

Best Practices in Diesel Technology Career Pathways



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Introduction

The *Best Practices in Diesel Technology Career Pathways* was developed on behalf of the Greater Memphis Alliance for a Competitive Workforce (GMACW) in order to assist the Diesel Technology Sector Council and partner institutions as they explore career pathway improvements (including curriculum, technology, credentials, and work-based learning) for diesel technology related programs.

To offer a comprehensive review of the diesel technology occupation and better inform the Sector Council of regional and national trends, Thomas P. Miller and Associates (TPMA) has included the following components in this report:

- **Industry Demand:** TPMA reviewed relevant Labor Market Information (LMI) to confirm demand and understand regional skill needs. All labor market data included in this report is from Emsi.
- **Industry Recognized Credentials:** TPMA developed a competency list of the core knowledge, skills, and abilities needed in the diesel technology career pathway using information primarily from O*Net Online (www.onetonline.org); this list was then compared to the skills and standards measured by nationally recognized credentials. Due to their wide recognition, rigorous and industry-driven development, and close alignment with the knowledge, skills, and abilities detailed on O*Net for Bus and Truck Mechanics and Diesel Engine Specialists¹, Automotive Service Excellence (ASE) competencies were selected to establish baseline standards for the career pathway.
- **Best and Promising Practices:** TPMA researched post-secondary programs in diesel technology and related disciplines in order to identify national best practices and trends in curriculum, credentialing, and technology use.

When creating this report, TPMA took into account GMACW's priorities for regional development and career pathway elements, consistent with the U.S. Department of Labor's (USDOL) Career Pathways Toolkit², including:

- Greater articulation of non-credit, contact-hour programs with credit-bearing degree pathways;
- Alignment of industry-recognized certifications with degree pathways;
- Contextualized integration of basic skills content into career-technical credit-bearing pathways;
- Integrated student support services, personal effectiveness and workplace readiness training; and
- Improved work-based learning experiences.

¹ "49-3031.00 - Bus and Truck Mechanics and Diesel Engine Specialists" is the best match on O*Net for a number of job titles associated with the diesel technology career pathway; more specialized occupations may require additional competencies.

² https://www.doleta.gov/usworkforce/pdf/career_pathways_toolkit.pdf

Industry Demand

Career pathways work best when they are designed in direct response to local industry demand. To better understand industry demand for Diesel Technology workers in the GMACW region, the following section examines the anticipated occupational growth, key industries employing workers, as well as average earnings and age of the current workforce.

Occupational Growth

In 2016, the GMACW region had 2,917 positions for diesel technology workers (formally Standard Occupational Codes (SOC) 49-3031.00 - Bus and Truck Mechanics and Diesel Engine Specialists; 49-3042 - Mobile Heavy Equipment Mechanics, Except Engines; 49-3041 – Farm Equipment Mechanics and Service Technicians; 49-3051 – Motorboat Mechanics and Service Technicians; and 49-3092 – Recreational Vehicle Service Technicians).

SOC ³	Occupation Description	2016 Jobs	2026 Jobs	# Change	% Change	Median Hourly (GMACW)
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	1,810	1,904	94	5%	\$21.80
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	804	816	12	1%	\$20.44
49-3041	Farm Equipment Mechanics and Service Technicians	150	160	10	7%	\$17.01
49-3051	Motorboat Mechanics and Service Technicians	85	80	(5)	(6%)	\$17.88
49-3092	Recreational Vehicle Service Technicians	68	71	3	4%	\$11.83

A majority of the counties are expected to have an increased need for diesel technology workers within the next 10 years (see below). Tipton County is estimated to have the greatest growth need for the occupation, at 36 percent by 2026, and DeSoto County is expected to add the most workers (64) to the nine county region over this timeframe. Shelby County has the greatest regional need and will employ over 2,350 diesel technology workers in 2026.

Between 2016 and 2026, the number of diesel technology workers in this region is expected to grow 4 percent. The national growth rate is expected to be 14.4 percent in this same period.

In terms of overall demand, the projected job growth does not take into account turnover and retirements. Diesel Technology Sector Council members will likely be able to provide a more nuanced understanding of the regional demand in regards to overall turnover, churn, and internal hiring projections.

³ Emsi 2017.1 dataset

2016-2026 Diesel Technology (5) Occupations - Projected Change Per County

Region	2016 Jobs	2026 Jobs	# Change	% Change	Median Hourly Earnings
Shelby County, TN	2,332	2,352	20	1%	\$21.13
DeSoto County, MS	245	309	64	26%	\$20.97
Crittenden County, AR	118	116	(2)	(2%)	\$18.60
Tipton County, TN	55	75	20	36%	\$17.76
Fayette County, TN	42	44	2	5%	\$17.84
Marshall County, MS	31	39	8	26%	\$21.06
Tunica County, MS	19	22	3	16%	\$19.96
Tate County, MS	17	20	3	18%	\$17.38
Benton County, MS	<10	<10	Insf. Data	Insf. Data	Insf. Data
TOTAL REGION (5 Occupations)	2,862	2,982	120	4%	\$20.86

Industries Employing Diesel Technology Workers

It is also important to look more broadly at which industries employ Diesel Technology workers. The General Freight Trucking, Long-Distance, Truckload, industry was the largest employer of these workers in 2016, although this industry is expected to shrink the most over the next decade (52 fewer positions, or 20% decline). Motor Vehicle Supplies and New Parts Merchant Wholesalers is predicted to add the most Diesel Technology workers (34) in the next ten years.

2016-2026 Largest Industries Employing Diesel Technology Workers⁴⁵

Industry	Jobs in Industry (2016)	Jobs in Industry (2026)	Change (2016 - 2026)		2016 % of Occupation in Industry
			#	%	
General Freight Trucking, Long-Distance, Truckload	261	209	(52)	(20%)	9%
Couriers and Express Delivery Services	225	219	(6)	(3%)	8%
Industrial Machinery and Equipment Merchant Wholesalers	172	168	(4)	(2%)	6%
General Freight Trucking, Long-Distance, Less Than Truckload	166	188	22	13%	6%
Local Government, Excluding Education and Hospitals	156	164	8	5%	5%
Motor Vehicle Supplies and New Parts Merchant Wholesalers	146	180	34	23%	5%

⁴ 6-digit NAICS code

⁵ With the exception of Farm & Garden Machinery, this chart of industry staffing mirrors/is largely representative of the two largest occupations, 49-3031 - Bus and Truck Mechanics and Diesel Engine Specialists and 49-3042 - Mobile Heavy Equipment Mechanics, Except Engines.

Farm & Garden Machinery & Equipment Wholesalers	112	118	6	5%	4%
General Automotive Repair	107	139	32	30%	4%
Industrial Supplies Merchant Wholesalers	92	123	31	34%	3%
Commercial & Industrial Machinery & Equipment (except Automotive/Electronic) Repair & Maintenance	76	80	4	5%	3%

Worker Earnings

As individuals obtain additional credentials and work experience – progressing along the career pathway detailed in [Appendix 1](#) – their earnings potential also increases.⁶ The median hourly earnings for Diesel Technology positions in the GMACW region are \$20.83 per hour, which is slightly lower than the national average of \$21.24 per hour. When applying hourly earnings to full-time employment (2,080 hours/year), the percentile breakdown of yearly salaries is:

Worker Earnings, by Region (5 occupations)

Region	25 th Percentile	50 th Percentile	75 th Percentile
US	\$36,170	\$44,180	\$53,250
GMACW	\$35,030	\$43,330	\$52,020
Tennessee	\$33,180	\$40,810	\$48,530
Mississippi	\$30,970	\$37,110	\$44,470
Arkansas	\$29,120	\$35,960	\$44,120

The region trends slightly lower at every percentile compared to the nation and slightly higher than the states of Tennessee, Mississippi, and Arkansas – indicating the Region offers competitive pay rates for the Diesel Technology occupation.

⁶ Although the career pathway in the appendix indicates a variety of job titles associated with progressively higher skill levels, those same job titles are not reflected in the SOC codes used to collect wage data. Therefore, the Annual Salaries table includes wages by percentile rather than job title.

Employment by Age

Approximately 20 percent of the workers in Diesel Technology and related occupations are within 10 years of retirement age. Many of the individuals working in diesel technology positions in the GMACW region are 45-54 years old (29%), followed by 35-44 year olds (23%) and 25-34 year olds (19%). Additionally, just over six percent of the workers are amongst the youngest of working-age individuals (age 19 to 24). With this relatively young workforce, continued education and training opportunities will be important for retention and advancement as older individuals leave the workforce.



Age	2016 Jobs	2016 Percent
14-18	9	0.3%
19-24	187	6.4%
25-34	544	18.6%
35-44	656	22.5%
45-54	833	28.6%
55-64	574	19.7%
65+	114	3.9%

Industry-Recognized Credentials

Industry-recognized credentials are becoming the “new currency” in the marketplace. Employers are seeking clear ways to determine what workers know and are able to do on the job. Workers are seeking alternatives or add-ons to degrees to demonstrate marketable competencies. Educational systems, from high school through four-year institutions, are looking for efficient ways to provide seamless, effective and relevant programs. Industry-recognized credentials are a win-win proposition. Credentials provide an objective way for:

- Students to validate the talent they can bring to the job,
- Educational providers to establish the value of their product, and
- Employers to have a level of certainty about the competencies of an individual before hiring them.

While industry-recognized credentials can be awarded after testing, totally apart from the education process itself, embedding certifications within education pathways benefits the student, the educational provider, and the employer.

The Manufacturing Institute has been collecting documentation on the value of certifications over the past ten years. Some of the major observations on value include:

Benefits for Students

- Documents knowledge and skills gained through education or life experiences
- Offers a competitive advantage when looking for work or career advancement
- Increases career opportunities and earning potential
- Enhances transferable skills across industries within manufacturing or other sectors

Benefits for Educators

- Outlines critical foundation and workplace skills employers are demanding
- Identifies technical skill sets employers require, particularly in high growth occupations
- Provides clear guidance for updating/aligning curricula with industry requirements
- Standardizes learning outcomes across similar programs nationally

Benefits for Educational Systems

- Enhances efficiencies of the education and workforce delivery systems
- Supports sector-based strategies, linking closer to an economic development agenda
- Increases acceptance of credits for articulation across programs and institutions
- Promotes student completion

Benefits for Employers and Communities

- Access to a skilled workforce they can further develop through on-the-job training
- Ability to focus during the hiring process on the candidate “fit” within the company
- Reduced training costs and turnover, enhanced workplace safety, and increased productivity
- Improved quality of the workforce and workforce expertise in a community or region

To ensure the appropriate credentials are, in fact, meeting industry demand and regional skill needs, education and training providers must work closely with businesses to:

- Understand the needs of regional employers,
- Identify targeted occupations and essential skills required to perform job tasks, and
- Ensure appropriate assessment measures are in place to validate attainment of skill and award relevant credentials to program graduates.

The Manufacturing Institute recommends using WorkKeys National Career Readiness Certificate (NCRC), which validates core academic competencies across industries and occupations. Specific to Diesel Technology, a scan of national best practices and industry associations indicates that the most relevant certifications in diesel technology are from the National Institute for Automotive Service Excellence (ASE) and the National Center for Construction Education and Research (NCCER).

National Institute for Automotive Service Excellence (ASE)

ASE provides testing and certification for several occupations in the automotive industry, including: automobile, medium/heavy truck, truck equipment, school bus, and collision repair. In each specialization, standards and tests are developed by industry experts and vetted by committee. Tests are designed to be rigorous, and individuals are required to have one to two years of on-the-job experience prior to becoming certified.

In the diesel technology pathway, the most relevant certifications are the Medium / Heavy Truck credentials. Medium / Heavy Truck Credentials include:

- T2: Diesel Engines
- T3: Drive Train
- T4: Brakes
- T5: Suspension and Steering
- T6: Electrical / Electronic Systems
- T7: Heating, Ventilation, and A/C
- T8: Preventive Maintenance Inspection

Also relevant to the diesel technology pathway is L2: Electronic Diesel Engine Diagnosis Specialist; this certification requires prior certification in T2 Diesel Engines and T5 Suspension and Steering. For details on the competencies assessed by each of these credentials, refer to [Appendix 2](#).

All ASE testing must be done at an accredited testing center. For more information about ASE certification, and to view a list of certified testing centers in and around Memphis please visit: www.ase.com.

National Center for Construction Education and Research (NCCER)

NCCER provides training and credentialing for more than 70 craft areas in the construction industry. Developed by industry, association, and academic leaders, the organization's Accredited Assessment Center verifies an individual's knowledge and performance skills through standardized curricula and maintains a NCCER Registry System.

The most relevant certifications to the diesel technology career pathway are the Heavy Equipment Operations (HEO) credentials, available at Level 1, Level 2, and Level 3. In understanding how heavy equipment operates, diesel technology workers can troubleshoot and diagnose problems more readily as well as broaden their employment options.

In addition to the prerequisite NCCER core curriculum – which covers topics such as basic safety, communication skills, and introduction to construction drawings – key components of Heavy Equipment Operations include:

- Level 1: Heavy equipment safety, identification of heavy equipment, basic operational techniques, utility tractors, introduction to Earth moving, and grades part one
- Level 2: On-road dump trucks, scrapers, loaders, rough terrain forklifts, excavation math, interpreting civil drawings, site work, skid steers, and soils
- Level 3: Finishing and grading, compaction equipment, backhoes, off-road dump trucks, dozers, excavators, and motor graders

All NCCER testing must be done at an accredited assessment centers. For more information about NCCER certifications, please visit: <https://nccer.org/>. To find a testing center in the Greater Memphis region, visit: <https://nccer.org/get-involved/individuals-seeking-training/find-a-training-or-assessment-center>. There are a number of testing centers in and around Memphis, including at the University of Arkansas, Mid-South.

National Best Practices in Diesel Technology

TPMA reviewed several post-secondary diesel technology programs and has selected a few to highlight as best and promising practices from which GMACW can draw. In addition, we strongly recommend that GMACW and its partners refer to [skillscommons.org](https://www.skillscommons.org), which houses syllabi, assessments, and learning objectives, and other documentation created by TAACCCT grantees. These materials are available for public use and will save GMACW and its partners a great deal of time as it begins to update curriculum.

Our research has revealed a few common elements of successful diesel technology programs:

- Curriculum is **aligned with one or more ASE credential**, allowing graduates to earn not only a post-secondary credential, but also attempt to earn an industry-recognized credential as well;
- One or more courses are **aligned with state safety regulations and /or commercial driver's license (CDL) exam requirements**, which ensure that students will be competitive for jobs that require additional licensing;
- Programs are **customized based on local industry** (e.g., Marine Diesel Technology in coastal regions, heavy-duty agricultural equipment in rural areas), allowing students to specialize and sometimes earn credentials in in-demand skills;
- **Students complete pre-screening activities** such as career counseling and aptitude testing to ensure that they are likely to succeed in the diesel technology sector;
- **Hands-on learning** provides students with practical experience that they can apply to their credential assessments and in job interviews;
- Students are exposed to **a variety of current diesel technologies**, including electronic controls, biodiesel and natural gas fuel systems, and many others.

Gateway Technical College: Diesel Equipment Technology (Kenosha, Wisconsin)

Gateway's key advantage is the Horizon Center for Transportation Technology, which offers students an opportunity to work with biofuels and other sustainable engine technologies, creating an important link to the green energy trend sweeping transportation and adjacent industries. At the Horizon Center, students are exposed to high-tech training and simulation tools, allowing them to learn the most up-to-date diagnostic techniques.

Relevant best practices: customized based on local industry, hands-on learning, variety of current diesel technologies

For more information: <https://www.gtc.edu/programs/diesel-equipment-technology>

Kansas Institute of Diesel Technology (Northwest Kansas Technical College, Goodland, Kansas)

The Kansas Institute of Diesel Technology ensures that students have a realistic understanding of the diesel technology industry by frequently updating curriculum to reflect recent industry trends and changes to technology and methods, including biodiesel technology. Students spend lab time working

on customers' truck and farm equipment, gaining valuable hands-on experience in real-world scenarios. The institute offers two-year degrees in three specializations: Auto Tech, Agricultural Equipment, and Over-the-Road Trucking.

Relevant best practices: Hands-on learning, variety of current diesel technologies

For more information: <http://nwktc.edu/academics/programs/diesel-technology/>

Lane Community College: Diesel Technology (Eugene, Oregon)

At Lane Community College, students in the diesel technology program spend time with local companies throughout the program, better preparing them for the “real world” by making connections with potential employers and mentors early on. The program encourages students to think ahead by providing a detailed career pathway, which includes links to outside resources (tutoring, funding, counseling, etc.), programs for transfer and articulation, and detailed employment information. In order to grab potential students' attention, Lane highlights the need for advanced computer and technical skills for use in engine diagnostics, making an important connection with younger students who may not have much exposure to heavy trucks and equipment.

Relevant best practices: Customized based on local industry, students complete pre-screening activities, hands-on learning, variety of diesel technologies

For more information: <https://www.lanec.edu/advtech/ds>

North Iowa Area Community College: Diesel Technology (Mason City, Iowa)

The Diesel Technology program at North Iowa Area Community College offers curriculum in the categories tested by ASE, although alignment with the credentials is not promoted. Entrance into the associate of applied science is granted only to students who complete an entrance advising visit with a career counselor and program staff.

Relevant best practices: Aligned with one or more ASE credential, aligned with CDL requirements, students complete pre-screening activities

For more information, visit: <http://www.niacc.edu/academics/career-clusters/diesel-technology/overview-employment/>

Northern Wyoming Community College District: Diesel Technology (Sheridan, Wyoming and Gillette, Wyoming)

At Sheridan College and Gillette College, all students in the Diesel Technology program have internship and co-op opportunities. This leads to a 90% placement rate with many students gaining employment before they graduate. As a SkillsUSA participant, these colleges are able to offer small class sizes and expose students to the most up-to-date engines and diagnostic equipment from key manufacturers such as Caterpillar and Cummins.

Relevant best practices: hands-on learning; variety of diesel technologies

For more information: <http://www.sheridan.edu/academics/program/diesel-technology/>

Tidewater Community College: Diesel Technology (Chesapeake, Virginia)

Tidewater Community College houses several programs in its Regional Automotive Center, where all instructors are ASE certified. Curriculum is aligned with a number of industry-recognized credentials, including the Medium / Heavy Truck certifications described in this report (diesel engines, drive train, brakes, suspension and steering, electrical/electronic systems, heating and air conditioning, preventive maintenance inspection). The college offers an associate of applied science in diesel technology as well as a one-year diesel engine technician career studies certificate. Students who complete the one-year certificate can transfer all of their credits to the two-year degree option.

Relevant best practices: Aligned with one or more ASE credential, customized to local industry, hands-on training

For more information: <https://www.tcc.edu/academics/mechanical-industrial/programs/diesel-technology-degree>

West Kentucky Community and Technical College: Diesel Technology (Paducah, Kentucky)

West Kentucky Community and Technical College has been recognized by the Aspen Institute as a finalist with distinction for the Aspen Prize in Community College Excellence. The diesel technology program offers several diplomas (four semester technical programs) and short-term certifications. In addition, students who wish to pursue an associate's degree can apply their technical courses toward an Associate in Applied Science in General Occupational/Technical Studies (AAS-GOTS) degree. The variety of certificates and diplomas offered allows maximum flexibility for students to customize their education based on their interests and career goals. Courses are aligned with four ASE certifications: T2 Diesel Engines, T4 Brakes, T5 Suspension and Steering, and T7 Heating, Ventilation, and Air Conditioning (HVAC), and the instructor is a National Automotive Technicians Education Foundation (NATEF) Master Certified Truck Technician.

Relevant best practices: Aligned with one or more ASE credential, customized based on local industry

For more information: https://westkentucky.kctcs.edu/Academics/Academic_Divisions/at/Diesel_Technology.aspx

Other Resources:

Association of Diesel Specialists: An industry trade association that provides "On-Engine" technical training and optional certifications to members, hosts an annual convention, and offers scholarships to member schools. For more information, visit: <http://diesel.org>

Diesel Technology Forum: A nonprofit organization dedicated to advocating for the diesel industry, particularly focused on advanced engines, vehicles and equipment, cleaner diesel fuel and emissions-control systems. Provides a clearinghouse of research and policy analysis on industry trends and new technologies, including a "Clean Diesel Glossary." <http://www.dieselforum.org/>

Appendix 1: Recommended Diesel Technology Career Pathway

Based upon our research of diesel technology programs, TPMA recommends the following four-step pathway for education and training related to diesel technology occupations. This set of recommendations is intended to serve as a starting point for conversation only—employer validation and a thorough review of available training programs is required.

Step 1 – Diesel Technology Foundation (Short-term certificate)

At this level, students gain foundational academic and technical skills as demonstrated by credentials including OSHA 10, WorkKeys National Career Readiness Certificate (NCRC) Levels 3 and 4. Students will begin preparing for their first Medium/Heavy Truck certification from ASE, which they will be able to earn after two years of experience. In addition, students will gain a basic understanding of the careers available in the diesel technology field, such as diesel technicians and diesel engine specialists. Students should be exposed to a variety of occupations and work environments through tours, speakers, and job shadowing as appropriate.

Graduates who choose to seek employment after Step 1 will be qualified for entry-level repair technician and maintenance helper roles. Tasks may include routine maintenance (oil changes, checking tire pressure, etc.). Individuals working in these roles will gain valuable on-the-job experience; however, some additional education will likely accelerate their advancement.

To ensure graduates are work ready, programs at this level should include a focus on employability skills (soft skills). There should be clear expectations about the work conditions and requirements to be a successful diesel technician.

Step 2 – Diesel Technology Basics (One-Year Certificate)

Step 2 in the diesel technology pathway will typically require approximately one year of technical education and one or more years of on-the-job training. At this level, individuals moving through the pathway will begin to develop competencies in diesel engines, drive trains, and brakes—aligned with ASE certifications T2, T3, and T4. Those individuals interested in heavy equipment and related specializations may also pursue the NCCER Level 1 and 2 credentials at this level.

In the job market, individuals at this level will be qualified to serve as a technician’s assistant or similar job title. An individual in this role would be responsible for some diagnostics and basic repairs while working closely with an experienced technician for more complex repairs.

Step 3 – Advanced Diesel Technology (Two-Year Degree)

At the completion of Step 3, students will be prepared for most, if not all, of the ASE T-series certifications. In order to sit for these exams, the student will also have to have at least one year of work experience. For this reason, TPMA strongly recommends including a work-based learning component (such as an internship or co-op) to the final semester of coursework. This would require active partnership with the Diesel Technology Council Members. Students may also choose to pursue the Level 3 NCCER credentials if they completed Level 1 and Level 2 in the previous step.

Graduates with little to no work experience may find that they are more competitive for roles similar to those described in Step 2; however, if a student has been working while attending school or participating in an internship, they will be more likely to gain employment as a diesel mechanic or diesel technician after graduation.

Step 4 – Diesel Technology Specialist (Extended Work Experience)

Step 4 is often achieved only after gaining some years of experience; although in some cases, a four-year degree may be a suitable proxy.

Individuals at Step 4 may become generalists, earning their “Master Medium/Heavy Vehicle Technician” certification after successfully completing credentials T2-T8. Others may choose to specialize; for instance, an individual can pursue certification as an Advanced Electronic Diesel Engine Diagnosis Specialist (L2). Other occupations at this level include Lead Technician, Floor Supervisor, and Diesel Engine Technician.

Additional Considerations

It is also important to note that successful career pathways are comprised of more than just training, credentials, and aligned occupations.⁷

Essential features of quality career pathways include:

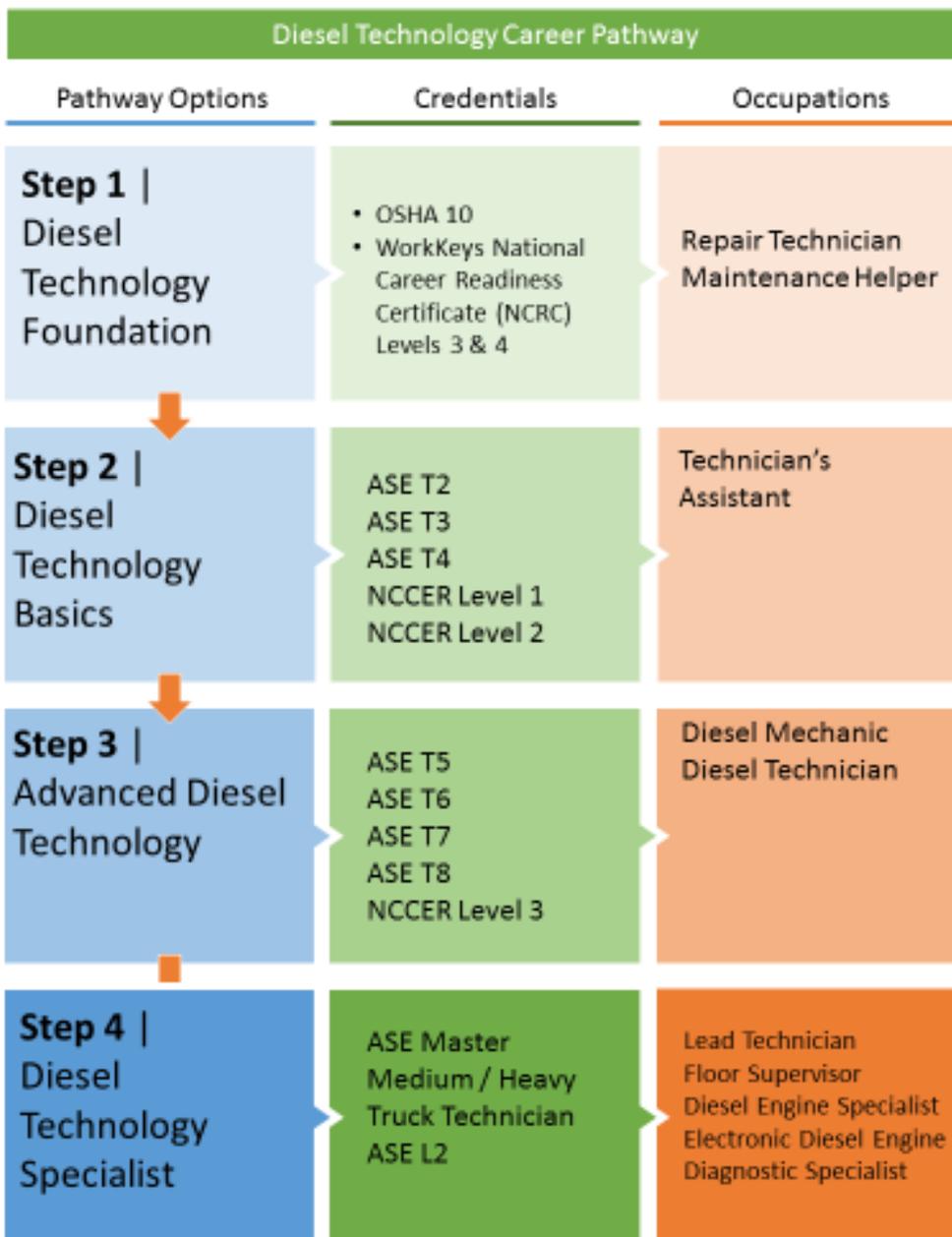
- Well-connected and transparent education, training, credentialing, and support service offerings (often delivered via multiple linked and aligned programs);
- Multiple entry points that enable well-prepared students as well as targeted populations with limited education, skills, English, and work experience to successfully enter the career pathway; and
- Multiple exit points at successively higher levels leading to self- or family-supporting employment and aligned with subsequent entry points.

Essential functions in quality career pathways and programs include:

- Participant-focused education and training;
- Consistent and non-duplicative assessments of participations’ education, skills, and needs;
- Support services and career navigation assistance to facilitate transitions; and
- Employment services and work experiences.

Additional input from employers, including validation of the credentials and occupations at each level of the pathway, is needed to finalize the recommendations found in this report.

⁷ Additional information on creating high quality career pathways can be obtained through the Alliance for Quality Career Pathways (a project of CLASP) at: <http://www.clasp.org/issues/postsecondary/pages/aqcp-framework-version-1-0>



Appendix 2: Competency-Credential Crosswalk

		Master Medium/Heavy Vehicle Technician (T2-T8)								Electronic Diesel Eng. Diagnosis Specialist
Competency		T2	T3	T4	T5	T6	T7	T8	L2	
Diesel Engines	General Engine Diagnosis	X								
	Cylinder Head & Valve Train Diagnosis & Repair	X								
	Engine Block Diagnosis & Repair	X							X	
	Lubrication and Cooling Systems Diagnosis & Repair	X							X	
	Air Induction and Exhaust Systems Diagnosis & Repair	X								
	Fuel Systems Diagnosis & Repair	X							X	
	Starting and Charging System Diagnosis and Repair	X								
	Engine Brakes	X								
Drive Train	Clutch Diagnosis & Repair		X							
	Transmission Diagnosis & Repair		X							
	Driveshaft and Universal Joint Diagnosis & Repair		X							
	Drive Axle Diagnosis & Repair		X							
Brakes	Air Supply and Service Systems (Air Brakes)			X						
	Mechanical/Foundation & Wheel Bearings (Air Brakes)			X						
	Parking Brakes (Air Brakes)			X						
	Hydraulic Brakes Diagnosis & Repair			X						
	Air & Hydraulic Antilock Brake Systems (ABS), Automatic Traction Control (ATC), & Electronic Stability Control Systems			X						
Suspension and Steering	Steering System Diagnosis & Repair				X					
	Suspension System Diagnosis & Repair				X					
	Wheel Alignment Diagnosis, Adjustment & Repair				X					
	Wheels, Tires and Hub Diagnosis & Repair				X					

		Master Medium/Heavy Vehicle Technician (T2-T8)							Electronic Diesel Eng. Diagnosis Specialist
Competency		T2	T3	T4	T5	T6	T7	T8	L2
Electrical / Electronic Systems	General Electrical/Electronic System Diagnosis					X			
	Battery and Starting System Diagnosis & Repair					X			
	Charging System Diagnosis & Repair					X			
	Lighting Systems Diagnosis & Repair					X			
	Related Vehicle Systems Diagnosis & Repair					X			
Heating, Ventilation, and A/C	HVAC Systems Diagnosis, Service & Repair						X		
	A/C Systems General (Diagnosis, Service & Repair)						X		
	Compressor and Clutch						X		
	Evaporator, Condenser, and Related Components						X		
	Heating & Engine Cooling Systems Diagnosis, Service & Repair						X		
	Operating Systems & Related Controls Diagnosis & Repair						X		
Preventive Maintenance Inspection	Engine Systems							X	
	Cab and Hood							X	
	Electrical / Electronics							X	
	Frame and Chassis (Brakes; Drivetrain; Steering, Tires, and Wheels; Suspension, Frame, and 5 th Wheel)							X	
	Road / Operational Test							X	