



California Council on Diesel Technology Education and Training "CCDET"

CREATING A GREEN CALIFORNIA AND SUSTAINABLE COMMUNITIES

DECEMBER, 2016



<http://www.ccdet.org>

In 1992 a consortium of diesel truck and bus engine manufacturers and dealers, California community colleges, and the California Air Resource Board (CARB) came together to form the California Council on Diesel Technology Education and Technology (CCDET). We, diesel technology programs at six community colleges--College of Alameda, American River College, Los Angeles Trade-Technical College, Palomar College, San Joaquin Delta College, and Santa Ana College--are the backbone education and training partners of CCDET. We are united by two overarching goals:

- (1) provide the skilled workforce necessary for clean and green transportation in California; and
- (2) ensure underserved and disadvantaged individuals and communities have good air quality and access to education and training that sets them on a path to family supporting careers and long-term success within a robust, clean and green transportation industry.

In 2007 the CCDET Supplemental Environmental Project (SEP) began. The SEP provides funding to support our diesel technology programs and ultimately the achievement of our goals. The purpose of this report is to highlight our objectives, activities, outcomes, and how SEP funding supports our efforts.

Providing the Skilled Workforce for a Clean and Green Transportation Industry

We have two objectives to achieve this goal. (1) Provide the requisite, skilled diesel technician workforce for the transportation industry who are up-to-date on clean and green technologies and practices. And (2), provide training to firms with fleets and individuals performing heavy-duty vehicle inspections and smoke opacity emissions testing. This training is necessary for: (a) full understanding of CARB programs and regulations, (b) correctly administering the SAEJ1667 opacity test, and (c) servicing engines and exhaust after treatment devices so they meet opacity standards.

In regards to the first objective, our diesel technology programs are instrumental in providing new workforce entrants and keeping incumbent workers skilled on new technologies, standards, and practices. Demand for bus and truck Mechanics and Diesel Engine Specialists is projected to increase 21% by 2024 (California Employment Development Department, Labor Market Information Division). A significant number of retirements will create further employment demand. Nearly half of the workforce is eligible to retire within the next 10 years. Expansion and evolution of intelligent and clean/sustainable transportation technologies means training for new skill sets will be constant for 34,000 incumbent mechanics in California (California Employment Development Department, Labor Market Information Division). Demand for skilled and diverse workers is most critical in middle-skill occupations responsible for installing, maintaining, and repairing clean technologies in increasingly diverse California communities.

We have been, and continue to be, pioneers in education and training on cutting-edge emissions devices and clean technologies such as alternative fuels, hybrid and electric vehicles, and hydrogen-

fueled vehicles. Our colleges continuously monitor industry trends and emerging technologies, revise current programs, and develop new ones to ensure our education and training is state-of-the-art. For example, our courses have incorporated emerging technologies such as Diesel Particulate Filters (DPF), Selective Catalyst Reduction (SCR) systems, and On-Board Diagnostics (OBD) which impact emission performance and ensure vehicles remain as clean as possible. Looking ahead, we are monitoring the impact of new trends such as autonomous vehicles, demand/response systems, alternative power sources, and various "smart" technologies that will necessitate further programmatic changes.

In the past three years alone, more than 3,100 individuals have participated in diesel technology training and education at our colleges; 298 completed certificate programs and 118 completed degree programs. Another 1,036 related certificates and degrees have been awarded, such as in alternative fuels technology and hybrid and electric vehicle maintenance.

Pertaining to the second objective, our colleges offer two classes (CCDET I and II) that support firms with truck fleets and owners/operators to assure diesel technicians are up-to-date on California's heavy-duty vehicle inspection programs. CCDET I, covers California's Heavy-duty Vehicle Inspection Program (HDVIP) and the Periodic Smoke Inspection Program (PSIP) requirements. CCDET II covers diesel exhaust after-treatment operation, repair, and maintenance. Both courses include hands-on experiences to ensure technicians know how to keep engines working at peak performance, thereby reducing harmful PM and NOx emissions.



Over the past three years our colleges have taught a total of 231 CCDET classes; awarding 2,133 CCDET I, 706 CCDET II, and an additional 511 CCDET-related certifications. We have also provided incumbent diesel technician training to numerous organizations on electronics, electrical procedures, and programmable logic controllers that are necessary to maintain clean and "smart" transportation technologies.

Our colleges have become the "go to" location for assisting heavy-duty truck businesses with emissions standards and the many laws created to protect California's environment. For example, one CCDET college assisted the Port of Los Angeles with establishing new smoke emissions testing procedures. Smoke emission testing is required annually on cargo handling equipment as stated in Section 2479 of title 13 of the California Code of Regulations. Prior to this assistance, testing conducted on large shipping cranes took extensive time and incurred high costs. CCDET colleges also assist by loaning equipment, scanners, and other materials to local firms

and agencies. City and county transportation and utility companies, tool and vehicle manufacturers, rail companies, and other transportation businesses have established strong and enduring partnerships with our colleges. Examples of such agencies and businesses include the City of Los Angeles, County of Sacramento, Orange County Transportation Agency, San Joaquin Regional Transit District, Los Angeles Department of Water and Power, Port of Long Beach, Pacific Gas and Electric, Westrux, Thermo King, Carrier, Cummins, Snapon, Matco Tools, Caterpillar, Freightliner, Kenworth, Union Pacific Railroad, John Deere, Western Truck, Daimler Truck North America, and Bobcat to name a few.

As a result, our colleges have greatly increased the number of diesel technicians and operators with the knowledge and skills necessary to minimize diesel particulates and NOx emissions which is critical to CARB's Diesel Risk Reduction Program's mandate of an 85% reduction in diesel particulate exposure by 2020.

Fostering a Clean and Green Environment and Transportation Industry: *Inclusive of Disadvantaged, Low-Income Individuals and Communities*

We serve diverse, disadvantaged, low-income populations within communities that have high rates of poverty and other indicators of risk (i.e., areas that are aligned with AB 1071). The median annual household incomes in our service areas, on average, are nearly \$16,000 less than household incomes within the counties they are located in. These median household incomes range from a low of \$11,458 (\$41,796 lower than corresponding median county income) to a high of \$55,132 (\$18,590 lower than corresponding median county income). Residents are predominantly racial and ethnic minorities--the average minority population rate is 63.40%.



Our student demographics mirror our communities. On average, our student population is 79% minority. Most students receive state and/or federal financial aid and, at some of our colleges, nearly all students do. For example, 91% of students at American River College receive aid. These aid rates are similar for students in our diesel technology programs, for example 2/3rds (65%) at LATTC receive aid. Our colleges also serve high numbers of immigrant and

limited English speaking students. Serving communities with high numbers of low-income and immigrant residents; with historically low participation rates in higher education; and with other high-risk, factors means our colleges must offer extensive resources and services to ensure student success. This also drives up the cost of education.

Here's a snapshot of one of our colleges' community to paint a picture of the mosaic of populations we serve. In LATTC's service area the adult, college-aged population is 96.5% ethnic minority; 70.6% are Hispanic and 20.5 % African American. Foreign born residents comprise 46.7% of the population; 65.1% are non-native English speaking and 34.7% are limited or non-English speaking. Nearly one-third (32.4%) of the population lives at or below the Federal Poverty Level. 55.2% of the adult population does not have a high school diploma, GED, or equivalency; 20.2% have obtained only between a 9th and 12th grade education; and 35.0% have less than a 9th grade education. 38.6% of children live below the poverty level and 69.9% are from low-income families, 39% of all children are in long-term foster care; 20% of youths are in the juvenile justice system, and the college's service area has the highest rates of child and teen deaths from accidents, suicide, and hospitalizations from assaultive injuries in L.A. County (U.S. Census, Los Angeles County Children's Scorecard, South Los Angeles Health Equity Scorecard).

Our colleges are considered by many in our communities as a sanctuary--where self-confidence and self-reliance that is built by our students transcends beyond college campuses as they inspire and strengthen their family and friends.

Our diesel technology programs provide opportunities for individuals in these communities to obtain low cost certificates and degrees that result in enduring careers within a robust transportation industry and--most importantly--a path out of poverty. Economically, a student with an AA/AS degree from a diesel technology program in California earns an average of \$53,253 after 5 years (Salary Surfer, California Community College Chancellor's Office). This is a family sustaining wage at or above median annual household incomes in their respective communities.

On average, the median wage of our diesel technology students within 2 quarters after exiting our programs is \$8,891 or \$35,565 annualized (Calpassplus.org/Launchboard). Within 3 years of obtaining a certificate or degree, a sampling of diesel technology alumni reveals they earn an average, median wage of \$45,250. (California Community Colleges Chancellor's Office Wage Tracker). This wage falls between 25-50% of the median wage (\$40,400-\$51,600) of all diesel mechanics in California (U.S Department of Labor, ONET) and is significant



considering most entry-level mechanics typically earn less than 25% of the median wage.

Also a sampling of alumni who utilize LinkedIn reveals, 78% reside within the college's surrounding community and are employed at a myriad of businesses/agencies such as FedEx, Greyhound, Freightliner, Ports America, DirectTV, transit agencies, truck rental and leasing companies, and railway companies. A majority, 63%, are working in operations, 13% in engineering, 10% in information technology, and the remaining 13% are working in sales, education, community services, and entrepreneurial occupations.

Steven's story (an alumnus from one of our colleges) reveals how lives are transformed by our programs. He had three strikes against him. He was formerly incarcerated, has a profound epilepsy condition, and lived in extremely high-risk and impoverished conditions. For several years now after graduating, Steven is working full-time at a local dealership, rides public transportation every day, and is making a family-sustaining wage. He loves the college program he graduated from so much that he started a "Big Diesel" Facebook page so current and former students can stay connected.

A recent study by the Brookings Institution's Metropolitan Policy Program on the effects of college graduates spending on local economies finds households with a college graduate, as the highest educated member, accrue more income and spend nearly \$13,000 more each year locally than those without a member with a degree. When you factor in how much these households spend over a lifetime, the disparity becomes even more pronounced. Additionally, highly skilled workers (such as diesel technicians) affect economic growth by contributing to productivity. For these reasons, the economic benefit calculation here is considered conservative. Utilizing this calculation and applying it the 202 degree recipients from our colleges in the last three years, reveals these individuals would have contributed more than \$2.6 million dollars, annually, to the economic vitality of the California communities they reside in.

FAST FACTS... <i>In the past 3 years at our colleges...</i>	
3,100	<i>individuals received diesel technology education and training</i>
298 / 118	<i>diesel technology certificates / degrees awarded</i>
1,036	<i>other certificates, such as alternative fuels and hybrid/electric vehicles, awarded</i>
231	<i>CCCDDET classes taught</i>
2,133 / 706	<i>CCCDDET I / CCDET II certificates awarded</i>
511	<i>CCDET-related certificates awarded</i>
\$45,250	<i>average, median wage of diesel technology graduates within 3 years of graduation</i>
~\$2.6m	<i>estimated annual spending of graduates in their surrounding communities</i>

To further illustrate the economic impact of our programs, let's take a closer look at the two colleges with the largest number of diesel technology certificates and degrees conferred: Los Angeles

Trade-Technical College (LATTC) and Palomar College (Palomar). These colleges are located in Los Angeles and San Diego counties, respectively, and are in 2 of the 4 least affordable areas to live in the U.S. (The San Diego Union-Tribune, 2016). The median household incomes of their communities are 79% lower (LATTC) and 16% lower (Palomar) than the surrounding city/county (U.S. Census). Minority students comprise 92% (LATTC) and 55% (Palomar) of the student body. Combined, they have awarded a total of 66 degrees and 744 certificates in the last 3 years. Using the same calculations discussed previously, their graduates will have likely contributed nearly \$1 million, annually, to their surrounding communities.

In addition to contributing to the economic well-being of their communities, these graduates are poised to be contributors and leaders in a clean and green transportation industry and sustainable environment because of the state-of-the-art programs they learned within.

Supplemental Environmental Project Funding

Supplemental Environmental Project funding is critical for supporting our colleges' high-cost diesel technology programs. These programs are significantly more costly than other programs at our colleges because: (1) they have enrollment limitations and lower student-to-faculty ratios that diminish revenues and increase instructional costs and (2) they require greater facilities, materials, and equipment costs. Therefore, our programs rely on supplemental funding sources, such as SEP, for their existence. For example, each semester at LATTC the average, direct cost per full-time equivalent student (FTES) in diesel technology is \$3,899.45. The college receives \$4,000 per FTES, leaving only \$100.55 per student for equipment, supplies, materials, and other direct and indirect costs*. This funding story is similar at all our colleges.

Included with this report is a table outlining SEP funding for the prior 3 years including expenditures, current balances, and future spending plans by college. SEP funding enables our colleges to maintain safety requirements, make programmatic improvements and expansions, and keep up-to-date with industry standards and technology changes. SEP funding has been used to purchase equipment, general and specialty tools, teaching aids, diagnostic software, supplies, and replacement parts. Funding has also been used to cover costs of preparing students for Air Conditioning Recovery (EPA 609) Certification. Our colleges also accumulate SEP funds (e.g. carrying funding over from one year to another) to purchase expensive items such as trucks and engines needed to expand or update fleets and equipment inventory. These items are too costly to purchase within any single year of funding. In addition to supporting the existence of our programs, SEP funding allows us to keep our programs up-to-date with emerging clean/green and "smart" transportation technologies.

*Note: figures are from a cost study conducted by LATTC in fall 2007 and all figures have been adjusted for inflation.

**Supplemental Environmental Project
Income and Expense Table by College, November 2016**

College	Year (Calendar)	Income	Expenses	Items	Balance	Plan for Future Spending
American River College (Became a CCDET member in March 2014)	2015	\$72,263	\$82,928	A/C HVAC parts, tool kits, parts carts, grease, canopy, air compressor, saw, industrial supplies, training supplies, saw blade, material handling system, storage containers	\$70,160	Upgrade fleet with 2010 and newer trucks
	2014	\$91,493	\$10,668	Laser printer, heat press, classroom supplies, shop supplies, DPF for refuse truck, service carts and tools, office supplies, oil test kit, marketing supplies	\$80,825	Upgrade fleet with 2010 and newer trucks
	2013	N/A	N/A	N/A	N/A	N/A
College of Alameda	2015	\$72,263	\$32,346	Salvage truck, truck parts, classroom materials, scholarships, database for diagnostic repairs, tool replacements	\$91,159	Upgrade fleet to 2010 and newer trucks, tablets, laptops and software
	2014	\$113,452	\$144,078	Marketing and outreach, adapter, scholarships, classroom supplies, tools, truck transmissions	\$51,242	Educational demo boards and test equipment
	2013	\$79,261	\$24,346	Snap-on tools, laptop, training supplies, simulation board repair	\$81,868	Tools and tool boxes for student use
LA Trade – Technical College	2015	\$72,263	\$160,476	Office supplies, computers, shop parts, shop electronics, shop tools, office electronics, upgrades to emissions compliant training engines with latest after-treatment, purchase of Virtual College for student certification and tools awarded as student scholarships	\$8,182	Balance will be used to purchase consumables for diesel program and depleted by end of FY2015
	2014	\$113,452	\$114,882	New engines for overhaul class, upgraded air brake board, smartboards and computer equipment, consumables for diesel program classes, iPad carts for student use as part of training	\$96,395	Balance carried forward to complete purchase of turn-key training engines with after-treatment technology
	2013	\$79,261	\$32,770	CORE engines with stands, trans holder, parts, Snap-on tools, driveline angle analyzer, revolver diesel, diagnostic tools, J13939 adapters, battery, projector, cable computer	\$97,825	Balance carried over for truck engine overhaul engines, tools, parts and smartboards
Palomar College	2015	\$72,263	\$46,325	Signage, hydrostatic transmission simulator, electrical work, instructional supplies transmissions, training, equipment	\$49,576	Balance carried over for engine overhaul, engine rebuild #1, tools, parts, and shop supplies. Funds will be depleted by end of FY 2015.
	2014	\$113,452	\$169,988	DD-13 engine shipping, technical tools, containers, hydraulic simulator, travel, engine instrument cluster, engine parts, fuel pumps, instructional equipment and supplies, 4 DD-13 engines, engine for parts.	\$23,638	Balance to be used to purchase hydraulic trainer/simulator
	2013	\$79,261	\$35,599	Wheel ladders, glue, alternator, coolant pack, laptops, signs	\$80,174	Balance carried over for overhaul engines for engine rebuild #2, tools, parts, and shop supplies

Supplemental Environmental Project
Income and Expense Table by College, November 2016

College	Year (Calendar)	Income	Expenses	Items	Balance	Plan for Future Spending
Santa Ana College	2015	\$72,263	\$52,756	Cummins in-line scan tools, shop electronics, engine parts, transmission parts, hand tools, TVs for instruction, air impacts, refrigerant, diesel software, Cummins engine parts, carrier software, iPad software	\$76,127	Balance carried over for ISL-G engine purchase and Insite software, supplies
	2014	\$113,452	\$65,674	Air brake software, truck information system, replace diesel supplies, laptops and cart, tool boxes	\$56,620	Balance carried over for Cummins in-line scan tools, shop electronics, engine parts, transmission parts, hand tools, TVs for instruction, air impacts, refrigerant, diesel software, Cummins engine parts, carrier software, and iPad software
	2013	\$79,261	\$84,342	TRU Carrier, TRU ThermoKing, lab engine parts, shop supplies	\$8,842	Balance carried over for air brake software, truck information system, replace diesel supplies, laptops and cart, tools, and tool boxes
San Joaquin Delta College	2015	\$72,263	\$35,705	Supply software, instructional supplies, memberships, dues, staff travel, contract services Printing and duplicating services, permits, licenses, fees, repair and maintenance services, student event, new instructional equipment-low cost (\$200-\$999), new instructional equipment-capital, new equipment, awards, scholarships, grants, student supplies, classroom supplies	\$128,317	2 -2012 or newer Class 8 trucks
	2014	\$113,452	\$47,750	Tie down straps and air fittings, blue towels, fittings, electrical plugs, steel for truck step and tool boxes, tie down straps and towels, air hose and fittings for new tools, studs and simple green, U joint, differential yolk, torque wrench, tool box, brake valves and seals, fasteners, subscriptions, steel benches, engine parts, air compressor, safety glasses	\$91,759	Allison tools and brackets, 3 – Caterpillar comm adapters, 12-rolling shop tables, 2-2012 or newer Class 8 trucks
	2013	\$79,261	\$85,664	Student A/C certifications, torque wrench, service charges, Kenworth truck, tools, tool boxes, shop supplies, office supplies, classroom supplies, air hose fittings and gauges	\$26,057	5-shop laptops, 2006 Kenworth T300 with an Allison