

October 2021

Labor Market Analysis

Diesel Mechanics and Alternative Fuels Technology

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Prepared by the Central Valley/Mother Lode Center of Excellence

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COVID-19 Statement: This report includes employment projection data by Emsi. Emsi’s projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy during the projection period will be at approximately full employment or potential output. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, they may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Other measures such as unemployment rates and monthly industry employment estimates will reflect the most recent information on employment and jobs in the state and, in combination with input from local employers, may help validate current and future employment needs as depicted here.

If for any reason this document is not accessible or if you have specific needs for readability, please contact us and we will do our utmost to accommodate you with a modified version. To make a request, contact Nora Seronello by phone at (209) 575-6894 or by email seronellon@mjc.edu.

Summary

Please note the COVID-19 statement on page 2 when considering this report's findings.

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for diesel mechanics and alternative fuels technology. Five occupations related to diesel mechanics and alternative fuels technology were identified as appropriate for this analysis:

- 49-1011, First-Line Supervisors of Mechanics, Installers, and Repairers
- 49-3023, Automotive Service Technicians and Mechanics
- 49-3031, Bus and Truck Mechanics and Diesel Engine Specialists
- 49-3041, Farm Equipment Mechanics and Service Technicians
- 49-3042, Mobile Heavy Equipment Mechanics, Except Engines
- 49-3092, Recreational Vehicle Service Technicians

Key Findings:

- **Occupational demand** — More than 12,700 workers were employed in jobs related to diesel mechanics and alternative fuels technology in 2020 in the South Central Valley/Southern Mother Lode (SCV/SML) subregion. The largest occupation is automotive service technicians and mechanics, with 5,031 workers in 2020, a projected growth rate of 1% over the next five years, and 452 annual openings.
- **Wages** — First-line supervisors of mechanics, installers, and repairers, earn the highest entry-level wage, \$28.63/hour in the subregion.
- **Employers** — Employers with the most job postings in the subregion are Pep Boys, Penske, and Chevrolet.
- **Occupational titles** — The most common occupational title in job postings in the subregion is automotive specialty technicians. The most common job title is maintenance supervisor.
- **Skills and certifications** — The top baseline skill is communication, the top specialized skill is repair, and the top software skill is Microsoft Excel. The most in-demand certification is a driver's license.
- **Education** — A postsecondary nondegree award is typically required for automotive service technicians and mechanics. A high school diploma or equivalent is typically required for the remaining five occupations for diesel mechanics and alternative fuels technology.
- **Supply** — Analysis of postsecondary completions in the region shows that on average 857 awards were conferred in the Central Valley/Mother Lode region each year.

Based on a comparison of occupational demand and supply, there is an undersupply of 682 trained workers in the subregion and 1,121 workers in the region. The Center of Excellence recommends that Fresno City College work with the regional director, the college's advisory board, and local industry in the

expansion or development of programs to address the shortage of diesel mechanics and alternative fuels technology workers in the region.

Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Fresno City College to provide labor market information for diesel mechanics and alternative fuels technology. The geographical focus for this report is the South Central Valley/Southern Mother Lode (SCV/SML) subregion, but regional demand and supply data has been included for broader applicability and use. The average living wage for a single adult in the SCV/SML subregion is \$12.65/hour.¹ Analysis of the program and occupational data related to diesel mechanics and alternative fuels technology resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

- 49-1011, First-Line Supervisors of Mechanics, Installers, and Repairers
- 49-3023, Automotive Service Technicians and Mechanics
- 49-3031, Bus and Truck Mechanics and Diesel Engine Specialists
- 49-3041, Farm Equipment Mechanics and Service Technicians
- 49-3042, Mobile Heavy Equipment Mechanics, Except Engines
- 49-3092, Recreational Vehicle Service Technicians

The occupational titles, job descriptions, and knowledge and skills from the Bureau of Labor Statistics and O*NET OnLine are shown below.

First-Line Supervisors of Mechanics, Installers, and Repairers

Job Description: Directly supervise and coordinate the activities of mechanics, installers, and repairers. May also advise customers on recommended services. Excludes team or work leaders.

Knowledge: Administration and Management, Mechanical, Customer and Personal Service, Clerical, English Language

Skills: Monitoring, Management of Personnel Resources, Coordination, Critical Thinking, Judgement and Decision Making

Automotive Service Technicians and Mechanics

Job Description: Automotive Service Technicians and Mechanics.

Knowledge: Mechanical, Customer and Personal Service, Computers and Electronics, English Language, Engineering and Technology

Skills: Repairing, Troubleshooting, Operations Monitoring, Equipment Maintenance, Operation and Control

Bus and Truck Mechanics and Diesel Engine Specialists

Job Description: Diagnose, adjust, repair, or overhaul buses and trucks, or maintain and repair any type of diesel engines. Includes mechanics working primarily with automobile or marine diesel engines.

Knowledge: Mechanical, Transportation, Customer and Personal Service, Public Safety and Security, English Language

Skills: Repairing, Troubleshooting, Operation and Control, Operations Monitoring, Critical Thinking

¹ The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: <https://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

Farm Equipment Mechanics and Service Technicians

Job Description: Diagnose, adjust, repair, or overhaul farm machinery and vehicles, such as tractors, harvesters, dairy equipment, and irrigation systems.

Knowledge: Mechanical, Customer and Personal Service, Computer and Electronics, English Language, Mathematics

Skills: Equipment Maintenance, Repairing, Troubleshooting, Operation and Control, Critical Thinking

Mobile Heavy Equipment Mechanics, Except Engines

Job Description: Diagnose, adjust, repair, or overhaul mobile mechanical, hydraulic, and pneumatic equipment, such as cranes, bulldozers, graders, and conveyors, used in construction, logging, and mining.

Knowledge: Mechanical, Customer and Personal Service, Mathematics, Computer and Electronics, Building and Construction

Skills: Repairing, Troubleshooting, Equipment Maintenance, Operation Monitoring, Operation and Control

Recreational Vehicle Service Technicians

Job Description: Diagnose, inspect, adjust, repair, or overhaul recreational vehicles including travel trailers. May specialize in maintaining gas, electrical, hydraulic, plumbing, or chassis/towing systems as well as repairing generators, appliances, and interior components. Includes workers who perform customized van conversions.

Knowledge: Customer and Personal Service, Mechanical, Administration and Management

Skills: Repairing, Troubleshooting, Active Listening, Critical Thinking, Speaking

Occupational Demand

The South Central Valley/Southern Mother Lode subregion employed 12,773 workers in diesel mechanics and alternative fuels technology occupations in 2020 (Exhibit 1). The largest occupation is automotive service technicians and mechanics, with 5,031 workers in 2020. This occupation is projected to grow by 1% over the next five years and has the greatest number of projected annual openings, 452.

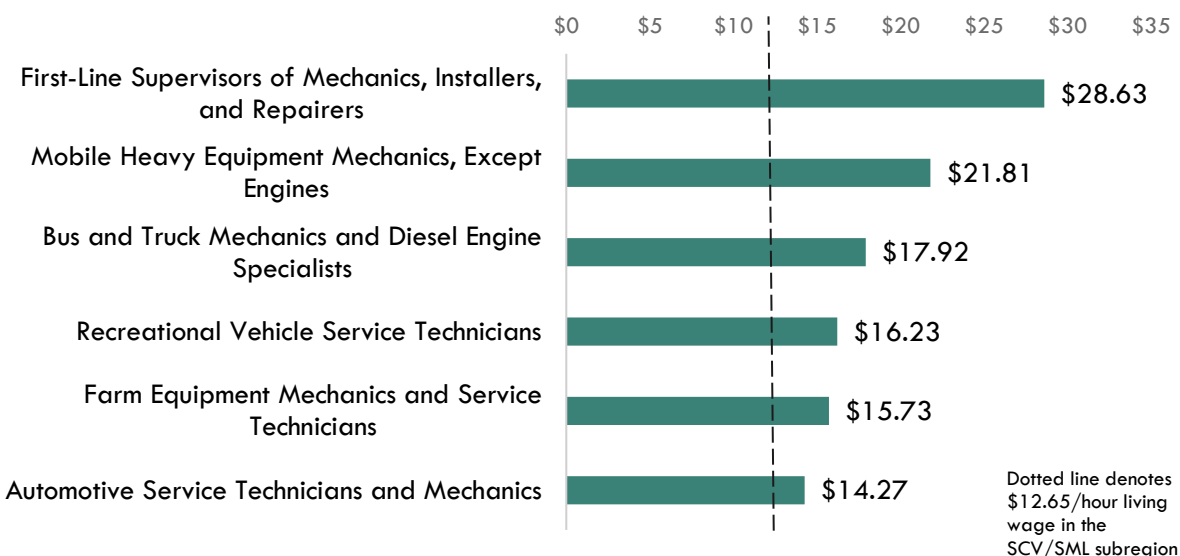
Exhibit 1. Diesel mechanics and alternative fuels technology employment and occupational projections in the SCV/SML subregion

Occupation	2020 Jobs	2025 Jobs	5-Year Change	5-Year % Change	Annual Openings
Automotive Service Technicians and Mechanics	5,031	5,068	37	1%	452
First-Line Supervisors of Mechanics, Installers, and Repairers	2,857	3,015	158	6%	269
Bus and Truck Mechanics and Diesel Engine Specialists	2,022	2,158	136	7%	199
Mobile Heavy Equipment Mechanics, Except Engines	1,503	1,493	(9)	(1%)	134
Farm Equipment Mechanics and Service Technicians	1,184	1,228	44	4%	115
Recreational Vehicle Service Technicians	176	159	(17)	(10%)	18
TOTAL	12,773	13,122	349	3%	1,187

Wages

Exhibit 2 shows the entry-level hourly wages of diesel mechanics and alternative fuels technology occupations. First-line supervisors of mechanics, installers, and repairers, earn the highest entry-level wage, \$28.63/hour in the subregion. Entry-level wages are derived from the 25th percentile.

Exhibit 2. Diesel mechanics and alternative fuels technology entry-level wages in the SCV/SML subregion



Job Postings

There were 1,936 job postings for the six occupations in the SCV/SML subregion from April 2021 to 2021.² The employers with the most job postings are listed in Exhibit 3.

Exhibit 3. Top employers of diesel mechanics and alternative fuels technology workers by number of job postings

Employer	Job Postings	% Job Postings
Pep Boys	41	2%
Penske	39	2%
Chevrolet	36	2%
PAE Incorporated	33	2%
Jiffy Lube	28	2%
TravelCenters of America	28	2%
Bridgestone / Firestone	18	1%
Toyota Motors	18	1%
United Rentals	18	1%
Love's Travel Stops	17	1%

² Other than occupation titles and job titles, the categories below can be counted one or multiple times per job posting, and across several areas in a single posting. For example, a skill can be counted in two different skill types, and an employer can indicate more than one education level.

Exhibit 4 shows how job postings for the targeted occupations in the SCV/SML subregion are distributed across 7 O*NET OnLine occupations. The occupational title automotive specialty technicians is listed in 868 job postings. Note how this occupational title dominates the job posting results. Common job titles in postings include Maintenance Supervisor in 87 job postings, Automotive Technician in 75 job postings, and Diesel Mechanic in 61 job postings.

Exhibit 4. Top occupational titles in job postings for diesel mechanics and alternative fuels technology occupations

Occupational Title	Job Postings	% of Job Postings
Automotive Specialty Technicians	868	45%
First-Line Supervisors of Mechanics, Installers, and Repairers	541	28%
Bus and Truck Mechanics and Diesel Engine Specialists	338	17%
Mobile Heavy Equipment Mechanics, Except Engines	120	6%
Automotive Master Mechanics	36	2%
Farm Equipment Mechanics and Service Technicians	18	1%
Recreational Vehicle Service Technicians	15	1%

Salaries

Exhibit 5 shows the “Market Salaries” for diesel mechanics and alternative fuels technology occupations that are calculated by Burning Glass which uses a machine learning model built off of millions of job postings every year, and accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

Exhibit 5. Salaries for diesel mechanics and alternative fuels technology occupations

Market Salary Percentile	Salary Amount
10th Percentile	\$29,830
25th Percentile	\$35,757
50th Percentile	\$43,158
75th Percentile	\$52,535
90th Percentile	\$63,944

Education

Of the 1,936 job postings, 1,037 listed an education level preferred for the positions being filled. Of those, 86% requested high school or vocational training, 15% requested a bachelor’s degree, and 8% requested an associate degree (Exhibit 6). A job posting can indicate more than one education level. Hence, the percentages shown in the chart below may total more than 100%.

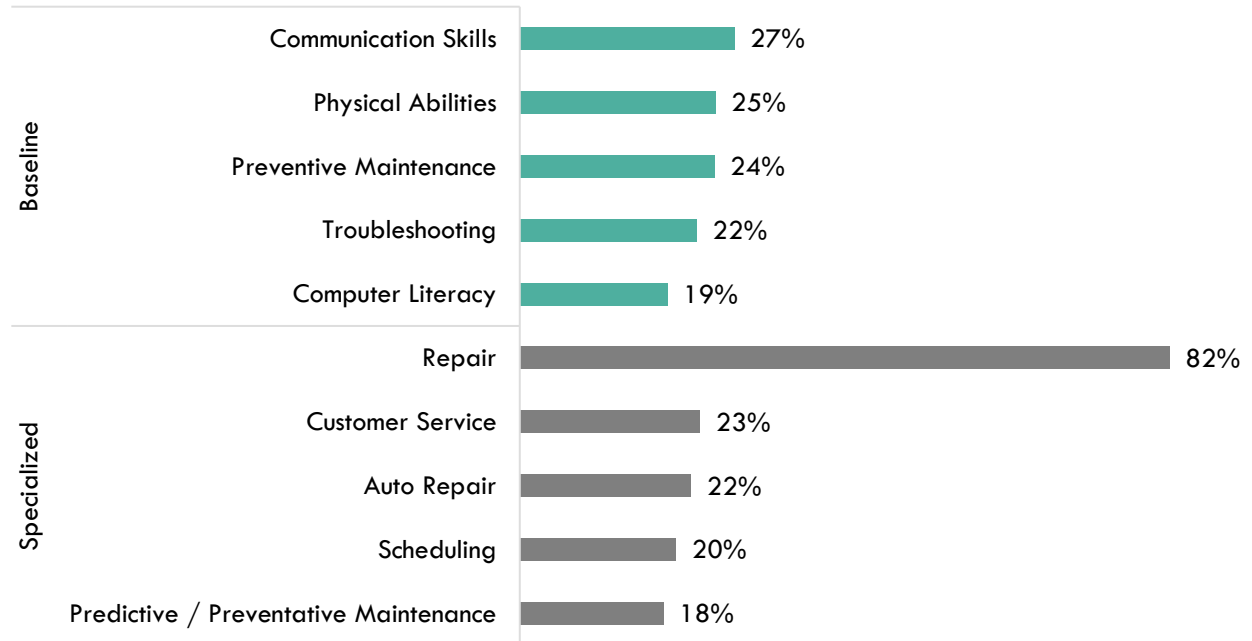
Exhibit 6. Education levels requested in job postings for diesel mechanics and alternative fuels technology occupations

Education Level	Job Postings	% of Job Postings
High school or vocational training	888	86%
Bachelor's degree	153	15%
Associate's degree	79	8%
Master's degree	3	0%

Baseline and Specialized Skills

Exhibit 7 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are communication, 27% of job postings, physical abilities, 25%, and preventive maintenance, 24%. The top three specialized skills are repair, 82% of job postings, customer service, 23%, and auto repair, 14%.

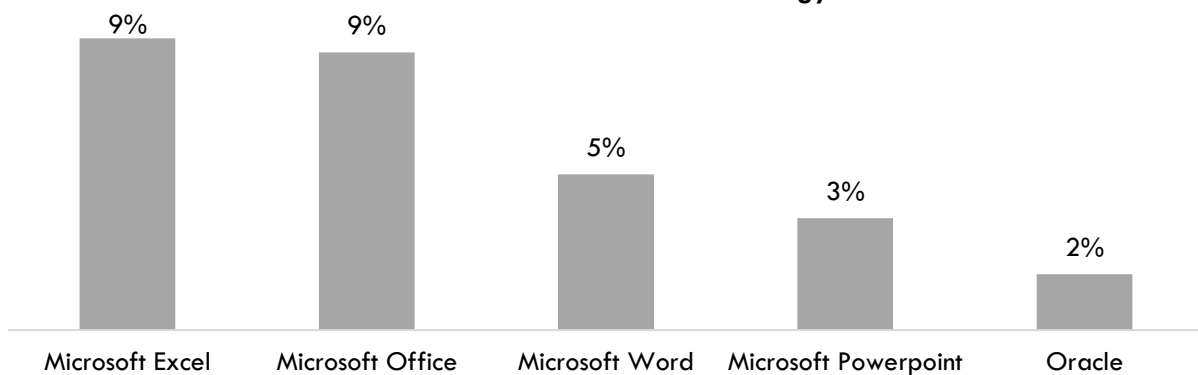
Exhibit 7. In-demand diesel mechanics and alternative fuels technology baseline and specialized skills



Software Skills

Analysis also included the software skills most in demand by employers. Microsoft Excel and Office were the top two software skills identified in job postings (Exhibit 8).

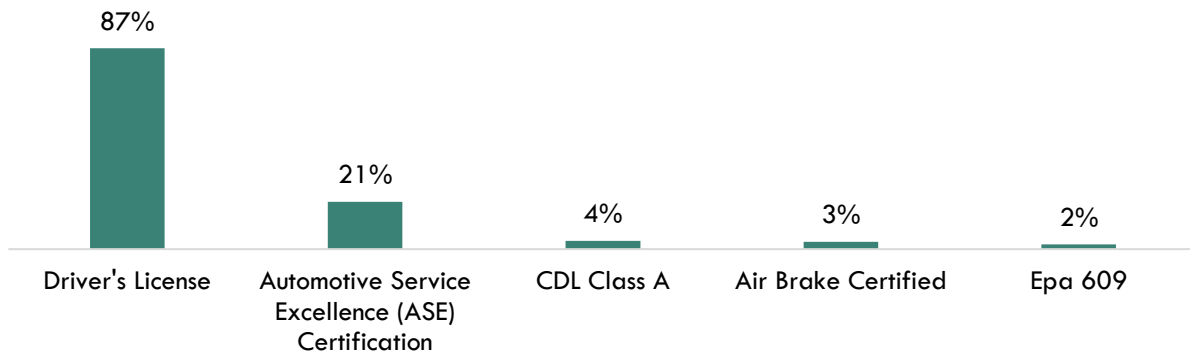
Exhibit 8. In-demand diesel mechanics and alternative fuels technology software skills



Certifications

Of the 1,936 job postings, 1,141 contained certification data. Among those, 87% indicated a need for a driver's license. The next top certifications are automotive service excellence (ASE) and CDL class A (Exhibit 9). (Due to the low number of job postings with certifications listed, the chart below may not be representative of the full sample.)

Exhibit 9. Top diesel mechanics and alternative fuels technology requested in job postings



Education, Work Experience & Training

A postsecondary nondegree award is typically required for automotive service technicians and mechanics. A high school diploma or equivalent is typically required for the remaining five occupations

Exhibit 10. Education, work experience, training, and Current Population Survey results for diesel mechanics and alternative fuels technology occupations³

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Automotive Service Technicians and Mechanics	Postsecondary nondegree award	None	Short-term	35.7%
First-Line Supervisors of Mechanics, Installers, and Repairers	High school diploma or equivalent	Less than 5 years	None	41.7%
Bus and Truck Mechanics and Diesel Engine Specialists	High school diploma or equivalent	None	Long-term	36.4%
Mobile Heavy Equipment Mechanics, Except Engines	High school diploma or equivalent	None	Long-term	35.2%
Farm Equipment Mechanics and Service Technicians	High school diploma or equivalent	None	Long-term	35.2%
Recreational Vehicle Service Technicians	High school diploma or equivalent	None	Long-term	24.4%

³ "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, <https://www.bls.gov/cps/>.

Supply

Analysis of program data from the California Community Colleges Chancellor’s Office Data Mart included the TOP and CIP codes and titles: 011600 - Agricultural Power Equipment Technology, 094700 - Diesel Technology, 094720 - Heavy Equipment Maintenance, 094800 - Automotive Technology, and 47.0604 - Automobile/Automotive Mechanics Technology/Technician. Analysis of the last three years of data shows that, on average, 857 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11). Data was not available for TOP Codes 094740 – Railroad and Light Rail Operations and 094850 – Recreational Vehicle Service.

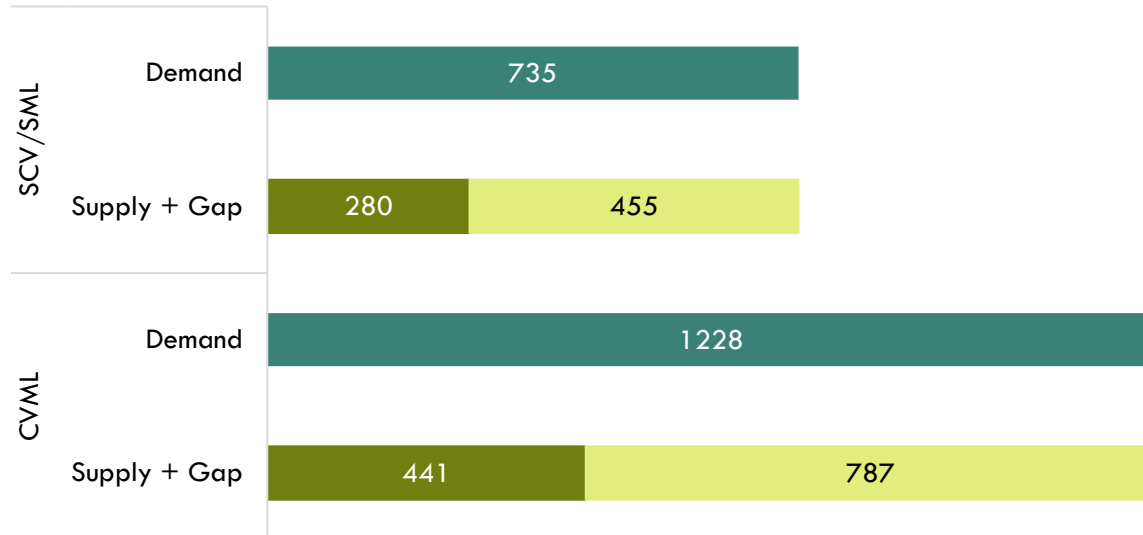
Exhibit 11. Postsecondary supply for diesel mechanics and alterative fuels technology occupations in the region

TOP/CIP Code-Title	College	Associate Degree	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Certificate 8 < 16 Semester Units	Noncredit Award 960+ Hours	Subtotal
011600 - Agricultural Power Equipment Technology	Bakersfield	4					1					6
	Fresno City	5			3	8	46					63
	Modesto	7		19	3	3				4		36
	Reedley College	18			92	81	27					218
	San Joaquin Delta					4	1					5
	Sequoias	1					0		0			2
094700 - Diesel Technology	San Joaquin Delta	2			2		11					15
094720 - Heavy Equipment Maintenance	San Joaquin Delta	25			1	6	11					42
094800 - Automotive Technology	Bakersfield	10			19	61	20	0				111
	Columbia	2		6		3	3	7		1		22
	Fresno City	12							1		6	19
	Fresno City	8			9	29	32					78
	Modesto	7		5	2	4	8			2		27
	Reedley College	9					43					51
	San Joaquin Delta	10			7	18	30					65

TOP/CIP Code-Title	College	Associate Degree	Award 1 < 2 Academic Years	Certificate 12 < 18 Semester Units	Certificate 16 < 30 Semester Units	Certificate 18 < 30 Semester Units	Certificate 30 < 60 Semester Units	Certificate 6 < 18 Semester Units	Certificate 60+ Semester Units	Certificate 8 < 16 Semester Units	Noncredit Award 960+ Hours	Subtotal
	Sequoias	6					1	37				43
47.0604 - Automobile/Automotive Mechanics Technology/Technician	UEI College-Bakersfield		55									55
TOTAL		126	55	29	138	217	234	44	1	7	6	857

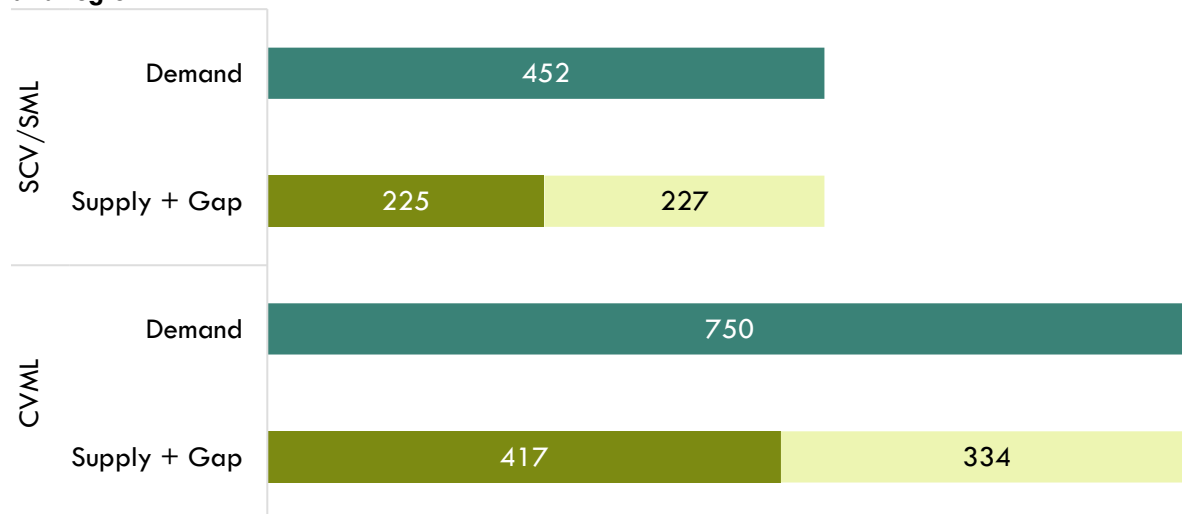
There is an undersupply of 455 diesel mechanics and alternative fuels technology workers in the SCV/SML subregion and 787 workers in the region (Exhibit 12).

Exhibit 12. Diesel mechanics and alternative fuels technology workforce annual demand and supply in the SCV/SML subregion and region



There is an undersupply of 227 automotive technology workers in the SCV/SML subregion and 334 workers in the region (Exhibit 13). Please note the occupation first-line supervisors of mechanics, installers, and repairs can also be included in the automotive technology demand, but it has been excluded to avoid double counting in this report.

Exhibit 13. Automotive technology workforce annual demand and supply in the SCV/SML subregion and region



Student Outcomes

Exhibit 13 summarizes employment and wage outcomes from the California Community College Chancellor’s Cal-PASS Plus LaunchBoard for the TOP codes related to diesel mechanics and alterative fuels technology. Of note, there were 195 agricultural power equipment technology students who received a degree or certificate or attained apprenticeship journey status; 27 students transferred; 77% of students obtained a job closely related to their field of study; 78% reported a median change in earnings; and 72% attained a living wage.

Exhibit 13. Regional metrics for the TOP codes related to diesel mechanics and alterative fuels technology

Metric	Agricultural Power Equipment Technology 011600	Diesel Technology 094700	Heavy Equipment Maintenance 094720	Automotive Technology 094800
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	195	11	52	188
Number of Students Who Transferred	27	*	*	10
Job Closely Related to Field of Study	77%	*	90%	69%
Median Change in Earnings	78%	24%	91%	42%
Attained a Living Wage	72%	67%	83%	57%
* denotes data not available.				

Conclusion

The entry-level wages of all the occupations exceed the SCV/SML subregion’s average living wage. There were 1,936 job postings in the past six months for occupations related to diesel mechanics and alterative fuels technology in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is communication, and the top specialized skill is repair.
- The top software skill is Microsoft Excel.
- The top certification is a driver’s license.

There is a total undersupply of trained workers, a shortage of 682 in the SCV/SML subregion and 1,121 in the region.

Recommendation

Based on these findings, it is recommended that Fresno City College work with the regional directors, the college’s advisory board, and local industry in the expansion or development of programs to address the shortage of diesel mechanics and alterative fuels technology workers in the region.

Appendix A: Methodology & Data Sources

Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor’s Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (EMSI). EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry: economicmodeling.com .
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: https://www.bls.gov/emp/tables/educational-attainment.htm .
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: labormarketinfo.edd.ca.gov .
Job Posting and Skills Data	Burning Glass: burning-glass.com/ .
Additional Education Requirements/ Employer Preferences	The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: onetonline.org .

Key Terms and Concepts

Annual Job Openings: Annual openings are calculated by dividing the number of years in the projection period by total job openings.

Education Attainment Level: The highest education attainment level of workers age 25 years or older.

Employment Estimate: The total number of workers currently employed.

Employment Projections: Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (EMSI) formula that includes historical employment and economic indicators along with national, state and local trends.

Living Wage: The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

Occupation: An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

Percent Change: Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

Replacements: Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

Total Job Openings (New + Replacements): Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

Typical Education Requirement: represents the typical education level most workers need to enter an occupation.

Typical On-The-Job Training: indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.