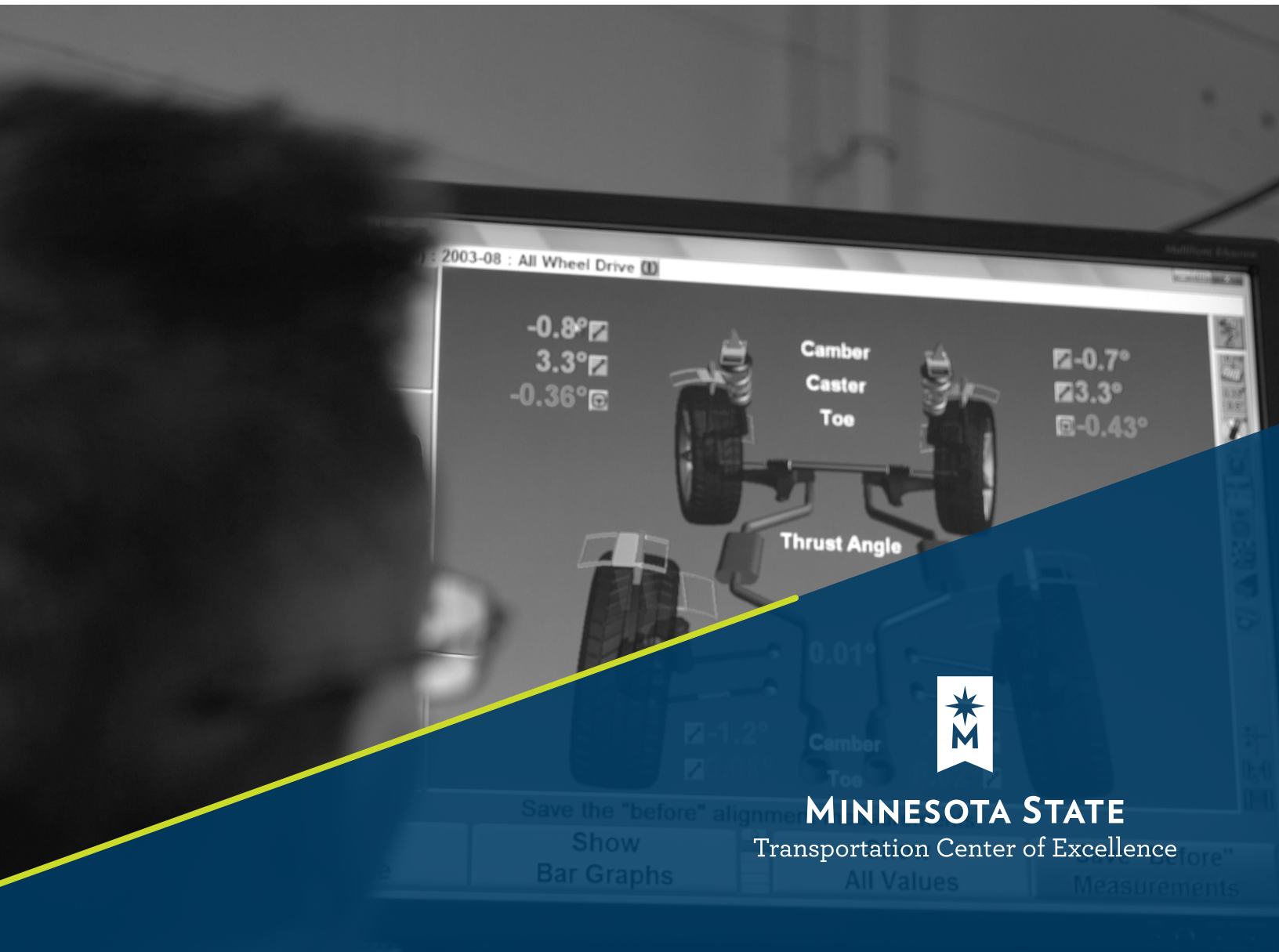


AUTOMOTIVE TECHNOLOGY

2023 Supply & Demand Analysis Overview

Published February 2024



MINNESOTA STATE

Transportation Center of Excellence

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Introduction and Sector Overview

This report highlights the importance of the Automotive Technology career pathway for Minnesota’s Transportation Industry. Professionals in Automotive Technology work in diverse roles from automotive service technicians to farm equipment mechanics, serving industries as diverse as Navigational Manufacturing and Automobile Dealerships. In all, about 20,884 people work in Automotive Technology roles in Minnesota as of the second quarter of 2023—a 0.9% increase (192 workers) from a year prior in the second quarter of 2022.

Overall employment in Minnesota grew by nearly 60,301 workers (2.0%) between the second quarter of 2022 and the second quarter of 2023. Over the past five years, employment grew by about 11,603 workers, or an 0.1% average annual growth in total employment. Over the next five years, overall employment is forecast to remain flat (0.0% average annual growth), while all Transportation Occupations together forecast moderate growth of 0.1% average annual growth. Automotive Technology employment is anticipated to grow slightly in Minnesota by about 60 total jobs over the next five years (0.1% on average annually) due to a tight talent pool. Total baseline demand for Automotive Technology talent is anticipated to be around 9,072 professionals needed to fill positions due to job exits and transfers, such as retirements and job changes.

Transportation Pathways in Minnesota – Baseline Forecast, 2023Q2¹

Occupation	Current					5-Year History		5-Year Baseline Forecast				
	Empl	Avg Ann Wages ²	LQ	Unempl	Unempl Rate	Empl Change	Ann % Change	Total Demand	Exits	Transfers	Empl Change	Ann % Change
Automotive Technology Pathway	20,884	\$68,300	0.97	236	1.1%	-586	-0.6%	9,072	3,184	5,828	60	0.1%
Aviation and Drone Technology Pathway	9,370	\$125,500	0.87	135	1.5%	69	0.1%	4,559	1,602	2,976	-19	0.0%
Collision Repair Pathway	7,307	\$52,800	1.10	227	3.1%	188	0.5%	3,442	1,213	2,305	-77	-0.2%
Diesel Equipment and Truck Pathway	12,161	\$64,200	1.01	153	1.3%	152	0.3%	5,635	1,954	3,724	-43	-0.1%
Marine and Power Sports Pathway	4,284	\$48,700	0.84	159	3.7%	68	0.3%	2,574	926	1,673	-25	-0.1%
Truck Driving Pathway*	97,603	\$51,800	0.95	3,280	3.3%	2,561	0.5%	61,265	26,466	33,538	1,261	0.3%
Transportation Occupations	133,108	\$60,700	0.93	3,418	2.6%	3,212	0.5%	73,669	27,527	45,162	981	0.1%
Total - All Occupations	3,075,767	\$66,100	1.00	87,730	2.9%	11,603	0.1%	1,746,576	727,900	1,016,920	1,756	0.0%

*This pathway includes School Bus Driver careers as of 2022, which were not included in the 2020 or 2021 estimates of career pathway employment or demand.

Source: [JobsEQ®](#)

Data as of 2023Q2 unless noted otherwise

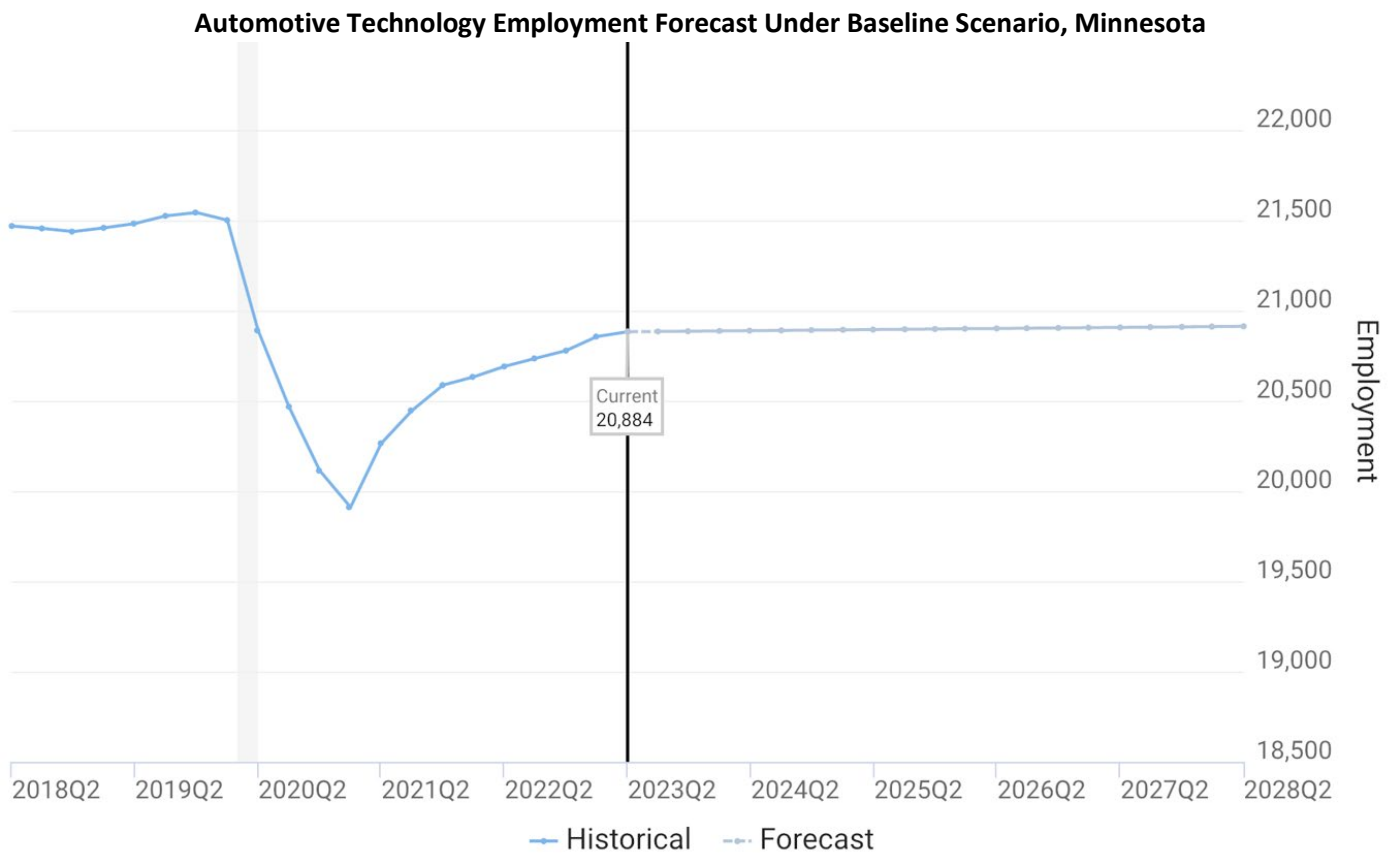
Note: Figures may not sum due to rounding.

1. Data based on a four-quarter moving average unless noted otherwise.

2. Wage data represent the average for all Covered Employment

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Minnesota’s job market cooled somewhat in 2023 from 2021 and 2022’s strong recoveries. Unemployment rates have begun to rise again as the market stabilizes and shifts in response to new realities. Forecasting future needs under current conditions with an eye to anticipated talent pipelines into Automotive Technology suggest that there may be shortages of talent across a large share of occupations in this career pathway unless more talent decides to enter the field. Current forecasts estimate about 0.1% average annual growth in overall employment through the second quarter of 2028. Following an initially strong recovery in early 2021, 2022 saw relatively flat employment growth quarter-to-quarter.



Source: JobsEQ®, Data as of 2023Q2, The shaded areas of the graph represent national recessions.

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, <http://www.chmuraecon.com/jobseq/>. Job Posting Trends section uses data from Gartner TalentNeuron Plan, accessed 1/2/2024 at talentneuronplan.gartner.com. Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2023Q4 dataset accessed at analyst.lightcast.io

Industry/Occupation Mix

Automotive Technology talent is primarily concentrated in the Automotive Repair and Maintenance industry (25.7%), decreasing in its concentration from estimates in 2022 by one percentage point. The next highest industry of employment concentration is Automobile Dealers (22.4%), but Automotive Technology talent are important across a wide range of transportation, manufacturing, and agriculture sub-industries. These top industries (Automotive Repair and Maintenance, and Automobile Dealers) account for the most total demand for this talent over the next ten years.

Top Industry Distribution for Automotive Technology Pathway Occupations in Minnesota

NAICS Code	Industry Title	CURRENT		10-YEAR DEMAND				Total Demand
		% of Occ Empl	Empl	Avg Ann Wages	Exits	Transfers	Empl Growth	
8111	Automotive Repair and Maintenance	25.7%	5,357	\$51,500	1,854	3,338	-113	5,078
4411	Automobile Dealers	22.4%	4,671	\$58,800	1,650	2,970	95	4,715
5413	Architectural, Engineering, and Related Services	5.1%	1,070	\$95,700	242	461	21	725
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	4.2%	877	\$99,300	197	376	27	600
4413	Automotive Parts, Accessories, and Tire Retailers	4.2%	867	\$47,400	292	528	-54	767
3339	Other General Purpose Machinery Manufacturing	2.7%	573	\$94,700	129	247	33	409
3331	Agriculture, Construction, and Mining Machinery Manufacturing	1.7%	352	\$94,700	78	150	13	241
5511	Management of Companies and Enterprises	1.6%	343	\$102,600	81	155	45	281
4571	Gasoline Stations	1.6%	324	\$49,000	106	190	-43	253
4231	Motor Vehicle and Motor Vehicle Parts and Supplies Merchant Wholesalers	1.5%	311	\$58,300	107	194	15	316
5417	Scientific Research and Development Services	1.3%	267	\$113,800	64	122	34	220
9211	Executive, Legislative, and Other General Government Support	1.1%	239	\$59,800	78	142	-9	212
4238	Machinery, Equipment, and Supplies Merchant Wholesalers	1.1%	236	\$71,500	57	108	0	165
3391	Medical Equipment and Supplies Manufacturing	1.1%	236	\$87,600	56	106	18	180
4552	Warehouse Clubs, Supercenters, and Other General Merchandise Retailers	1.1%	221	\$54,600	74	133	-19	188
5613	Employment Services	1.0%	217	\$79,300	58	107	12	177
3332	Industrial Machinery Manufacturing	1.0%	202	\$94,700	46	87	13	146
4853	Taxi and Limousine Service	0.9%	195	\$54,900	66	118	-14	170
3335	Metalworking Machinery Manufacturing	0.9%	193	\$80,200	41	79	2	122
3327	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing	0.9%	188	\$78,600	42	81	17	140
-	All Others	18.9%	3,944	-	1,051	1,963	37	3,051

Source: JobsEQ®
 Data as of 2023Q2. Note that occupation-by-industry wages represent adjusted national data and may not be consistent with regional, all-industry occupation wages shown elsewhere in JobsEQ.
 Note: Figures may not sum due to rounding.

Talent Demand Detail

Employment and Wage Overview

Motor Vehicle Electronic Equipment Installers, Mechanical Engineering Technicians, and Mechanical Engineers are uniquely concentrated in Minnesota to a higher degree than seen in the nation overall. On average, Automotive Technology careers pay about \$68,300 per year—about \$2,200 higher than the average wage statewide across all positions. Demand was high over the past year, seeing employment growth of 0.9% since the second quarter of 2022. Two occupations in the Automotive Technology pathway have either very low or zero unemployment, meaning that there are no unemployed trained professionals in that occupation. Mechanical Engineers has a very low unemployment rate of 0.6% while Electrical and Electronics Installers and Repairers has an unemployment rate of 0%.

		Current					5-Year Baseline Forecast				
SOC	Occupation	Empl	Avg Ann Wages ²	LQ	Unempl	Unempl Rate	Total Demand	Exits	Transfers	Empl Change	Ann % Change
49-3023	Automotive Service Technicians and Mechanics	13,467	\$54,600	0.91	179	1.3%	6,447	2,338	4,209	-100	-0.1%
17-2141	Mechanical Engineers	6,117	\$98,700	1.11	38	0.6%	2,061	630	1,229	202	0.7%
17-3027	Mechanical Engineering Technologists and Technicians	1,011	\$69,400	1.25	15	1.6%	466	174	308	-16	-0.3%
49-2096	Electronic Equipment Installers and Repairers, Motor Vehicles	244	\$57,800	1.36	4	1.7%	77	35	68	-25	-2.2%
49-2093	Electrical and Electronics Installers and Repairers, Transportation Equipment	44	\$80,900	0.28	0	n/a	21	7	13	0	0.2%
Automotive Technology Pathway		20,884	\$68,300	0.97	236	1.1%	9,072	3,184	5,828	60	0.1%
Total - All Occupations		3,075,767	\$66,100	1.00	87,730	2.9%	1,746,576	727,900	1,016,920	1,756	0.0%

Source: [JobsEQ®](#)

Data as of 2023Q2 unless noted otherwise

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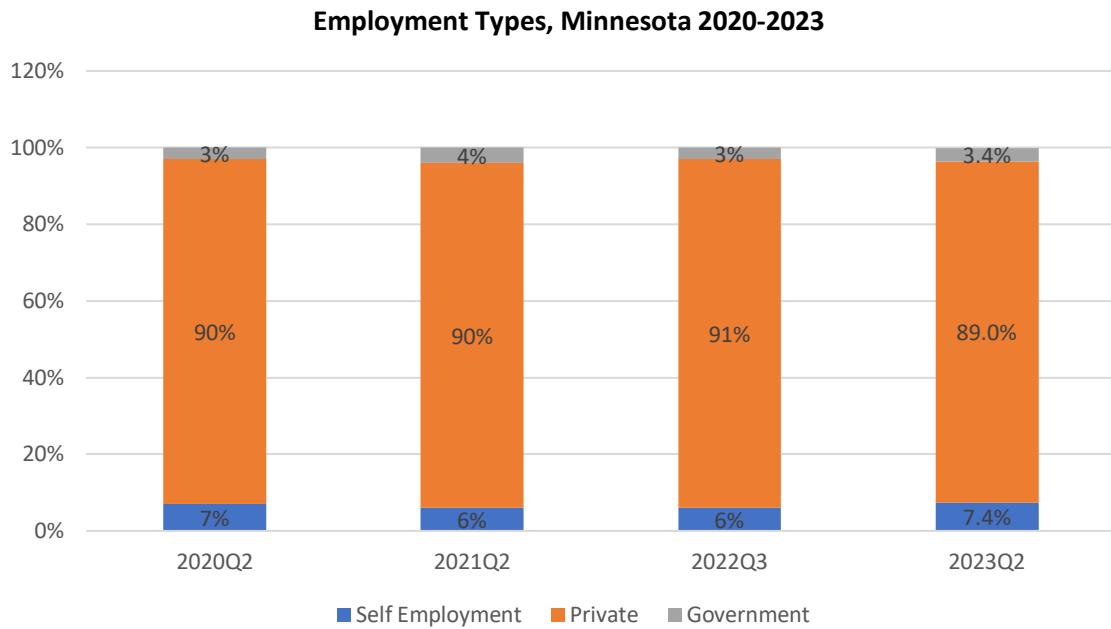
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Employment Types

About 89% of people employed in Automotive Technology in Minnesota work for private employers, while just over 7% are self-employed (a slight increase from 2022 and 2021). The remaining 3.4% work for state, federal, or local government entities.



Wage Analysis

Automotive Technology saw some significant wage gains across the pathway, with average wages rising by \$1,400 from prior estimates.¹ Entry-level wages in the pathways exceed the average entry-level wages observed across all occupations statewide by over \$13,000, paying an average of \$46,400 annually for entry-level talent. Education and training requirements vary across the different occupations in this pathway, with Mechanical Engineers requiring a Bachelor’s degree whereas Auto Electronic Equipment Installers, and Repairers typically requires a High School Diploma or equivalent. None of these occupations require previous work experience and three require some level of on-the-job training.

Automotive Technology Pathway Wages and Experience Level Requirements, MN, 2023Q2

SOC	Occupation	Empl Count	Mean	Entry Level	Experienced	Percentiles					Education and Training		
						10%	25%	50% (Median)	75%	90%	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
17-2141	Mechanical Engineers	13,467	\$98,700	\$68,300	\$114,000	\$64,500	\$76,400	\$89,600	\$107,100	\$131,800	BA	None	None
17-3027	Mechanical Engineering Technologists and Technicians	6,117	\$69,400	\$51,700	\$78,200	\$48,700	\$58,100	\$69,000	\$80,300	\$91,400	AS	None	None
49-2093	Electrical and Electronics Installers and Repairers, Transportation Equipment	1,011	\$80,900	\$67,100	\$87,800	\$65,100	\$71,600	\$79,100	\$92,200	\$100,400	Certificate	None	Long-term OJT
49-2096	Electronic Equipment Installers and Repairers, Motor Vehicles	244	\$57,800	\$41,500	\$65,900	\$39,500	\$46,600	\$57,500	\$69,700	\$78,300	HS/GED	None	Mod-term OJT
49-3023	Automotive Service Technicians and Mechanics	44	\$54,600	\$36,100	\$63,900	\$34,400	\$40,400	\$51,300	\$63,400	\$75,700	Certificate	None	Short-term OJT
	Automotive Technology Pathway	20,884	\$68,300	\$46,400	\$79,300	\$44,000	\$51,900	\$63,500	\$77,200	\$93,000			
	Total - All Occupations	3,075,767	\$66,100	\$32,800	\$82,700	\$30,300	\$37,500	\$51,700	\$77,900	\$113,000			

¹ Methodology for estimating wages changed between the 2022 and 2023 reports and are new as of the 2023Q2 dataset used here. They are estimated for the most current quarter of data available (2023Q2) using a combination of data from the Bureau of Labor Statistics and Chmura RTI wages, and no longer lag by a calendar year.

Wages in the Automotive Technology pathway vary across the three regions of Rural Greater Minnesota, Urban Greater Minnesota, and the 7-county MSP Metro. The MSP Metro region has the highest wages across experience levels and percentiles, and contains 57% of the pathway’s total statewide employment. The Rural Greater Minnesota region and the Urban Greater Minnesota region have very close average and median wage rates; Average Automotive Technology Pathway wages in the Greater Minnesota regions are nearly \$15,000 below the average pathway wages in the MSP Metro.

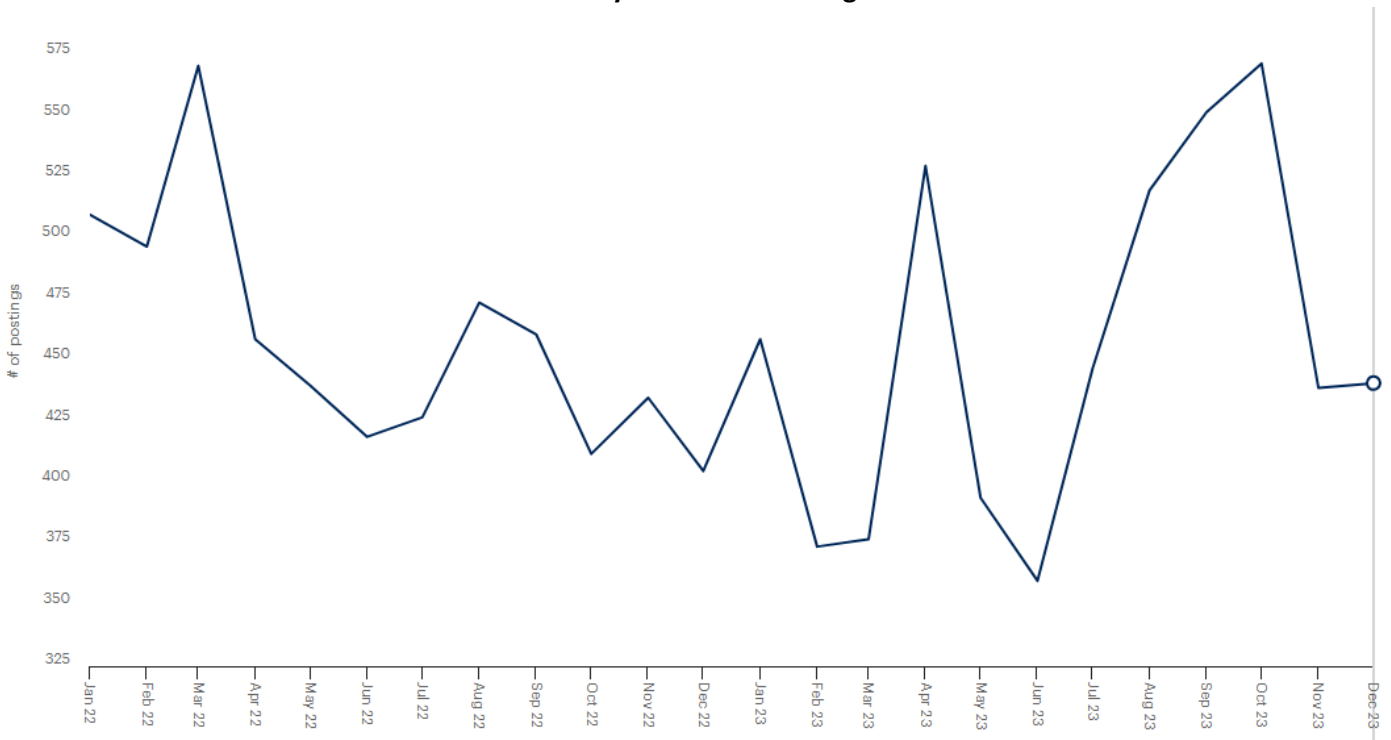
Automotive Technology Pathway Wages, 2023Q2

Region	Empl Count	Mean	Entry Level	Experienced	Percentiles				
					10%	25%	50% (Median)	75%	90%
Rural Greater Minnesota	5,475	\$59,600	\$41,800	\$68,400	\$39,900	\$46,200	\$56,400	\$67,900	\$78,100
Urban Greater Minnesota	3,157	\$59,700	\$41,400	\$68,900	\$39,400	\$46,000	\$56,600	\$70,100	\$80,600
MSP Metro	11,911	\$74,400	\$50,900	\$86,100	\$48,800	\$56,200	\$68,300	\$83,000	\$102,700
Minnesota	20,884	\$68,300	\$46,400	\$79,300	\$44,000	\$51,900	\$63,500	\$77,200	\$93,000

Job Posting Trends

Data in this section focuses on jobs newly advertised between January 1 and December 31, 2023 in Automotive Technology roles across Minnesota. Volume of total job postings, employer types (direct versus staffing), and top employers by unique job posting volumes comes from Gartner TalentNeuron; industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2023Q4 dataset. Overall, there were 5,465 new jobs advertised in Automotive Technology during this time frame, a slight decrease of -1% from the prior 12-month period (2022). Volume of positions advertised by staffing and temp agencies in the Automotive Technology pathway dropped further in 2023 to about 15% of all postings (compared to last year's 19%), implying a cooling of the market. Posted wages increased to an average \$24.55 per hour as of 2023, and there was only one hire per every one unique job posting advertised based on Lightcast estimates.

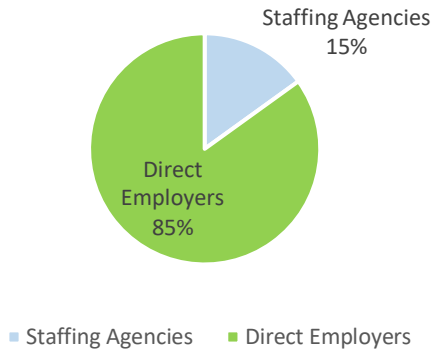
Volume of Career Pathway Online Job Postings in 2022 and 2023



Top Employers by Volume of New Job Postings, With Change from Prior Year

Employer	Percent Change between 2022 and 2023
1. Valvoline	124%
2. Army	273%
3. CARxTire & Auto	241%
4. Firestone Complete Auto Care	12%
5. Honeywell	9%
6. Tire Choice Auto Service Centers	New Entrant
7. Kwik Trip	88%
8. Polaris	-54%
9. Lube-Tech	-29%
10. TGK Automotive	195%

New Job Postings Advertised in Minnesota by Employer Type

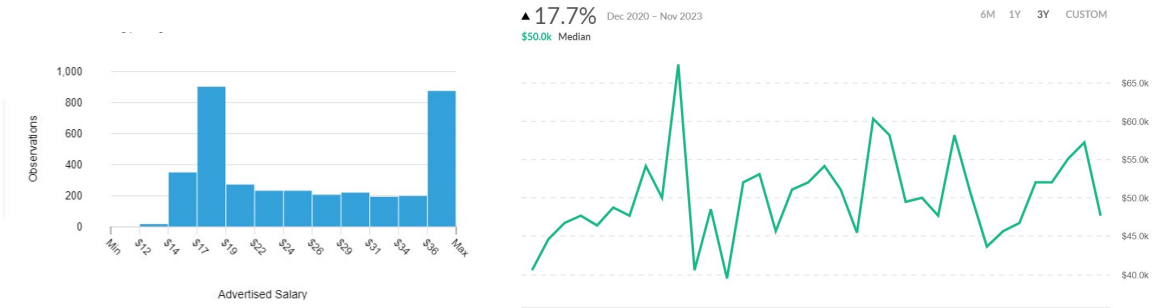


New Job Postings by Industry or Employer Type

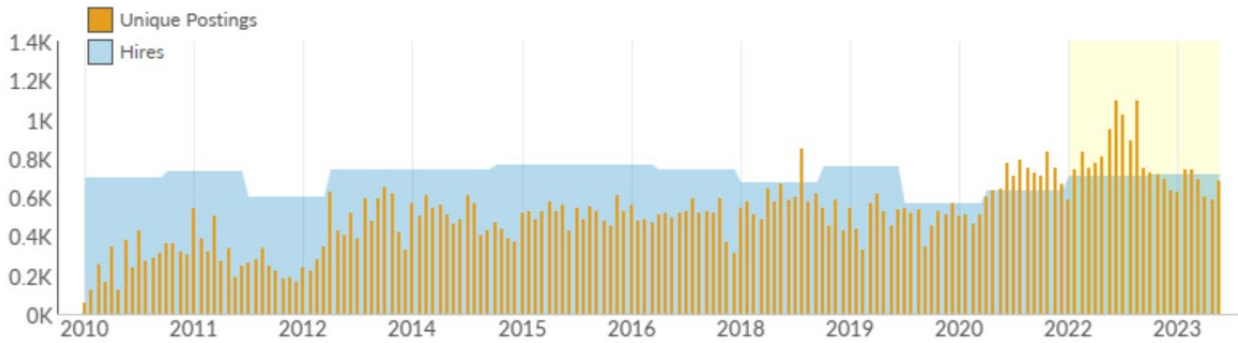
Industry	Total/Unique (Jan 2023 - Dec 2023)	Posting Intensity	Median Posting Duration
New Car Dealers	1,612 / 626	3 : 1	29 days
All Other Automotive Repair and Maintenance	2,769 / 580	5 : 1	30 days
Employment Placement Agencies	1,035 / 579	2 : 1	25 days
General Automotive Repair	1,724 / 338	5 : 1	26 days
Engineering Services	273 / 171	2 : 1	25 days
Tire Dealers	536 / 141	4 : 1	34 days
Tire Manufacturing (except Retreading)	569 / 136	4 : 1	30 days
All Other General Merchandise Retailers	761 / 136	6 : 1	30 days
Temporary Help Services	271 / 125	2 : 1	23 days
Automobile and Light Duty Motor Vehicle Manufacturing	396 / 121	3 : 1	23 days

Pathway Advertised Salary Range

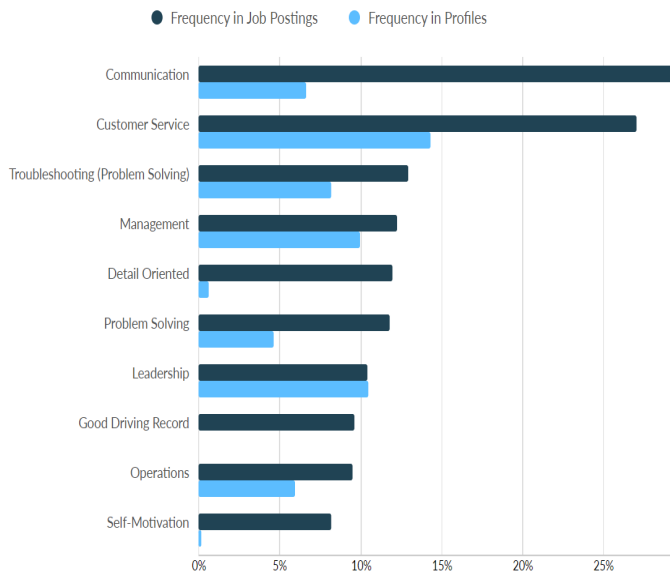
\$24.55/hr
Median Advertised Salary



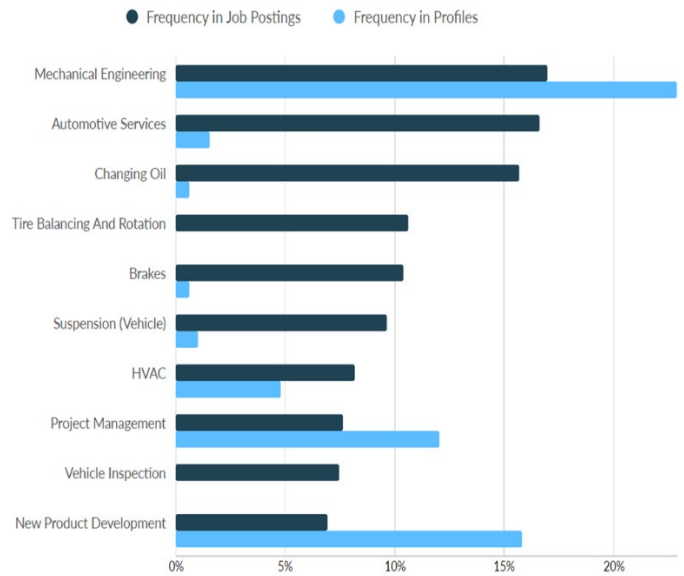
Monthly Ratio of Unique Job Postings to Estimated Hires



Top Common Skills



Top Specialized Skills



Top Certifications and Qualifications

Top Qualifications

Qualification	Postings with Qualification
Valid Driver's License	3,19
Automotive Service Excellence (ASE) Certification	90
Professional Engineer (PE) License	19
Commercial Driver's License (CDL)	16
Engineer in Training	6
Security Clearance	6
CDL Class A License	5
LEED Accredited Professional (AP)	4
CDL Class B License	3
Forklift Certification	3

Talent Supply Detail

Talent Unemployment, Underemployment, and Educational Attainment

At an overall pathway unemployment rate of 1.1%, there are about 236 unemployed Automotive Technology professionals statewide. An additional 1,357 Automotive Technology professionals are underemployed—meaning they are working in roles for which they are overqualified by education or experience.²

Automotive Technology Pathway in Minnesota

SOC	Occupation	Empl (Place of Residence)								Overall Occupation ¹		
		< High School	High School	Some College	2-Year	4-Year	Master's	PhD	Total Empl	Underemployed	Unemployed	Unempl Rate
17-2141	Mechanical Engineers	0.2%	1.9%	3.1%	8.9%	60.1%	21.8%	4.0%	5,954	N/A	38	0.6%
17-3027	Mechanical Engineering Technologists and Technicians	1.8%	17.3%	20.5%	29.6%	25.8%	3.9%	1.2%	978	274	15	1.6%
49-2093	Electrical and Electronics Installers and Repairers, Transportation Equipment	3.9%	24.1%	22.9%	27.8%	20.0%	1.0%	0.3%	43	8	0	1.0%
49-2096	Electronic Equipment Installers and Repairers, Motor Vehicles	4.0%	23.9%	22.8%	27.4%	20.7%	1.0%	0.3%	244	50	4	1.7%
49-3023	Automotive Service Technicians and Mechanics	9.1%	39.2%	19.6%	23.3%	7.7%	0.7%	0.4%	13,267	1,025	179	1.3%
	Automotive Technology Pathway	6.1%	27.1%	14.9%	19.4%	24.0%	7.0%	1.5%	20,486	1,357	236	1.1%
	Total - All Occupations	4.8%	20.9%	15.2%	14.1%	30.7%	10.4%	3.9%	2,976,622	526,677	87,730	2.9%

Source: JobsEQ®

Data as of 2023Q2 unless noted otherwise

Note: Figures may not sum due to rounding.

1. "Overall occupation" characteristics refer to attributes across all individuals in those occupations, not just those limited to the demographic categories shown in this table.

² Chmura adopts the New York Fed methodology of counting as underemployed only those who have acquired at least a Bachelor's degree and yet are working in an occupation that does not typically require a Bachelor's degree. In Occupation Diversity, the only occupations shown in the Underemployment table are "non-college jobs", as designated by the New York Fed. Per the New York Fed, "a job is classified as a college job if 50 percent or more of the people working in that job indicate that at least a bachelor's degree is necessary; otherwise, the job is classified as a non-college job."

Workforce Demographics

About 12.5% (13.8% in the prior year) of the Automotive Technology workforce is under the age of 25, and 4.5% (4% in the previous year) are over 64 years old. The Automotive Technology workforce has aged slightly from the previous year. The largest demographic group by race are White, representing 87.9% of the total pathway's workforce, with the next largest cohort being Asian talent, representing 5.2% of the workforce. Just over 6% of the pathway's workforce are Hispanic or Latinx, and 5% are female (a slight decrease from the prior year's 5.2%). The percentage of the workforce that is BIPOC has increased slightly from the previous year by 0.2 percentage points.

Automotive Technology Workforce Age Demographics, 2022Q3



Automotive Technology Workforce Race Demographics, 2022Q3



Automotive Technology Workforce Ethnicity Demographics, 2022Q3



Automotive Technology Workforce Gender Demographics, 2022Q3

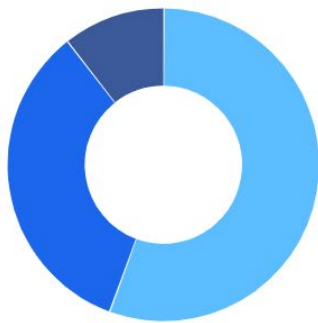


Aligned Postsecondary Programs

There were about 1,455 awards conferred at 27 different Minnesota postsecondary institutions in programs aligned to Automotive Technology careers in SY2022. Among, these 358 were at the Associate level, and 333 were certificates that could be earned in less than two years. The average school had about 50 completions, but range from two to 298 completions. No programs were delivered remotely.

Automotive Technology Postsecondary Program Awards by Level, SY2022

CIP Code	Title	Certificate < 1 Yr	Certificate 1+ but < 2 Yr	Associate's	Certificate 2+ but < 4 Yr	Bachelor's	Master's	Doctorate	Total Awards
14.1901	Mechanical Engineering	0	0	0	0	476	68	22	566
47.0604	Automobile/Automotive Mechanics Technology/Technician	65	92	133	91	0	0	0	381
15.0406	Automation Engineer Technology/Technician	21	32	100	11	0	0	0	164
15.1103	Hydraulics and Fluid Power Technology/Technician	56	21	44	39	0	0	0	160
47.0605	Diesel Mechanics Technology/Technician	0	33	35	22	0	0	0	90
47.0613	Medium/Heavy Vehicle and Truck Technology/Technician	4	9	38	21	0	0	0	72
15.0803	Automotive Engineering Technology/Technician	0	0	0	0	14	0	0	14
15.0805	Mechanical/Mechanical Engineering Technology/Technician	0	0	8	0	0	0	0	8
47.0614	Alternative Fuel Vehicle Technology/Technician	0	0	0	0	0	0	0	0
	Total	146 (10.0%)	187 (12.8%)	358 (24.6%)	184 (12.65%)	490 (33.7%)	68 (4.7%)	22 (1.5%)	1,455



Institution Type	Completions (2022)	Market Share
Public, 2-year	758	55.5%
Public, 4-year or above	462	33.8%
Private not-for-profit, 4-year or above	145	10.6%

Just over half (55.5%) of SY2022 awards were conferred at public two-year institutions, with Hennepin Technical College with the largest number of completions in SY2022, followed by the University of Minnesota, Twin Cities, comprising 21.8% and 19.7% respectively of related awards conferred. Completions are up overall by 1% from 2018.

Automotive Technology Postsecondary Program Awards by Institution, SY2022

Completions by Institution

Institution	Completions (2022)	Growth % YOY (2022)	Market Share (2022)	IPEDS Tuition & Fees (2022)	Completions Tren (2018-2022)
Hennepin Technical College	298	21.6%	21.8%	\$5,881	
University of Minnesota-Twin Cities	269	-5.6%	19.7%	\$15,859	
University of Minnesota-Duluth	109	-9.9%	8.0%	\$14,126	
University of St Thomas	100	-4.8%	7.3%	\$50,366	
Dakota County Technical College	74	17.5%	5.4%	\$6,419	
St Cloud Technical and Community College	53	39.5%	3.9%	\$6,075	
Minnesota State University-Mankato	50	-10.7%	3.7%	\$9,444	
Central Lakes College-Brainerd	45	25.0%	3.3%	\$6,140	
Century College	42	90.9%	3.1%	\$6,105	
Saint Cloud State University	34	-5.6%	2.5%	\$10,117	
Dunwoody College of Technology	33	50.0%	2.4%	\$24,611	
Saint Paul College	32	14.3%	2.3%	\$6,318	
Pine Technical & Community College	30	66.7%	2.2%	\$4,643	
South Central College	26	-31.6%	1.9%	\$6,146	
Alexandria Technical & Community College	21	-12.5%	1.5%	\$6,107	
Minnesota West Community and Technical College	21	-8.7%	1.5%	\$6,484	
Minnesota State College Southeast	21	61.5%	1.5%	\$7,490	
Ridgewater College	19	-17.4%	1.4%	\$6,114	
Riverland Community College	15	15.4%	1.1%	\$6,249	
Minnesota State Community and Technical College	14	-36.4%	1.0%	\$5,900	
Northland Community and Technical College	14	-56.3%	1.0%	\$6,244	
Bethel University	12	Insf. Data	0.9%	\$41,270	
Anoka Technical College	10	-44.4%	0.7%	\$6,075	
Lake Superior College	9	0.0%	0.7%	\$6,404	
Rochester Community and Technical College	9	50.0%	0.7%	\$5,670	
Minnesota North College	3	-78.6%	0.2%	\$5,970	
Northwest Technical College	2	-60.0%	0.1%	\$6,226	

Graduate Demographics

Postsecondary program diversity varies by program across the Automotive Technology pathway. Mechanical Engineering programs have the largest number of international students, and all programs have an overrepresentation of male students.³ Overall, the total number of international students increased by three from the previous school year. There was a greater increase for the total number of female graduates, with an additional 37 female graduates in programs aligned to the Automotive Technology pathway.

Race and Gender of Graduates Receiving Postsecondary Awards in SY2022, Minnesota

CIP Code	Description	All 2022 Graduates	International Student*	Black or African American, non-Hispanic	American Indian or Alaska Native	Asian, Native Hawaiian or Other Pacific Islander	Hispanic or Latino	White, non-Hispanic	Multiple or unknown race/ethnicity	Gender - Males	Gender - Females
14.1901	Mechanical Engineering	566	82	20	1	38	20	383	22	459	107
15.0406	Automation Engineer Technology/Technician	164	2	14	0	13	16	116	3	151	13
15.0803	Automotive Engineering Technology/Technician	14	4	0	0	0	1	9	0	13	1
15.0805	Mechanical/Mechanical Engineering Technology/Technician	8	0	0	0	0	0	8	0	8	0
15.1103	Hydraulics and Fluid Power Technology/Technician	160	0	2	0	44	14	98	2	143	17
47.0604	Automobile/Automotive Mechanics Technology/Technician	381	3	26	2	48	32	254	16	358	23
47.0605	Diesel Mechanics Technology/Technician	90	1	0	3	0	5	76	5	87	3
47.0613	Medium/Heavy Vehicle and Truck Technology/Technician	72	1	7	0	2	3	51	8	69	3
47.0614	Alternative Fuel Vehicle Technology/Technician	0	0	0	0	0	0	0	0	0	0
All Automotive Technology Postsecondary Programs		1,455	93	69	6	145	91	995	56	1,288	167

IPEDS SY2022 demographics by award conferred. Count of awards may double count individuals who obtained multiple credentials in the same calendar year. *[NCES IPEDS](#) refers to international students that do not have resident status in the United States as “nonresident aliens.” This title aligns to Federal tax definitions and according to NCES IPEDS refers to “a person who is not a citizen or national of the United States and who is in this country on a visa or temporary basis and does not have the right to remain indefinitely. Note: Nonresident aliens are reported separately, rather than in any of the racial/ethnic categories.” They are not included in calculations of BIPOC talent in this report as race and ethnicity information is not provided for these international students. The terminology of “international student” has been used in this report as it is more familiar to a common audience. <https://nces.ed.gov/ipeds/report-your-data/race-ethnicity-definitions>. For more information, view this article from Berkeley on tax filing status of international students. <https://internationaloffice.berkeley.edu/taxes/tax-filing-status>

³ [NCES IPEDS](#) refers to international students that do not have resident status in the United States as “nonresident aliens.” This title aligns to Federal tax definitions and according to NCES IPEDS refers to “a person who is not a citizen or national of the United States and who is in this country on a visa or temporary basis and does not have the right to remain indefinitely. Note: Nonresident aliens are reported separately, rather than in any of the racial/ethnic categories.” They are not included in calculations of BIPOC talent in this report as race and ethnicity information is not provided for these international students. The terminology of “international student” has been used in this report as it is more familiar to a common audience. <https://nces.ed.gov/ipeds/report-your-data/race-ethnicity-definitions>. For more information, view this article from Berkeley on tax filing status of international students. <https://internationaloffice.berkeley.edu/taxes/tax-filing-status>

Postsecondary programs aligned to all Automotive Technology pathway occupations except for Mechanical Engineering Technologists and Technicians are underproducing graduates in comparison to national benchmarks. Automotive Service Technicians, Mechanical Engineers, and Mechanical Engineering Technologists and Technicians are experiencing talent shortages. The nine aligned programs for the Automotive Technology pathway all have a low share of BIPOC graduates, and a low share of female graduates. The share of BIPOC graduates decreased by 0.3 percentage points from the 2021 school year. However, the share of graduates that are female increased from the 2021 school year (up from 9.4%). Automotive Service Technicians have the highest volume of employment and the highest number related graduates; there were 381 graduates specifically from Automotive Mechanic programs in Minnesota during the 2022 school year, plus another 90 graduates of Truck and Diesel Mechanic programs—both of which are counted in the table below.

Postsecondary Strategy Summary Table, Minnesota 2023

Occupation	Related Programs*	2023Q2 Empl	Workforce BIPOC by Race	Workforce Hispanic/Latinx	Workforce Female	Workforce Under 45	SY2022 Graduates (Certificate and AA/AS only)	Award Gap (All Award Levels)**	Graduates BIPOC by Race or Ethnicity (All Award Levels)	Graduates Female (All Award Levels)
Automotive Service Technicians and Mechanics	<ul style="list-style-type: none"> Automobile/Automotive Mechanics Technology/Technician Hydraulics and Fluid Power Technology/Technician Diesel Mechanics Technology/Technician Medium/Heavy Vehicle and Truck Technology/Technician 	13,267	11.2%	7.7%	3.0%	57.3%	703	Y	15.1%	3.2%
Mechanical Engineers	<ul style="list-style-type: none"> Mechanical Engineering 	5,954	13.8%	2.9%	7.8%	56.2%	0	Y	6.9%	7.4%
Mechanical Engineering Technologists and Technicians	<ul style="list-style-type: none"> Mechanical Engineering Technology/Technician Automotive Engineering Technology/Technician Automation Engineer Technology/Technician 	978	15.5%	3.0%	15.3%	50.9%	172	N	3.2%	0.1%
Electronic Equipment Installers and Repairers, Motor Vehicles	<ul style="list-style-type: none"> Alternative Fuel Vehicle Technology/Technician 	244	11.5%	5.2%	4.4%	53.0%	0	Y	N/A	N/A
Electrical and Electronics Installers and Repairers, Transportation Equipment	N/A	43	10.7%	4.9%	4.4%	52.8%	N/A	Y	N/A	N/A
Automotive Technology Pathway	All nine aligned programs	20,486	12.1%	6.1%	5.0%	56.6%	875	Y	25.2%	11.5%
All Occupations		2,976,622	16.0%	5.4%	48.1%	56.7%	30,032		34.1%	66.0%

NOTE: Red highlighting indicates lower than overall share of workforce or graduate pool, or existence of occupation or award gap. *Related programs may overlap among occupations within the pathway or across other Transportation career pathways. Only those programs most tightly aligned to the occupation in question are listed in this column. **Award gaps are estimated based on a wider alignment of programs than what is illustrated in this table.

Conclusion

The Automotive Technology pathway employment forecast improved slightly in 2023, now forecasting a slight increase of 0.1% average annual employment growth over the next five years. Of the five occupations included in the Automotive Technology pathway, Motor Vehicle Electronic Equipment Installers, Mechanical Engineering Technicians, and Mechanical Engineers are uniquely concentrated in Minnesota to a higher degree than seen in the nation overall, with location quotients of 1.36, 1.25, and 1.11 respectively. The percentage of people employed by private employers in Automotive Technology careers has decreased slightly from prior years (89% compared to 91% in 2022). Whereas the percentage of people who are self-employed increased from prior years from 6% in 2021 and 2022 to 7.4% in 2023. Average wages have increased significantly across the pathway statewide, rising by nearly \$1,500 from prior year estimates.

About 6.5% of workers employed in the Automotive Technology pathway in Minnesota are underemployed (about 1,357 underemployed people). While in prior years, the institution with the largest number of completions was the University of Minnesota-Twin Cities, Hennepin Technical College now has the largest number of completions in SY2022. The programs of Alternative Fuel Vehicle Technology/Technician, Mechanical Engineering Technology, and Automotive Engineering Technology are prime for exploration of certificate or two-year program growth or development given local employer demand and low award numbers. Each of the nine programs aligned with the Automotive Technology pathway have a low share of BIPOC graduates and a low share of female graduates, showcasing the opportunity to diversify student enrollment into these programs.

FAQ

How is employment forecast determined?

Forecast employment growth uses national projections from the Bureau of Labor Statistics, forecasts for 2022-2032, adapted for regional growth patterns by Chmura. Employment data are based on [occupation forecasts](#) and event-based forecasts if applicable. Forecasts are developed at the county level; therefore, for detailed (6-digit NAICS) ownership-specific industries, the forecast employment growth for a zip code or place (city, town, etc.) is taken from the forecast of the county to which it belongs.

What is a location quotient?

A location quotient (LQ) is a measurement of concentration in comparison to the nation. An LQ of 1.00 indicates a region has the same concentration of an industry (or occupation) as the nation. An LQ of 2.00 would mean the region has twice the expected employment compared to the nation and an LQ of 0.50 would mean the region has half the expected employment in comparison to the nation.

What is a cluster?

A cluster is a geographic concentration of interrelated industries or occupations. If a regional cluster has a location quotient of 1.25 or greater, the region is considered to possess a competitive advantage in that cluster.

What is separation demand?

Separation demand is the number of jobs required due to separations—labor force exits (including retirements) and turnover resulting from workers moving from one occupation into another. Note that separation demand does not include all turnover—it does not include when workers stay in the same occupation but switch employers. The total projected demand for an occupation is the sum of the separation demand and the growth demand (which is the increase or decrease of jobs in an occupation expected due to expansion or contraction of the overall number of jobs in that occupation).

What is the difference between industry wages and occupation wages?

Industry wages and occupation wages are estimated via separate data sets, often the time periods being reported do not align, and wages are defined slightly differently in the two systems (for example, certain bonuses are included in the industry wages but not the occupation wages). It is therefore common that estimates of the average industry wages and average occupation wages in a region do not match exactly.

What is NAICS?

The North American Industry Classification System (NAICS) is used to classify business establishments according to the type of economic activity. The NAICS Code comprises six levels, from the “all industry” level to the 6-digit level. The first two digits define the top level category, known as the “sector,” which is the level examined in this report.

What is SOC?

The Standard Occupational Classification system (SOC) is used to classify workers into occupational categories. All workers are classified into one of over 804 occupations according to their occupational definition. To facilitate classification, occupations are combined to form 22 major groups, 95 minor groups, and 452

occupation groups. Each occupation group includes detailed occupations requiring similar job duties, skills, education, or experience.

Who created this report?

This report was developed by RealTime Talent for the Transportation Center of Excellence. If you have questions about the data found in this report, or are interested in learning more, please contact the Senior Director of Strategic Research, Erin Olson at erin@realtimetalentmn.org or visit the RealTime Talent website at www.realtimetalent.org