

2024



SUPPLY *vs* DEMAND



PROJECTED ANNUAL DEMAND
FOR NEW ENTRANT TECHNICIANS

techforce.org



OVERVIEW

Our 2023 report highlighted two significant milestones for the transportation industry on the technician supply side. For the first time in 10 years, the number of postsecondary graduates in the automotive, collision, diesel and aviation sectors all increased. Additionally, the number of employees in three out of four of these sectors increased year-over year.

In this year's **Transportation Technician Supply & Demand Report**, there is again reason for encouragement. Once again, the number of postsecondary graduates in all four industry sectors increased. Not only that, but this year the number of employees increased in all four sectors. So, progress is being made in filling the pipeline.

That being said, challenges with the imbalance of technician supply vs. demand still exist. This is true in the Automotive, Collision and Aviation sectors, but is **most concerning in the diesel sector. The number of employed technicians there has increased quite slowly** in recent years, as will be apparent further on in this report.



***Diesel Sector Decline:
A Critical Issue***

With continued growth in the economy, as well as the trend for owners to keep their vehicles longer, we can expect that technician demand will only continue to grow.

The topic of the **impact of Electric Vehicles (EVs) on the total demand for technicians** continues to be discussed and debated. There is an impact, certainly with battery electric vehicles (BEVs) which do require less maintenance than internal combustion engine (ICE) powered vehicles. This report incorporates the latest research and projections on that topic.



Preparing for the EV Shift

Companies and organizations actively supporting students through TechForce Foundation



DAIMLER TRUCK
North America



Rental | Leasing | Logistics



MOTOR AGE



TIRE BUSINESS

VEHICLE REPAIR GROUP

TECHNICIAN DEMAND

This report addresses projected annual **demand** for **new entrant technicians** in the automotive, collision, diesel and aviation fields. By definition, new entrant technicians are those entering the occupation for the first time, as opposed to experienced technicians who may be switching employers but don't increase the number of technicians available in the occupation. These new entrant techs come not only from postsecondary training programs, but also from high school shop programs and "off-the-street", with no specific related training at all.

It is important to understand the projections below are for new entrant demand, not actual hiring. To the extent that employers are not able to hire all the technicians they seek, the numbers below will exceed the total increase in technicians actually reported by the Bureau of Labor Statistics (BLS).



This report is a combined update supplement to TechForce Foundation's Technician Demand report (Oct. 2017), and the Technician Supply report (June 2018). For detailed information on methodology and background, please see those reports.

1

Automotive Technician Employment

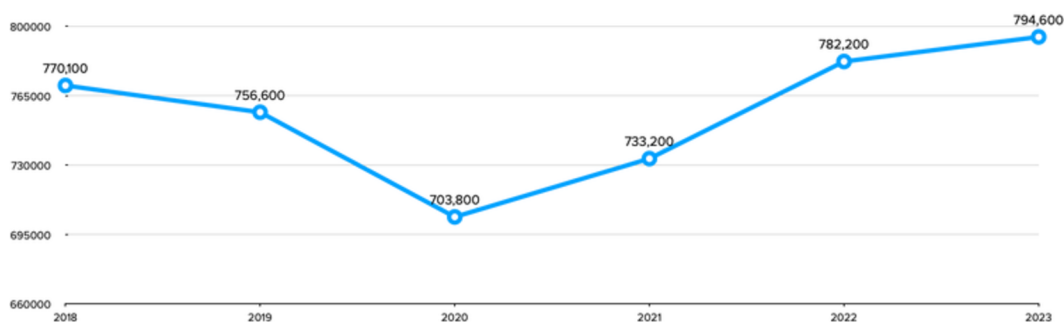
In 2021, the total number of automotive technicians employed increased for the first time since 2018. That trend continued into 2022, with another very significant increase of nearly 50,000 technicians. In the two-year period from 2020 to 2022,

that shows a growth in the automotive segment of over 78,000 technicians, corresponding to an 11.1% increase.



Growth in Automotive **11.1%**

Total Automotive Technicians Employed



2

Demand for Automotive New Entrant Technicians

Demand for new entrant technicians comes from two sources; new growth in that sector, and occupational separations. Occupational separations include both retirements and turnover from those leaving the industry for other reasons. As in past years, the demand from occupational separations far outpaces the demand from new growth. For example, between 2024 and 2028, over 349,000 positions will be needed due to operational separations, while only 87,000 will come from new growth.

Projections for New Entrant Demand (a)	2024	2025	2026	2027	2028
New positions from growth	19,865	15,289	17,144	17,297	17,409
Replacement positions from separations	65,157	70,292	70,918	71,376	71,671
Unfilled positions from 2023 - carried over to 2024	34,934				
Total New Entrant Demand	119,956	85,581	88,062	88,673	89,080

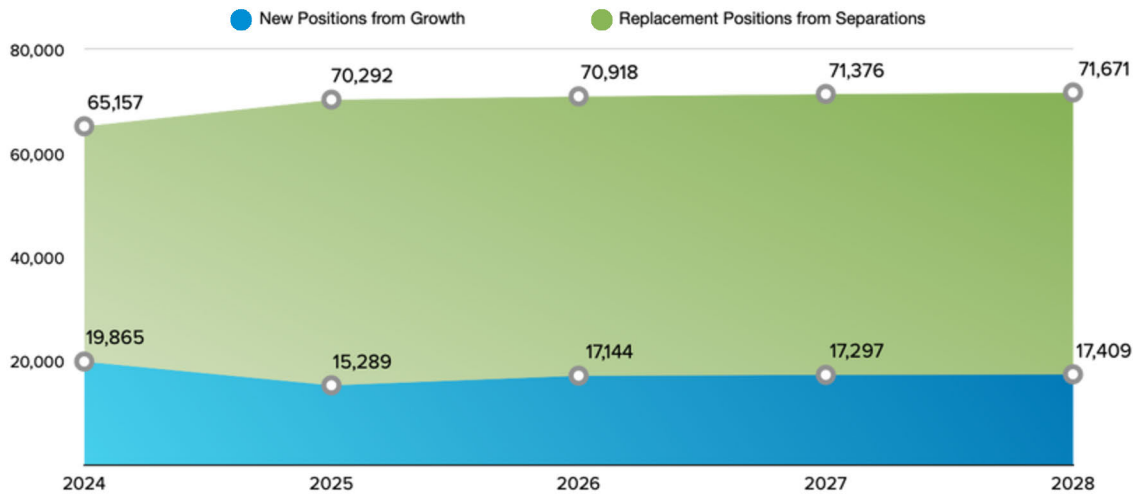
(a) Projections assume 2.5% growth in 2024, 1.8% in 2025, and 2.0% in 2026 through 2028. Estimates based on a compilation of Congressional Budget Office (CBO), The World Bank, Federal Reserve Board, Survey of Professional Forecasters (SPF) forecasts, as well as other sources and this author's projections.

The following chart visually illustrates that disparity between new entrant demand from growth vs. demand from replacement positions. The BLS Replacement Rate that quantifies occupational separations was 9.8% for 2022, and dropped substantially to 8.2% in 2023. This is a positive trend, and in this case, less is more. Fewer auto techs will be leaving their positions due to retirement or turnover.

Comparison of New vs Replacement Auto Positions

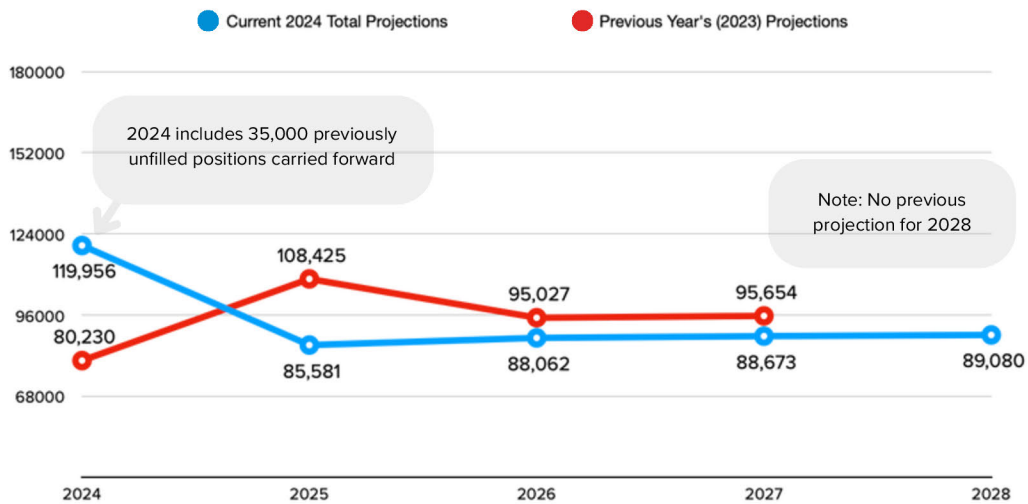
New positions are created by growth

Replacement positions are created by retirement and turnover



This next chart compares the current automotive technician new entrant demand with our previous report released in 2023.

Comparison of Current vs. Previous Auto Demand Projections



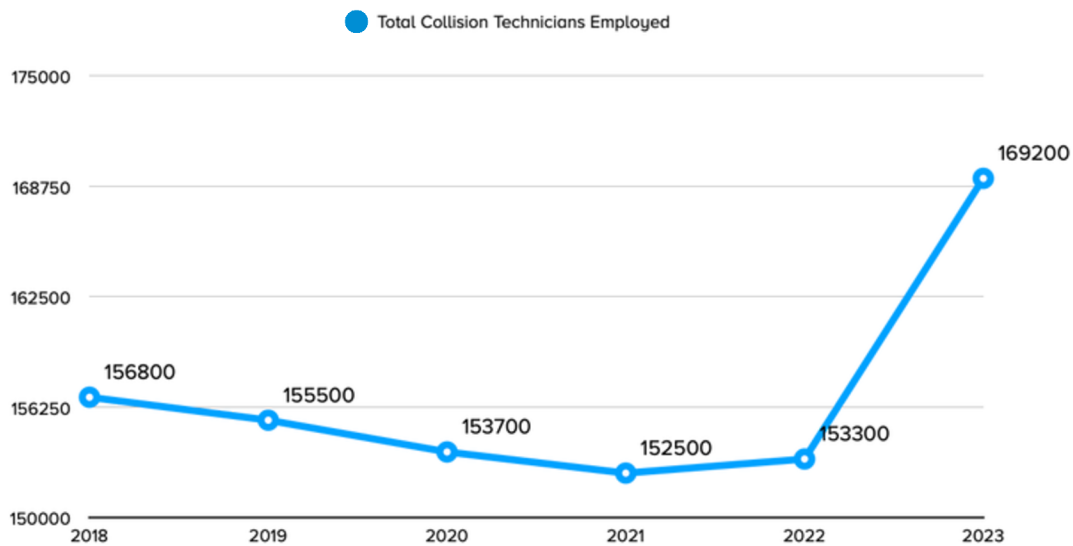
3

Collision Technician Employment

The chart below represents total industry employment of collision technicians over the past 6 years. After a downward slide in employment that lasted for six years, an upward trend began in 2022, with a gain of slightly over 0.5%.

For 2023, the sector added nearly 16,000 additional employees, equating to a very strong gain of 10.4%.

 **Growth in Collision** **10.4%**



4

Demand for Collision New Entrant Technicians

In a similar trend to that seen with automotive technicians, the majority of new entrant demand will be created by occupational separations.

Projections (a)	2024	2025	2026	2027	2028
New positions	4,230	3,269	3,699	3,773	3,848
Replacement positions	13,705	14,715	14,980	15,279	15,585
Unfilled positions from 2023 - carried over to 2024	8,234				
Total New Entrant Demand	26,169	17,984	18,678	19,052	19,433

^(a) Same economic projections as used for automotive projections.

This next chart illustrates the disproportion between new entrant demand from growth vs. demand from replacement positions in the collision sector. The BLS Replacement Rate for collision technicians has dropped from 9.5% in 2021 and 2022 to 8.1% in 2023, a positive gain in retention very similar to what was seen in the auto tech sector.

Comparison of New vs Replacement Collision Positions

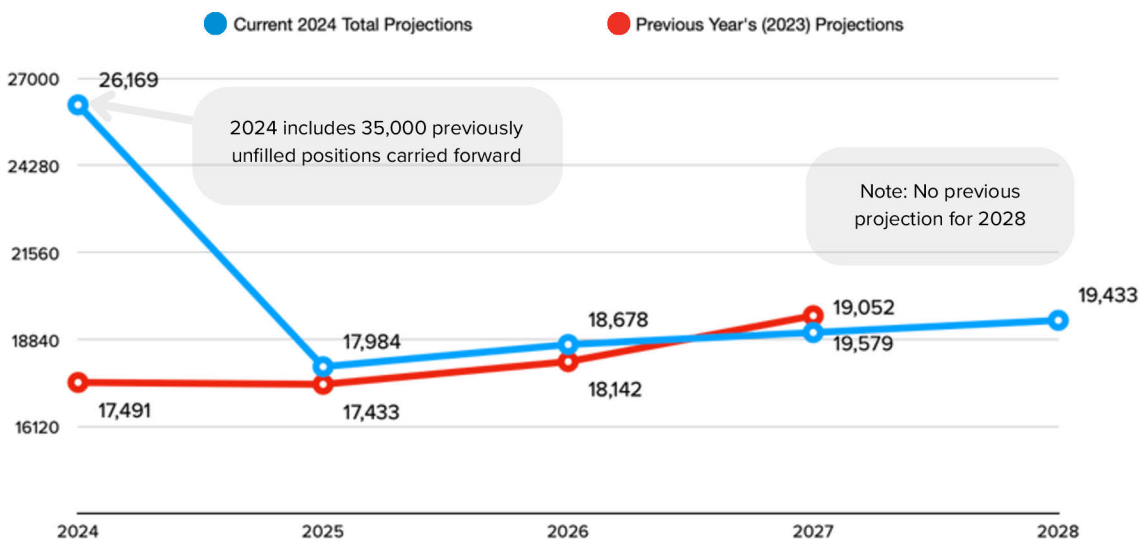
New positions are created by growth

Replacement positions are created by retirement and turnover



The following chart compares the current collision technician new entrant demand with our previous report released in 2023.

Comparison of Current vs Previous Collision Demand Positions



Diesel Technician Employment

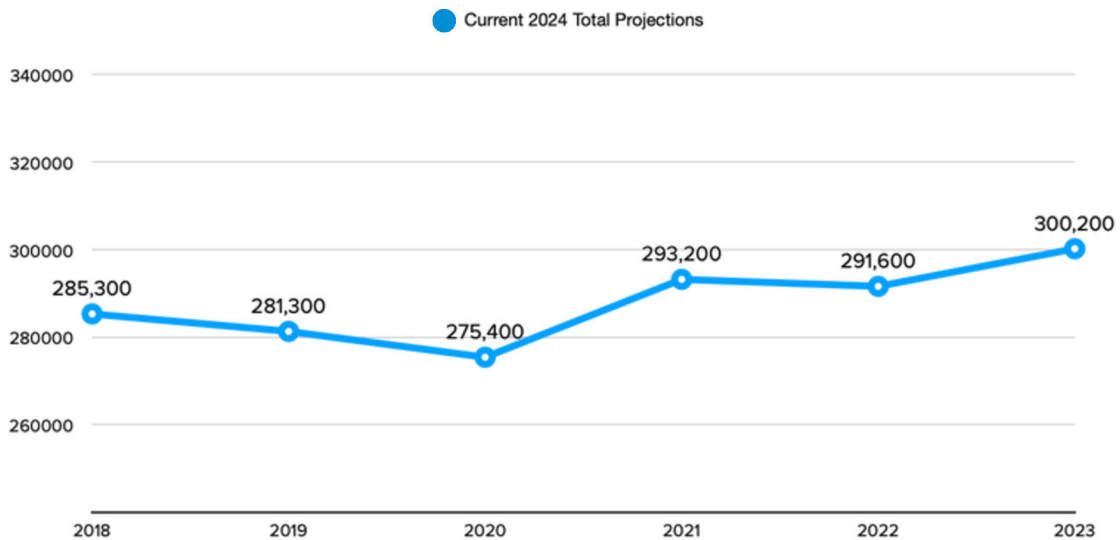
The chart below represents total industry employment of diesel technicians over the past 6 years. Employment in the diesel sector hit its peak in 2018 before dropping for the following two years. Numbers for 2021 showed a more robust increase of 6.5%. In 2022, employment slipped back slightly, but increased again year-over-year in 2023 by nearly 3% to top 300,000. However, taking the entire period

from 2018 to 2023 as a whole, the growth of employed technicians has been very slow. This period has seen a gain of only 15,000 technicians, which equates to a **total increase of just 5.22%, or 1.04% per year.**



1.04%
ANNUAL
GROWTH

Total Diesel technicians Employed



6

Demand for Diesel New Entrant Technicians

The trend as seen in the automotive and collision sectors continues in the diesel sector. Over the next 5 years,

Replacement positions created by occupational separations outpace positions created by growth at a rate of over 4 to 1.



High Diesel Replacement Needs

Projections (a)	2024	2025	2026	2027	2028
New Positions	9,606	9,711	9,958	10,212	10,473
Replacement Positions	24,316	30,846	31,633	32,439	33,267
Unfilled positions from 2022 & 2023 carried over to 2024	46,695	Yet To Be Determined			
Total New Entrant Demand	80,618	40,557	41,591	42,652	43,739

(a) Same economic projections as used for automotive projections.

This next chart illustrates that imbalance between new entrant demand from growth vs. from replacement positions in the diesel sector. The BLS Replacement Rate for diesel technicians was at 8.2% for 2022, and it dropped slightly in 2023 to 8.1%. This maintains a positive trend for the sector, with the percentage of labor force exits continuing to drop from its high of 9.1% in 2020.

Comparison of New vs Replacement Positions

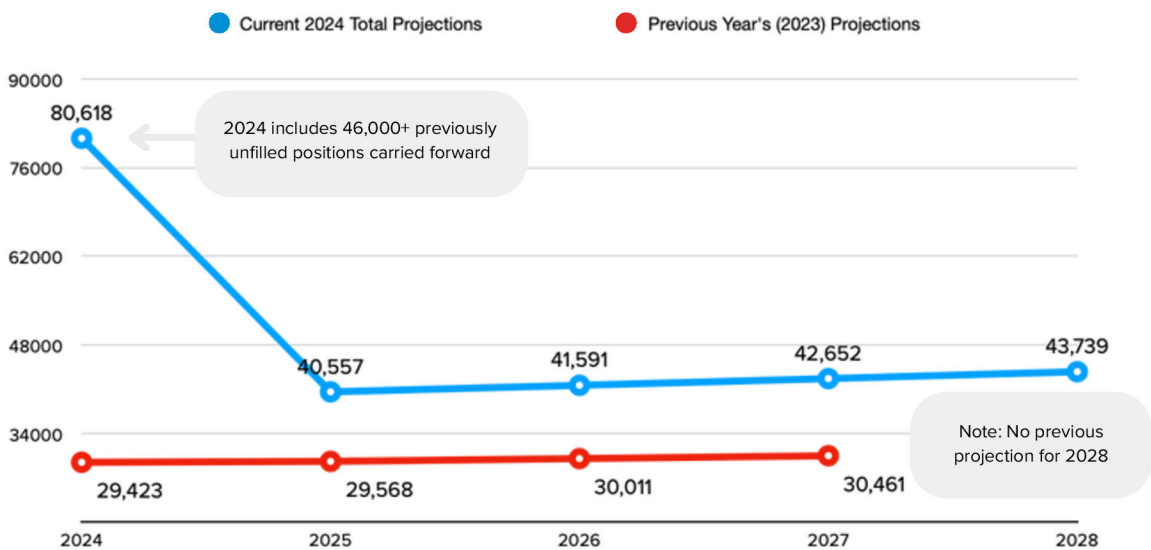
New positions are created by growth

Replacement positions are created by retirement and turnover



The following chart compares last year’s diesel new entrant demand projections to this year’s. What is very apparent is the significant increase in projection numbers for 2024, as seen in the previous chart on technician demand. This is due to the trend of relatively low annual increases in the diesel tech population, and particularly in 2022 - 2023, when the projections were for 55,000 new techs needed, but only 8,600 were added. That deficiency is now ramping up the new entry-level techs needed in 2024.

Comparison of New Diesel Tech Projections vs. Prior Numbers



7 Aviation Technician Employment

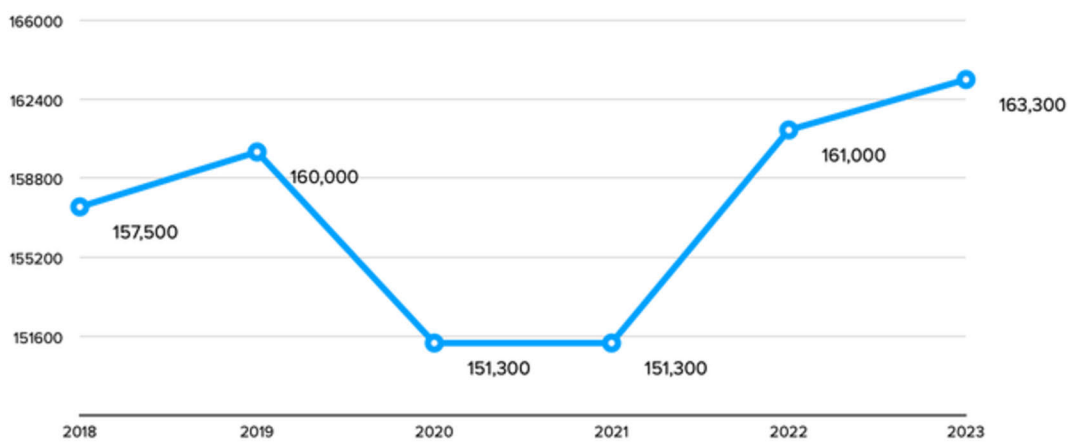
This chart represents total industry employment of aviation technicians over the past 6 years. **The trajectory of employment gains from 2022 to 2023** closely mirror what was seen from 2018 to 2019, with the 2020 to 2021 period being the outlier, related to COVID.



*Aviation Tech
Growth Steady*

Total Aviation Technicians

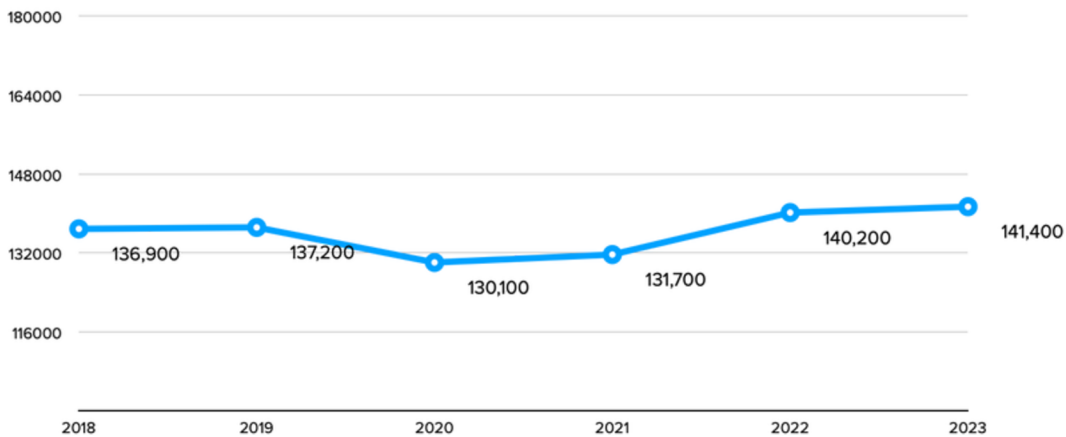
Employed by Year



Demand for Aviation New Entrant Technicians

In the aviation sector, we have two distinct job profiles, the aircraft technician and the avionics technician. Therefore, we have broken down the employment numbers and projected demand requirements according to those roles.

Aircraft Technicians Employed by Year



The following chart illustrates projections for the aircraft technician role. New entrant demand remains virtually level, year-over-year for the next 5 years, due to the projection methodology explained in footnote (a) below the chart.



**Consistent
Need for
Avionics
Techs**

Projections for New Entrant Demand (a)	2024	2025	2026	2027	2028
New Positions from growth	15,867	15,867	15,867	15,867	15,867
Replacement positions from separations	12,084	12,151	12,218	12,284	12,351
Total New Entrant Demand	27,951	28,018	28,085	28,151	28,218

(a) Projections for 2024-2028 are based on a compilation of data from the BLS occupational separations and openings, projected 2023-33 report: <https://www.bls.gov/emp/tables/occupational-separations-and-openings.htm> and the Oct. 2024 Boeing report - Pilot and Technician Outlook 2024-2043: <https://www.boeing.com/commercial/market/pilot-technician-outlook#overview> Projections shown are based on straight-line annual calculations provided by those organizations with no interpretation or factoring of year-to-year fluctuations.

9

Avionics Technician Employment

The chart below represents total industry employment of avionics technicians over the past 6 years. While the low point of employment for aircraft technicians came in 2020, for avionics technicians, it was a year later. However,

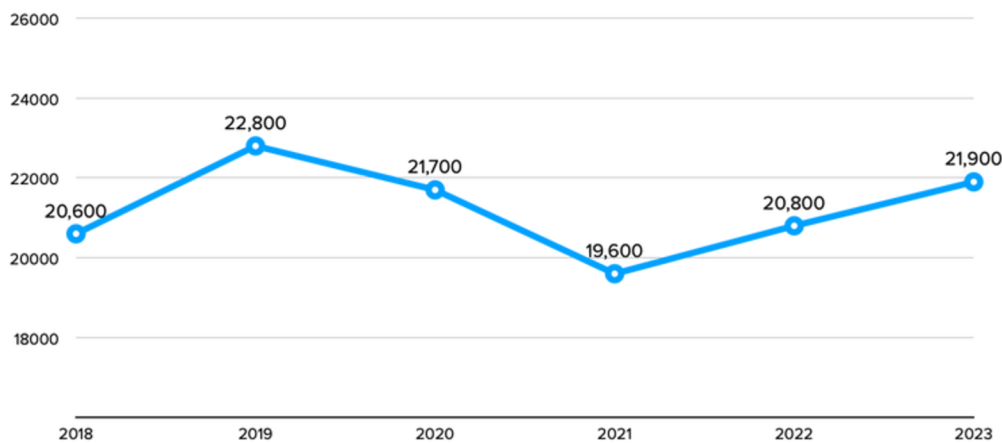
both segments show growth in employment year-over-year for 2022 and 2023.



*Avionics Tech
Employment Recovery*

Avionics Technicians

Employed by Year



10

Demand for Avionics New Entrant Technicians

In a similar trend as seen with aviation technicians, new entrant demand for avionics technicians remains at a very consistent level over the next 5 years due to the projection methodology.

Projections for New Entrant Demand (a)	2024	2025	2026	2027	2028
New Positions from growth	166	166	166	166	166
Replacement positions from separations	1,655	1,667	1,680	1,692	1,705
Total New Entrant Demand	1,821	1,833	1,846	1,858	1,871

(a) Projections for 2024-2028 are based on a compilation of data from the BLS occupational separations and openings, projected 2023-33 report: <https://www.bls.gov/emp/tables/occupational-separations-and-openings.htm> and the Oct. 2024 Boeing report - Pilot and Technician Outlook 2024-2043: <https://www.boeing.com/commercial/market/pilot-technician-outlook#overview> Projections shown are based on straight-line annual calculations provided by those organizations with no interpretation or factoring of year-to-year fluctuations.

Demand for Aircraft & Avionics New Entrant Technicians Combined

The following chart provides a picture of new entrant demand for both aviation sectors combined.

Projections for New Entrant Demand (a)	2024	2025	2026	2027	2028
New Positions from growth	16,033	16,033	16,033	16,033	16,033
Replacement positions from separations	13,739	13,818	13,897	13,977	14,056
Total New Entrant Demand	29,772	29,851	29,930	30,010	30,089

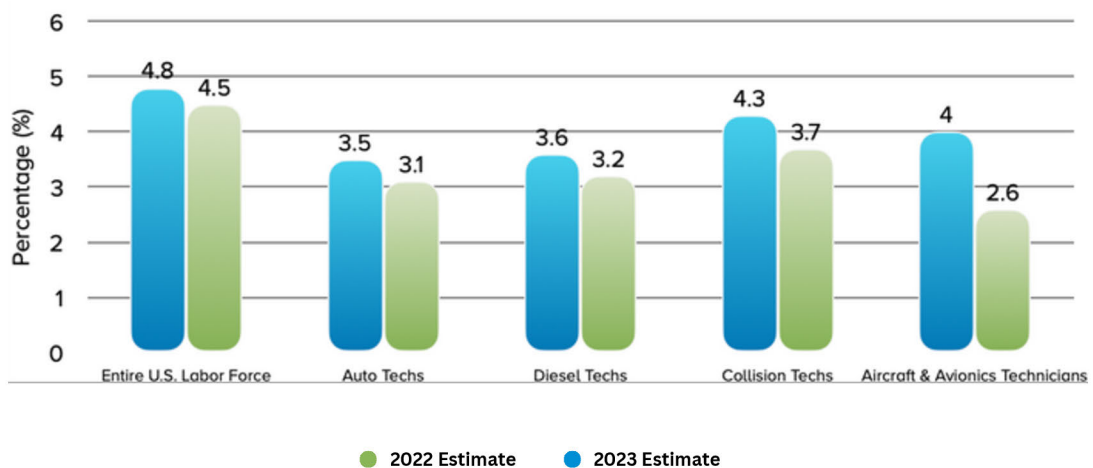
Graying of the technician workforce as related to technician demand

For four consecutive years now, the data shows that the size of the transportation industry technician workforce is being affected by **retirements and other departures** to a lesser degree than the entire US Labor Force as a whole. **Aircraft and avionics technicians show the lowest exit rate.**

Retirements Impact Technician Workforce

Comparison of Estimated Labor Force Exits

2023 to 2033



TECHNICIAN SUPPLY

This report provides completion data for automotive, collision, diesel, aircraft and avionics technicians for the 2022-2023 school year from IPEDS. For information on the value and limitations of these numbers, please see the footnotes referenced on page 5 of this report.



1

Postsecondary Automotive Completions

Following the **positive trend begun in 2022**, automotive completions in 2023 once again showed a strong gain, with a **very strong increase of over 3600 students** year-over-year. **This equates to a 10.7% increase.**

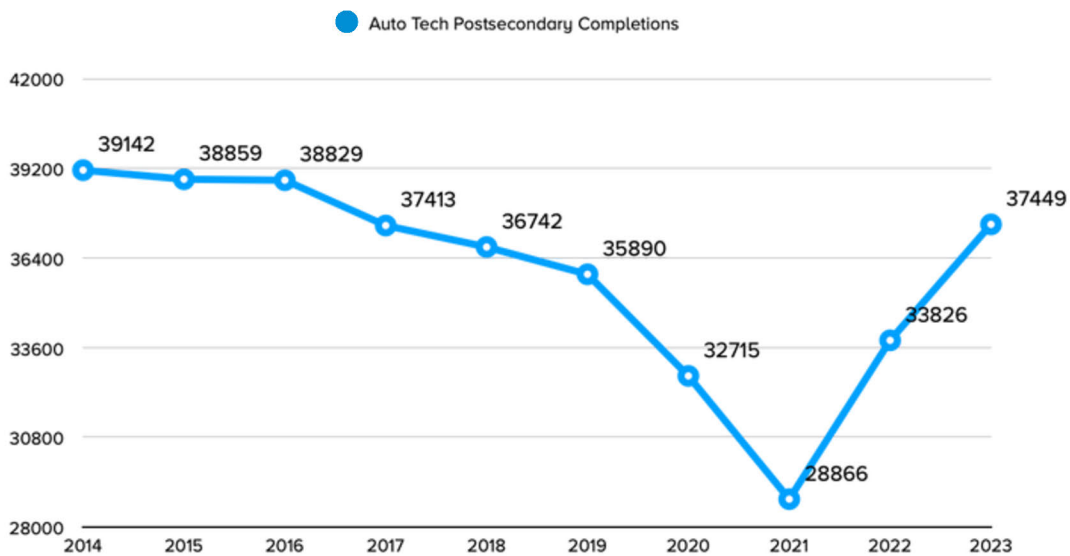


Sustaining Workforce Growth

10.7% increase

Auto Tech Postsecondary Completions

2014-2023



In looking at the various school types that offer automotive programs, Public, 2-year schools and Private, for-profit 2-year schools graduate the highest number of students (completions). This follows the consistent trend of the past several years.

IPEDS is the Integrated Postsecondary Education Data System. It is a system of interrelated surveys conducted annually by the U.S. Department of Education's National Center for Education Statistics (NCES). IPEDS gathers information from every college, university, and technical and vocational institution that participates in the federal student financial aid programs.

Postsecondary Automotive Completions by Sector (a) 2023

Sector	# Institutions	Auto Completions
Public, 4-year or above	108	5,654
Public, 2-year	491	18,740
Public, less-than 2-year	66	1103
Total Public	665	25,497
Private not-for-profit, 4-year or above	10	461
Private for-profit, 4-year or above	2	146
Private not-for-profit, 2-year	7	257
Private for-profit, 2-year	36	8745
Private not-for-profit, less-than 2-year	3	34
Private for-profit, less-than 2-year	28	2,309
Total Private	86	11,952
GRAND TOTAL	751	37,449

(a) Source: IPEDS database. Completions from first major, Automobile/Automotive Mechanics Technology/Technician programs, Bachelor's degrees and Associate's degrees as well as certificates below the B.A. level.
<https://nces.ed.gov/ipeds/datacenter/login.aspx>

In 2023, the 10 largest providers of postsecondary automotive completions were:

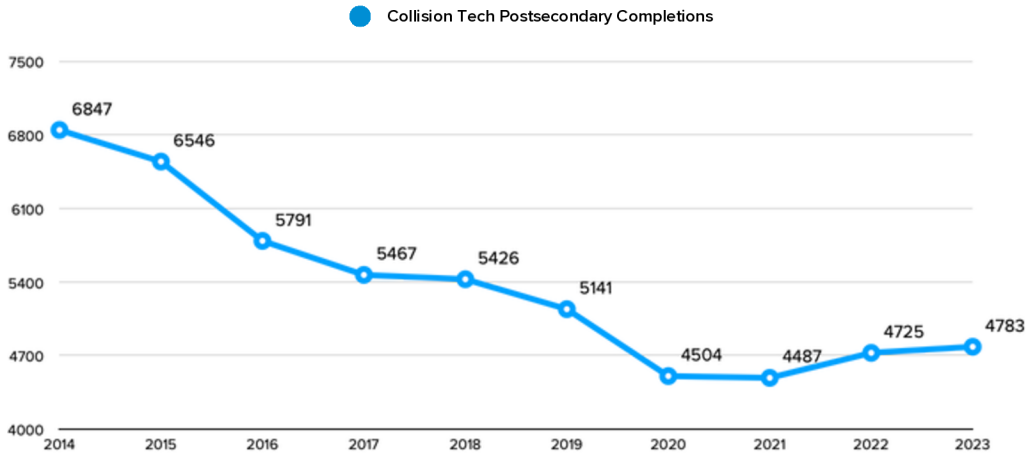
Top 10 Postsecondary Automotive Providers 2023

Institution	Automotive Completions
Universal Technical Institute of Arizona Inc	693
Universal Technical Institute-Dallas Fort Worth	669
Ivy Tech Community College	651
Universal Technical Institute-Auto Motorcycle & Marine Mechanics Institute Division-Orlando	568
Universal Technical Institute of Texas Inc.	566
NASCAR Technical Institute	535
Universal Technical Institute of California Inc	516
GateWay Community College	504
Universal Technical Institute of Northern California Inc	477
Universal Technical Institute-Southern California	463

2

Postsecondary Collision Completions

As with automotive completions, collision completions had previously been dropping over the past several years. Also, as with automotive completions, they now have a two-year stretch of an increased number of completions. The increase from 2022, is small, at just 58 students, however, it is an increase, nonetheless.



Again, as was seen with automotive programs, Public, 2-year schools and Private, for-profit 2-year schools are graduating the highest number of collision program students.

Postsecondary Collision Completions by Sector (a) 2023

Sector	# Institutions	Collision Completions
Public, 4-year or above	46	720
Public, 2-year	188	2,433
Public, less-than 2-year	29	298
Total Public	263	3,451
Private not-for-profit, 4-year or above	3	27
Private for-profit, 4-year or above	1	2
Private not-for-profit, 2-year	1	23
Private for-profit, 2-year	16	1,042
Private for-profit, less-than 2-year	3	238
Total Private	24	1,332
GRAND TOTAL	287	4,783

(a) Source: IPEDS database. Completions from first major, Autobody/Collision and Repair Technology/Technician programs, Bachelor's and Associate's degrees as well as certificates below the B.A. level.

<https://nces.ed.gov/ipeds/datacenter/login.aspx>

In 2023, the 10 largest providers of postsecondary collision completions were:

Top 10 Postsecondary Collision Providers 2023

Institution	Collision Completions
Dallas College	131
WyoTech	112
Universal Technical Institute of Texas Inc.	108
Automeca Technical College-Bayamon	104
Lincoln College of Technology-Nashville	100
Lincoln College of Technology-Grand Prairie	88
Mech-Tech College	88
Universal Technical Institute-Southern California	88
Lincoln College of Technology-Denver	77
Lincoln College of Technology-Melrose Park	74

3

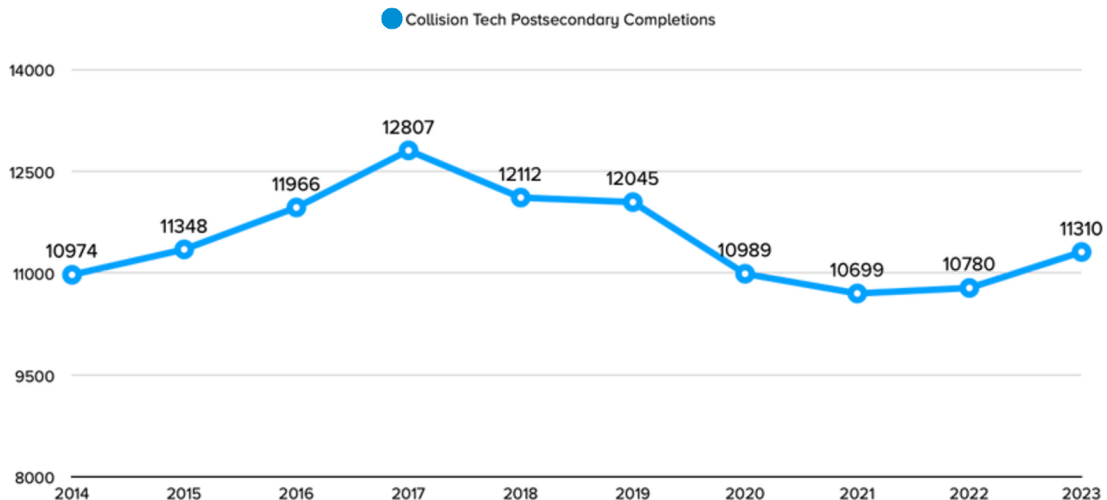
Postsecondary Diesel Completions

The number of diesel completions bottomed out in 2021, after several years of falling numbers. They then gained a slight 1% increase in 2022. For 2023, **the sector enjoyed a healthy rise increase of 530 completions, equating to a 5% increase.**



5%

Increase in Diesel Completions



Not surprisingly, as with automotive and collision, the Public, 2-year schools and Private, for-profit 2-year schools graduate the highest number of students in the diesel sector. This is a trend unlikely to change any time in the near future.

Postsecondary Diesel Completions by Sector (a) 2023

Sector	# Institutions	Diesel Completions
Public, 4-year or above	58	1,371
Public, 2-year	217	5,843
Public, less-than 2-year	32	432
Total Public	307	7,646
Private not-for-profit, 4-year or above	3	243
Private for-profit, 4-year or above	2	118
Private not-for-profit, 2-year	4	189
Private for-profit, 2-year	28	2,912
Private not-for-profit, less-than 2-year	0	0
Private for-profit, less-than 2-year	7	202
Total Private	44	3,664
GRAND TOTAL	351	11,310

(a) Source: IPEDS database. Completions from first major, Diesel Mechanics Technology/Technician Bachelor's degrees and Associate's degrees as well as certificates below the B.A. level. <https://nces.ed.gov/ipeds/datacenter/login.aspx>

In 2023, the 10 largest providers of postsecondary diesel completions were:

Top 10 Postsecondary Diesel Providers 2023

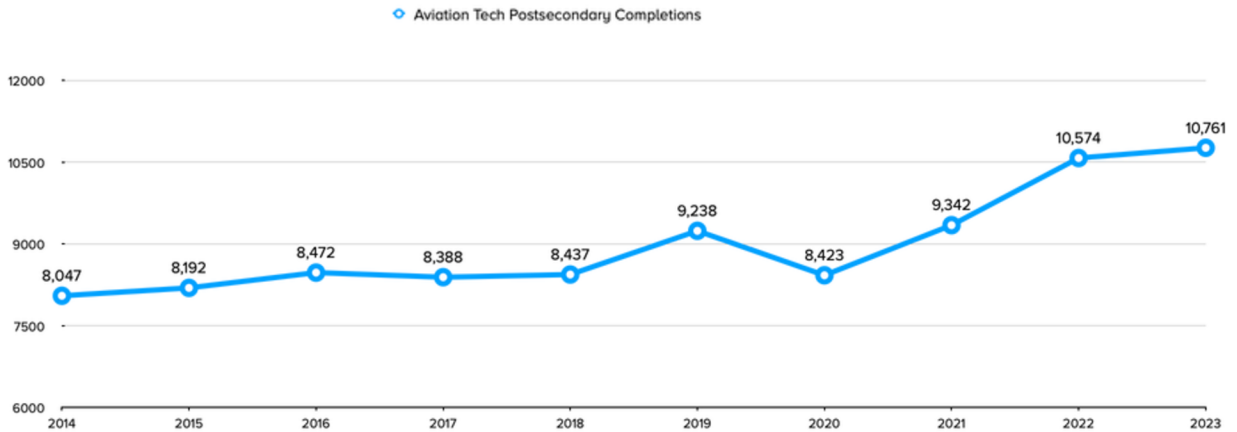
Institution	Diesel Completions
WyoTech	476
University of Northwestern Ohio	291
Universal Technical Institute of Arizona Inc	254
Gateway Community and Technical College	195
Texas State Technical College	176
Universal Technical Institute-Dallas Fort Worth	168
Universal Technical Institute of Texas Inc.	162
St Philip's College	160
Bates Technical College	155
Universal Technical Institute of Illinois Inc	153

4

Postsecondary Aviation Completions

This is the second year we are tracking postsecondary aviation completions. After bottoming out in 2020, the number of completions continues to increase, although at a relatively modest rate of just under 2%.

 **2%** *Rise in Aviation Completions*



Following the trend set by the other three sectors, Public, 2-year schools and Private, for-profit 2-year schools continue to graduate the highest number of students in the aviation sector.

Postsecondary Aviation Completions by Sector (a) 2023

Sector	# Institutions	Aviation Completions
Public, 4-year or above	27	1,523
Public, 2-year	95	4,744
Public, less-than 2-year	8	458
Total Public	130	6,725
Private for-profit, 4-year or above	2	154
Private not-for-profit, 4-year or above	6	758
Private not-for-profit, 2-year	2	62
Private for-profit, 2-year	22	2,964
Private for-profit, less-than 2-year	1	98
Total Private	33	4,036
GRAND TOTAL	163	10,761

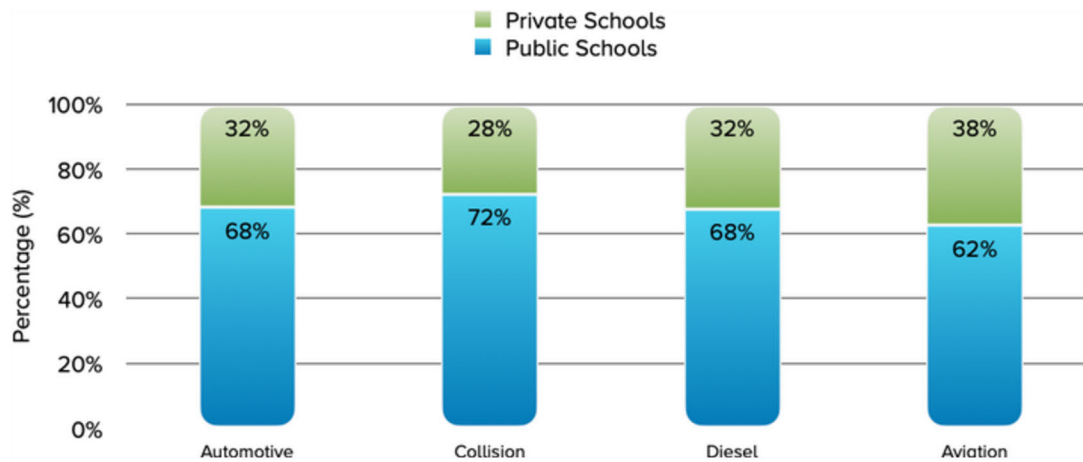
(a) Source: IPEDS database. Completions from first major, Airframe Mechanics and Aircraft Maintenance Technology/Technician Associate's degree, First major Airframe Mechanics and Aircraft Maintenance Technology/Technician Bachelor's degree, First major Airframe Mechanics and Aircraft Maintenance Technology/Technician Certificates below the baccalaureate total. <https://nces.ed.gov/ipeds/datacenter/login.aspx>

Listed below, are the top-performing schools in the aviation sector. Note that this represents graduates from both the avionics and aviation technician programs combined.

Top 10 Postsecondary Aviation Providers 2023

Institution	Aviation Completions
Antelope Valley Community College District	459
Embry-Riddle Aeronautical University-Worldwide	411
Wichita State University-Campus of Applied Sciences and Technology	380
National Aviation Academy of Tampa Bay	374
MIAT College of Technology	306
Aviation Institute of Maintenance-Atlanta	232
George T Baker Aviation Technical College	231
Enterprise State Community College	226
Vaughn College of Aeronautics and Technology	220
Central Georgia Technical College	211

The following chart displays the distribution of graduates (completions) between public schools and private schools in 2023. As in the past, the total number of graduates from public schools is greater than with private schools, due to the large number of public schools. However private schools average a higher number of graduates annually per school. For 2023, this was 112 graduates in comparison to the average of 32 graduates in public schools.



CONCLUSION

CONCLUSION

Certainly, there is reason for encouragement in this year's report. As was stated previously, we have seen the number of technicians employed increasing year-over year.

The technician workforce in the sectors we measure has grown by 39,200 employees from 2022 to 2023. That equates to a 2.8% increase; once again **outpacing the growth of the overall US Labor Force at 2.0%**, which is great news.



*Transportation Tech
Workforce Growth*

2.8% increase

Of course, seeing the number of graduates from technical programs increase year-over-year in all sectors is very important, and foretells our ability to “fill the pipeline” over the long-term. It is an indication that the interest young men and women have in pursuing an education in the skilled trades vs. a four-year college is increasing.

What is needed is to continue to work to accelerate the rate of that interest. The gains we are seeing are encouraging, but certainly not sufficient to meet the ever-growing demand we are experiencing.

The five-year demand for new-entry technicians across the board was close to a million two years ago. Last year, we were encouraged to see it drop to just under 800,000. However, this past year it has increased again to nearly a million. Evidence that we must continue to push hard as an industry if we are going to secure our future.

CONCLUSION

Core strategies to address the technician shortage:

- Engage with students early; beginning in middle school and continuing through postsecondary education
- Cultivate relationships on the local level with school instructors and administrators: visits, donations, training aids, advisory boards
- Build awareness of the rewarding career opportunities available as transportation technicians and subsequent career paths not only with students, but with their parents, school faculty, administrators and local community leaders
- Utilize internships, mentorships and apprenticeships to connect with and engage students
- Encourage enrollment in post-secondary training programs to students as an effective means of jump starting their careers
- Contribute to the funding of scholarships for technical training
- Provide support for non-profit organizations engaged in addressing the technician shortage, both through active partnerships and with financial contributions



QUICK FACTS

QUICK FACTS

ON INDUSTRY DEMAND FOR NEW TECHS

Between now and 2028



NEARLY ONE MILLION
TOTAL TECHNICIANS NEEDED

(auto-diesel-collision-aviation-avionics)

between 2024 and 2028

971000

AUTOMOTIVE
TECHS

over

471000

new entrant techs
will be needed

COLLISION
TECHS

over

101000

new entrant techs
will be needed

AIRCRAFT &
AVIONICS
TECHS

nearly

150000

new entrant techs
will be needed

DIESEL
TECHS

over

249000

new entrant techs
will be needed

APPENDIX A

Methodology to determine technician demand reductions attributed to Electric Vehicles

The methodology utilized in this year's report to determine the impact of electric vehicles (EVs) on automotive technician demand was similar to the methodology used for the 2023 report. However, this year, the decision was made to remove plug-in hybrid electric vehicles (PHEVs) from the calculations. Recent studies have shown that there is not a significant reduction in maintenance costs with PHEVs. Therefore, we have focused on only maintenance costs associated with battery-electric vehicles (BEVs).

Light Vehicle Sales Forecast numbers used were those provided by

Hedges Company

<https://tinyurl.com/Hedges-Company>

Sales forecast numbers for EVs were referenced from the following sources:

Statista

<https://tinyurl.com/Statista-Sales-Outlook>

Cox Automotive/Bloomberg

<https://tinyurl.com/Cox-Automotive-Bloomberg>

Progressive

<https://tinyurl.com/Progressive-Lifelanes>

EV Volumes

<https://tinyurl.com/EV-Volumes-website>

Actual maintenance cost comparisons between BEVs and internal combustion engine (ICE) powered vehicles remain somewhat sparse, and difficult to locate. The final numbers utilized in our calculations were a compilation averaging data from the following two organizations and their respective sources.

EVConnect

<https://tinyurl.com/EV-Connect-website>

AAA

<https://tinyurl.com/AAA-website>

The cost savings in maintenance seen with BEV vehicles was then reduced by extracting the labor-only costs from the total costs (parts & labor). An industry average parts to labor ratio of .8 to 1 was utilized. The resulting savings was then applied to all BEV vehicles forecast to be included in the total vehicles in operation (VIO) for 2024 to 2028.

Average savings in maintenance costs for BEV vehicles over ICE vehicles			
Powertrain Type	EVConnect.com	AAA	Averaged
BEV	40.0%	25.8%	32.9%
ICE			

With parts to labor ratio of .8 to 1, for every dollar of BEV service, we will only use 56%, or 56 cents of every ICE dollar.

Final calculation for reduction in techs needed due to BEV vehicle population

Labor is 56 cents out of every BEV maintenance dollar
 $56 \text{ cents} \times .323 = 18\%$ reduced labor cost for BEV vehicles

As EVs, and specifically BEVs gradually become a higher percentage of vehicles on the road, it is a logical question to ask what impact that will have on technician demand in the automotive workforce.

While there is an impact, it remains relatively small for the near future. Consider that in 2023, the BEV percentage of total light vehicle sales was approximately 11%. Although that is relatively significant when looked at by itself, we are looking at an exponentially higher number of total vehicles on the road. According to a May 2024 article by S&P Global Mobility,¹ the average age of passenger cars and light trucks on the road is 12.6 years; the highest it has ever been. When you look at that entire vehicle population, you are talking about nearly 297 million vehicles. On the other hand, the cumulative total of BEVs ever sold, is approximately 6 million vehicles, representing just over 2% of the total vehicle population. Then consider that the labor time saved on BEV vehicles is only 18%, and you get an idea that the overall impact is negligible. Of course, that will change over time, but by 2031, we project the impact will only be about 10% to the total technician labor force needed.

(1) Average age of vehicles hits new record in 2024: <https://www.spglobal.com/mobility/en/research-analysis/average-age-vehicles-united-states-2024.html>

Registered Vehicles in U.S. by Year	VIO by year	VIO % increase per year	Annual Light Vehicle Sales	Light Vehicle % increase per year	Light Vehicle Sales as % of VIO	# of Light Vehicle Sales that are BEV	% of Light Vehicle Sales that are BEV	# of Cumulative BEV Vehicles in VIO	% of Cumulative BEV Vehicles in VIO	Impact to Light Vehicle Technician Demand
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2012	248,700,000	0.000	14,433,200	0.00%	5.80%	14,587	0.10%	14,587	0.01%	0.00%
2013	248,900,000	0.080	15,530,100	7.6%	6.24%	48,094	0.31%	62,681	0.03%	0.02%
2014	252,600,000	1.486	16,452,000	5.9%	6.51%	63,525	0.39%	126,206	0.05%	0.04%
2015	257,900,000	2.098	17,408,000	5.8%	6.75%	71,064	0.41%	197,270	0.08%	0.06%
2016	264,000,000	2.365	17,477,300	0.4%	6.62%	86,731	0.50%	284,001	0.11%	0.09%
2017	270,400,000	2.424	17,150,100	-1.9%	6.34%	104,487	0.61%	388,488	0.14%	0.12%
2018	279,100,000	3.217	17,224,900	0.4%	6.17%	207,062	1.20%	595,550	0.21%	0.17%
2019	284,500,000	1.934	16,961,100	-1.5%	5.96%	233,822	1.38%	829,372	0.29%	0.24%
2020	286,900,000	0.834	14,471,800	-14.7%	5.04%	240,053	1.66%	1,069,425	0.37%	0.30%
2021	289,500,000	0.906	14,946,900	3.3%	5.16%	523,142	3.50%	1,592,567	0.55%	0.45%
2022	290,800,000	0.449	14,200,000	-5.0%	4.88%	994,000	7.00%	2,586,567	0.89%	0.73%
2023	292,300,000	0.515	15,502,500	9.2%	5.30%	1,120,000	11.00%	3,706,567	1.27%	1.03%
2024 (proj.)	297,810,000	1.885	15,100,000	-2.60%	5.07%	2,300,000	15.23%	6,006,567	2.02%	1.65%
2025 (proj.)	303,170,000	1.799	15,465,420	2.42%	5.10%	3,300,000	21.34%	9,306,567	3.07%	2.50%
2026 (proj.)	309,234,000	2.000	15,839,683	2.42%	5.12%	4,200,000	26.52%	13,506,567	4.37%	3.56%
2027 (proj.)	315,419,000	2.000	16,223,003	2.42%	5.14%	5,200,000	32.05%	18,706,567	5.93%	4.84%
2028 (proj.)	321,727,000	1.999	16,615,600	2.42%	5.16%	6,200,000	37.31%	24,906,567	7.74%	6.32%
2029 (proj.)	328,161,540	2.000	17,017,698	2.42%	5.19%	7,200,000	42.31%	32,106,567	9.78%	7.98%
2030 (proj.)	334,724,771	2.000	17,429,526	2.42%	5.21%	8,400,000	48.19%	40,506,567	12.10%	9.87%
2031 (proj.)	341,419,266	2.000	17,851,321	2.42%	5.23%	9,400,000	52.66%	41,506,567	12.16%	9.92%

(1) Vehicle Registration for 2012-2024 from www.hedgescompany.com. Vehicle registration from 2025-2028 based on VIO relationship to GDP in a linear regression model VIO projections for 2029-2031 based on the average projected YOY increase in VIO of 2.0% from 2025 to 2028

(2) VIO methodology – Same as # (1)

(3) VIO % increase per year from 2012-2023 are actual numbers. VIO % increase From 2025-2031 is projected based on explanation in footnote #1

(4) Annual light vehicles sales is a calculation based on light vehicle % of sales increase noted in footnote #5

(5) Annual light vehicles sales from 2012-2023 based on actual past sales history. Sales for 2024 based on NADA projections. Sales for 2025 -2031 based on average of light sales from 2012 to 2023.(not including 2020 as it was a substantial outlier due to COVID)

(6) # of light vehicle sales attributed to BEVs are extrapolated from EV Volumes website - a J.D. Power company: <https://ev-volumes.com/news/ev/evs-forecast-to-account-for-two-thirds-of-global-light-vehicle-sales-in-2035/>

(7) See footnote #6

(8) Impact to light vehicle demand is expressed as the % of reduction that BEV vehicles will make on total technician demand in a given year.

APPENDIX B

TechForce Foundation

TechForce Foundation is a nonprofit, 501(c)(3) with the mission to champion all students to and through their education and into careers as professional technicians. TechForce powers the technician workforce by awarding more than \$4 million in scholarships and grants annually to financially-disadvantaged students; changes perceptions towards this evolving, 'new collar' STEM career; and provides local career exploration and workforce development programming. TechForce's online network of students, working technicians, instructors, employers, industry professionals and enthusiasts committed to championing the technician workforce is the conduit through which the charity delivers its free resources, programs and career hub for the benefit of aspiring technicians. For more information, visit techforce.org. Follow us on [TikTok](#), [Facebook](#), [Instagram](#), [X](#) and [LinkedIn](#).

GREG SETTLE



Author of this report, is currently retired, but holds the position of **Director Emeritus, National Initiatives for TechForce Foundation**. He also serves as a contributing writer for TechForce Foundation. Mr. Settle graduated from the **Automotive and Diesel Technology programs at Universal Technical Institute** in Phoenix, AZ. He spent **43 years with the Mercedes-Benz** brand, beginning his career as a dealership technician, and subsequently moving through roles as Shop Foreman, Service Manager, and Fixed Operations Director. After moving to Mercedes-Benz, USA he held various field representative and engineering roles before joining the MBUSA training organization. Over several years he served as National Manager of Training Operations, Manager of Retail Training, and Manager of Technical Training and Curriculum. After retiring from MBUSA, he worked at TechForce Foundation as Director of Industry Partnerships and Director, National Initiatives. Mr. Settle also served multiple terms on the Board of Directors for Automotive Youth Educational Systems (AYES) and the I-CAR Education Foundation.

STEVE DEMARZIO



Contributor to this report is currently working in the aerospace industry as an Associate Fellow and Engineer for Lockheed Martin. He also serves as an Ambassador, Volunteer, and a long-term Provider donor for TechForce. Before his 24+ year career at Lockheed Martin, he served honorably in the US Air Force from 1982 to 1995 as a fighter aviator and Operation DESERT STORM veteran with the F-117A. **He is also an 18+ year board trustee for the Westside Union Elementary School District where he passionately advocates for CTE to be made accessible to all students**. Mr. DeMarzio holds a Bachelor of Science in Math/Computer Science from the Stevens Institute of Technology. He enjoys repairing, rebuilding, and restoring automobiles of all makes and models. His most challenging hands-on task was rebuilding a 1973 Chevrolet Corvette from the frame-up in a two-car garage. He is a current member of SAE International.

