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California Energy Commission

Clean Transportation Program

FINAL PROJECT REPORT

Advanced Transportation Technology and Energy Center at San Diego Miramar College

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**Prepared by: Advanced Transportation Technology and Energy Center,
San Diego Miramar College**

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PREFACE

Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007) created the Clean Transportation Program, formerly known as the Alternative and Renewable Fuel and Vehicle Technology Program. The statute authorizes the California Energy Commission (CEC) to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's climate change policies. Assembly Bill 8 (Perea, Chapter 401, Statutes of 2013) reauthorizes the Clean Transportation Program through January 1, 2024, and specifies that the CEC allocate up to \$20 million per year (or up to 20 percent of each fiscal year's funds) in funding for hydrogen station development until at least 100 stations are operational.

The Clean Transportation Program has an annual budget of about \$100 million and provides financial support for projects that:

- Reduce California's use and dependence on petroleum transportation fuels and increase the use of alternative and renewable fuels and advanced vehicle technologies.
- Produce sustainable alternative and renewable low-carbon fuels in California.
- Expand alternative fueling infrastructure and fueling stations.
- Improve the efficiency, performance and market viability of alternative light-, medium-, and heavy-duty vehicle technologies.
- Retrofit medium- and heavy-duty on-road and nonroad vehicle fleets to alternative technologies or fuel use.
- Expand the alternative fueling infrastructure available to existing fleets, public transit, and transportation corridors.
- Establish workforce-training programs and conduct public outreach on the benefits of alternative transportation fuels and vehicle technologies.

To be eligible for funding under the Clean Transportation Program, a project must be consistent with the CEC's annual Clean Transportation Program Investment Plan Update. The CEC issued agreement number 600-15-008 to develop and fund alternative fuels and advanced vehicle technology workforce training programs, to increase the number of individuals able to repair and maintain alternative fueled vehicles for California's growing clean vehicles market. The agreement was executed on October 30, 2015.

ABSTRACT

This is the final report for CEC contract 600-15-008. The purpose of this contract is to develop and fund alternative fuels and advanced vehicle technology workforce training program to increase the number of individuals able to repair and maintain alternative fueled vehicles for California's growing clean vehicles market.

Under the initial \$2 million agreement, the contractor, in concert with the CEC, approved nine community colleges for program development based on the conclusion of a request for proposal process. The contract was amended to add \$1 million, thereby awarding six additional community colleges –15 community colleges in total for funding. As a result of the work, alternative fuel technical training courses and certificate programs were added to the California community college system curriculum. These materials are available to all community college programs via the [Advanced Transportation and Logistics Initiative website](http://atleducation.org) at <http://atleducation.org>. As developed, these courses can provide technical training to over 750 students at a time and will continue to do so for years to come.

Approximately \$200,000 of the contract provided for direct workforce training. The initial pilot program was with the Southern California Regional Transit Training Consortium. A second pilot program provided technical training to Municipal Equipment Maintenance Association fleets. Over 160 technicians received alternative fuel vehicle technical training through this program.

As a result of this contract, key technical training programs were established throughout California providing both a statewide and regional foundation for technician training consistent with the market development of alternative fuel vehicles. Future program options include continued joint efforts between the CEC, the Chancellor's Office, and Advanced Transportation and Logistics to strengthen the state's technical training programs. In addition, the CEC could meet directly with organizations such as the Southern California Regional Transit Training Consortium and Municipal Equipment Maintenance Association to ascertain workforce technical training needs.

Keywords: Alternative Fuels, Clean Transportation, Community College, Technical Training, Workforce Training, Curriculum

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TABLE OF CONTENTS

	Page
Preface	i
Abstract.....	ii
Table of Contents	iii
Executive Summary	1
CHAPTER 1: Review of Contract Requirements.....	3
Background/Problem Statement	3
The Advanced Transportation Technology and Energy Center	3
Goal of the Contract	3
Objective of the Agreement.....	3
CHAPTER 2: Review of Task Work Activities	4
Task 2 – Funding Plan.....	4
Task 3 – Implementation of Approved Funding Plan	4
Overview of Major Equipment Purchases	6
Curriculum Development.....	8
Faculty Professional Development	11
Student/Faculty Response.....	13
Workforce Training Summary.....	14
Program Challenges.....	15
Future Program Opportunities	15
GLOSSARY	17

LIST OF FIGURES

	Page
Figure 1: Nissan Leaf – Copper Mountain College	6
Figure 2: Toyota Mirai – Los Angeles Trade Technical College.....	7
Figure 3: Freightliner Natural Gas-Fueled Truck – American River College	7
Figure 4: Cummins Natural Gas Engines on Stands – San Diego Miramar College	8
Figure 5: SCRTTC Cummins Engine Training	15

LIST OF TABLES

	Page
Table 1: Community College Funding	5
Table 2: Major Equipment Purchases	6
Table 3: Curriculum Development - Courses	8

Table 4: Curriculum Development – Certificates/Degrees	9
Table 5: Faculty Professional Development.....	12

EXECUTIVE SUMMARY

The objective of this agreement was to develop and fund alternative fuels and advanced vehicle technology workforce training programs to increase the number of individuals able to repair and maintain alternative fueled vehicles for California's growing clean vehicles market. This is the final report for CEC contract 600-15-008.

The final report provides a summary of all activities conducted by the Advanced Transportation Technology and Energy Center at San Diego Miramar College (contractor). Based on approved Task 2 – Final Funding Plan, the contractor implemented Task 3 of the contract. All community college contracts were implemented, and the colleges completed equipment purchases, curriculum development, and faculty professional development.

Through its subcontractor, Phillips Design, the contractor developed and managed a website location, 4nrg.org, to market and track all components of the funds allocated to the colleges and related features of program implementation. This included newsletter highlights associated with respective program implementation. Quarterly news flashes were created and emailed to provide up-to-date descriptions of program accomplishments at selected colleges. Contract project management and administration subcontracts were completed. Finally, all curriculum developed under this funding is posted at the [Clean Energy and Transportation Initiative website](http://atleducation.org), <http://atleducation.org> for use by all faculty in program development.

The CEC also funded workforce technical training through the Southern California Regional Transit Training Consortium and through Stanford Transportation Group. Both organizations provided alternative fuel vehicle technical training sessions to transit workforce including employees of public transportation agencies, academic instructors, and members of the Municipal Equipment Maintenance Association in northern and southern California. Through onsite and online training, more than 160 workers were trained on the newest systems and diagnostic applications in their field. In addition, 14 trainers were certified through the Southern California Regional Transit Training Consortium program, ensuring a sufficient number of trainers available to continue high-quality workforce training to transit organizations throughout California in natural gas engine diagnostics.

CHAPTER 1:

Review of Contract Requirements

Background/Problem Statement

There is strong growth in the use of alternative fueled vehicles in California. The increase in usage spans multiple user types, including personal/private use, business, and government fleets. As the market grows, there is a greater need for technicians to service these specialized vehicles. While there is now more availability of training for clean fuel vehicle technology, specialized training in alternative fueled and advanced vehicle technology is still significantly limited to proprietary training by manufacturers.

The Advanced Transportation Technology and Energy Center

The Advanced Transportation and Energy Center at San Diego Miramar College was created through initiative funding from the California Community College's Chancellor's Office and is responsible for implementing the California Community College Advanced Transportation and Energy initiative. During the contract, the community college initiative went through three name changes, first to Advanced Transportation and Renewable Energy, then changed to the Clean Energy and Transportation Initiative, and finally to Advanced Transportation and Logistics. [The Clean Energy and Transportation Initiative's website](http://atleducation.org) is found at <http://atleducation.org>.

Goal of the Contract

The goal was to develop and fund advanced transportation workforce training through the California Community Colleges automotive technologies system. Advanced Transportation and Energy published a request for proposal to fund alternative fuel and advanced vehicle technology proposals across the California Community College system, and issued awards with CEC staff direction and in keeping with each community college's process for receiving and using awarded funding. To the extent possible, and where applicable to training for participants, Advanced Transportation and Energy focused on the participation of veterans and persons living in underserved and disadvantaged communities. Advanced Transportation and Energy also recognized that community college technical training programs are not limited to a specific community college zip code location, but have a wide geographic range of service.

Objective of the Agreement

The objective was to develop and fund alternative fuels and advanced vehicle technology workforce training program to increase the number of individuals able to repair and maintain alternative fueled vehicles for the growing clean vehicles market

CHAPTER 2:

Review of Task Work Activities

Task 2 – Funding Plan

The goal of this task was to develop a funding plan and submit it to the CEC for approval. Prior to this agreement, the CEC and the California Community Colleges Chancellor's Office Initiative Programs worked together to assess the readiness of California's community colleges to provide alternative fuel and advanced transportation training throughout the state. A key finding of that work was that "Community college programs related to advanced transportation need to be available across the state (including rural areas) but should be primarily concentrated in regions with high absolute and relative advanced transportation employment, such as Los Angeles and Orange, San Diego, Bay Area Counties, Sacramento, and other counties that show a high regional concentration of such employment including Shasta, San Bernardino, San Joaquin, Sutter and Imperial." To that end, the organizations initiated activities to establish technical training programs that provide a foundation for alternative fuels technical training within regions incorporating these areas.

The concept for the funding plan was designed to continue those efforts by improving the regional capacity to deliver alternative fuel technical training via California Community Colleges. An request for proposal process was created, approved by the CEC, and implemented. The request for proposal process was designed to facilitate the advancement of community college alternative fuel technical training programs in almost all areas of California. Under the initial \$2 million agreement, the contractor and the CEC approved nine community colleges for program development based on scores at the conclusion of the request for proposal process. The contract was amended to add \$1 million. As a result, in March 2017 an additional six community colleges received funding. These colleges had received passing scores, but were not funded through the original request for proposal process. Subcontracts with each of the colleges were implemented according to the overall requirements of the CEC contract.

The funding plan included a set aside of \$200,000 to develop workforce training pilot programs. The CEC and the contractor identified two programs for such training, the Southern California Transit Training Consortium (SCRTTC), with members throughout California, and the Municipal Equipment Maintenance Association, focused on local government fleet operations and maintenance.

Task 3 – Implementation of Approved Funding Plan

The goal of this task was to implement the approved funding plan. The contractor implemented and administered the approved funding plan, including all of the following:

- Development and delivery of training for trainers
- Equipment purchases for training purposes
- Information on the development and publication of curriculums

- Training to underserved communities and veterans, when applicable
- Information in the quarterly reports on the operation and oversight of the approved Funding Plan, including:
 - Activities related to monitoring the program
 - Challenges in implementing the program
 - Proposed solutions to challenges faced in implementing the program
 - Information the Contractor deems essential to the success of the program

Table 1 is an overview of the funding as used by the colleges.

Table 1: Community College Funding

ORIGINAL FUNDING	Awarded	Expended
American River College	\$192,308.00	\$105,584.67
City College of San Francisco	\$192,308.00	\$183,257.43
Chabot College	\$184,826.00	\$183,265.89
Bakersfield College	\$ 80,452.00	\$80,355.16
San Diego Miramar College	\$192,308.00	\$192,308.00
College of the Desert	\$191,920.00	\$191,920.00
Cerritos College	\$189,600.00	\$189,459.52
Rio Hondo College	\$192,551.00	\$191,814.48
Cypress College	\$183,727.00	\$183,727.00
ADDED FUNDING		
Copper Mountain College	\$134,089.84	\$134,088.71
Foothill-DeAnza Community College District	\$189,148.83	\$189,031.74
Hartnell College	\$191,211.83	\$133,171.55
Los Angeles Trade Tech	\$198,588.83	\$179,091.57
Saddleback College	\$135,916.83	\$130,405.55
Victor Valley College	\$101,043.84	\$100,901.00

Source: San Diego Community College District

Overview of Major Equipment Purchases

The information below summarizes the efforts of the colleges during this contract. An appendix to the final report includes detailed reporting from each college and workforce trainer.

Community colleges were encouraged to address alternative fuel technical training needs as pertinent to their respective region and the use of that technology in the region. As a result, there was a wide range of light-duty vehicles selected, varying from hybrid to all electric and fuel cell vehicles. On the heavy-duty side, most purchases focused on natural gas engines as a primary means to provide up to date technical training.

Table 2 summarizes the overall major purchases.

Table 2: Major Equipment Purchases

Light-Duty Hybrid Vehicles	9
Light-Duty Electric Vehicles	15
Light-Duty Fuel Cell Vehicles	4
Compressed Natural Gas (CNG) Engine Technology	4

Source: San Diego Community College District

Figure 1, Figure 2, Figure 3 and Figure 4 depict the overall major purchases.

Figure 1: Nissan Leaf – Copper Mountain College



Source: San Diego Community College District

Figure 2: Toyota Mirai – Los Angeles Trade Technical College



Source: San Diego Community College District

Figure 3: Freightliner Natural Gas-Fueled Truck – American River College



Source: San Diego Community College District

Figure 4: Cummins Natural Gas Engines on Stands – San Diego Miramar College



Source: San Diego Community College District

Curriculum Development

While the ability to provide technical training with up-to-date equipment is a challenge for community colleges, the program did not stop with such purchases but made effective use of that equipment in existing or new courses advancing the technical training related to alternative fuel vehicles.

Courses developed through CEC funding will impact an estimated 756 students each year, and 318 students have already attended classes that use new equipment purchased with CEC funding.

In summary, key courses the colleges modified or created are as demonstrated below in Table 3.

Table 3: Curriculum Development - Courses

College	Courses Modified/Created
American River	AT 341 Alternative Fuels & Advanced Technology Vehicles
	AT 345 Hybrid Electric Vehicle Technology Service & Repair AT 343
	Electric Vehicle Construction, Service & Repair
	AT 347 Advanced Hybrid Electric Vehicle Technology Service & Repair
Bakersfield	B31 Advanced Automotive Electrical & Hybrid Technology
	B34 Advanced Engine Performance
City College of San Francisco	Auto 56 Hybrid and Electric Vehicle (EV) Technology
Cerritos	AUTO 183 CNG Engines

College	Courses Modified/Created
	AUTO 265 Advanced Automotive Electrical
	AUTO 182 Intro. To Alternative Fuels
Chabot	ATEC 90 Hybrid Vehicles Operation/Service
	ATEC 91 Hybrid Diagnostics and Alternative Fuels
Copper Mountain	Introduction to Hybrid/Electric Vehicle Technology
College of the Desert	Auto-043B Hybrid, Fuel Cell, and Electric Vehicle Diagnosis and Repair
Cypress	EV I, EV II, EV III - New Electric Vehicle Certificate Programs
Foothill DeAnza	Auto 67A Hybrid Electric Vehicles
	Auto 67B Plug in Electric Vehicles
	Auto 67G Gaseous Fuel Vehicles
Hartnell	AAT 160 Intro to Alternative Fuels
	AAT 161 Hybrid, Electric, and Fuel Cell Vehicles
LA Trade Technical	DIESLTK 301, 302, 303 incorporated Fuel Cell Vehicle technology
Rio Hondo	Auto 147 Intro to Hybrid and Electric Vehicle Technology
	Auto 158 High Voltage
	Auto 265 Fuel Cell Technology Fundamentals
Saddleback	New Alternative Fuel Vehicle Specialist Program
San Diego Miramar	DT-131 Alternative-Fueled Engine Overhaul
	DT-144 Electronics For Diesel Technology – focused on CNG diagnostics
Victor Valley	Auto 89.3 Intro to Hybrid, Electric Vehicles
	Auto 89.4 Hybrid Vehicle Propulsion
	Auto 89.5 Electric Vehicle Propulsion
	Auto 89.6 Advanced Hybrid, Electric Vehicles and Alternative Propulsion Vehicle Technology

Source: San Diego Community College District

In addition to modifying or developing new curriculum, a number of the colleges also created new certificate or even degree programs focused on alternative fuels. Table 4 presents examples of these.

Table 4: Curriculum Development – Certificates/Degrees

College	Units	Courses in Certificate Program
Cerritos created an Alternative Fuel Service Technician Certificate	24.5	AUTO-54, Introduction to Electric Vehicles (four units)
		AUTO-55, Advanced Technology Electric Vehicles (four units)
		AUTO-105, Hydraulics and Pneumatics (two units)

College	Units	Courses in Certificate Program
		AUTO-155, Medium/Heavy Duty Brake Systems 3 (2 units)
		AUTO-109, Automotive Diesel Systems (five units)
		AUTO-182, Intro to Alternative Fuels (3.5 units)
		AUTO-183, Compressed Natural Gas Engines (four units)
City College of San Francisco created an Automotive Hybrid and EV Technology Certificate Program	20	Auto 50 Intro to Automotive Mechanics (eight units)
		Auto 51 Automotive Electrical (eight units)
		Auto 56 Hybrid and EV Technology (four units)
Rio Hondo	15.5	Tesla Certificate of Achievement- an added 12-week program for students who have completed or nearly completed their associate degree in hybrid-electric/fuel cell vehicle technology
Saddleback created an Alternative Fuel Vehicle Specialist Certificate Program (AFVS)	27	Automotive Fundamentals (three units)
		Automotive Electrical Systems (three units)
		Advanced Automotive Electrical (three units)
		Automotive Engineering Fundamentals (three units)
		Diesel Technology (three units)
		Alternative Propulsion Systems (three units)
		Hybrid and Electrical Vehicle Technology
		Diesel Systems Technology (three units)
Victor Valley created an Automotive Alternative Propulsion Certificate program and an Associates of Science degree that consists of the same curriculum plus general education courses	24	Select From Restricted Electives (three units)
		Auto 50 (Intro to Auto prerequisite) (four units)
		Auto 82.0 (Automotive Electrical) (four units)
		Auto 77.3 (Workplace Professionalism) (two units)
		Auto 89.3/ (four units)
		Auto 89.4 (three units)
		Auto 89.5 (three units)
		Auto 89.6 (four units)

Source: San Diego Community College District

Faculty Professional Development

The value of faculty professional development in the vocational arena cannot be overstated. Faculty must maintain an up-to-date knowledge of, a hands-on ability to work with, and the aptitude to teach ever-advancing technologies for new technicians to successfully enter the workforce. A crucial component of the contract has been the provision of such technical training for faculty, enabling them to bring new alternative fuel vehicle technology into the classroom and technical automotive laboratories on their respective campuses.

With this funding, at least 127 faculty participated in faculty professional development technical training. Electrical and hybrid vehicle training were the predominant selections, along with natural gas and fuel cell technical training. Finally, technical training in vehicle system diagnostics and diagnostic tools for alternative fuel vehicles was undertaken.

All of these aspects of training are critical for faculty to provide the most up-to-date technical education. Those entering the workforce must have a firm foundation in automotive technology to adapt quickly to technological changes in alternative fuel and advanced automotive vehicle technology.

In summary, the faculty training received is as follows in Table 5.

Table 5: Faculty Professional Development

College	Training Acquired	Faculty Trained
American River	Cummins Technical Training	2
	Toyota Mirai Fuel Cell Vehicle	1
	ACDC Electric Vehicle	14
Bakersfield	Scan Tool Diagnostics/Pico Scope Advanced Methods	3
	Hydrogen Vehicle Training For Faculty	2
	Hybrid Electric Vehicle Familiarization	3
	Advanced Hybrid Electrical Diagnosis	3
	Advanced Engine Performance Diagnosis	3
	Sensor Analysis Scan Tool & Scope	3
City College of San Francisco	Hybrid Training Course A	4
	Tech Training	3
Cerritos	Introduction to Cummins ISL-G Engine	5
Chabot	Intro/Intermediate Hybrid Instructor	9
	Advanced/level II Hybrid/EV Instructor	8
Copper Mountain	Up Your Voltage Hybrid/Electric Vehicle Training	1
College of the Desert	Cummins Technical Training	1
	Cummins Near Zero Emissions 9.0 CNG Engine Hydrogen	6
	Vehicle Training for Faculty	18
	Toyota Vocational Education Training	1
	Sunline Transit Workshop	2
Cypress	Subaru electrical/electronic systems	1
	Toyota curriculum development	2
LA Trade Technical	Fuel Cell Seminar and Energy Exposition	1
	Sunline Zero Emission Bus Program	1
	Train-the-Trainer: Fuel Cell Curriculum	4
Saddleback	Successful Hybrid Training Diagnosis and Repair	2
	BMW High Voltage Battery Technology	1
San Diego Miramar	Cummins online training	1
Victor Valley	Electric Drive Vehicle Course	14
	three day conference related to Alternative Propulsion	4
	Basic and Advanced Hybrid Vehicle Propulsion	4

Source: San Diego Community College District

The provision of workforce training, though a small component of the overall contract, is a highly effective faculty professional development tool in its own right. Community colleges faculty deliver workforce training to technicians already in the workforce, that require new

knowledge of alternative fuels and associated technologies. The faculty must be able to interact with and effectively deliver technical training to those already knowledgeable of the vehicle technology. Through this process, faculty also learn real world issues associated with the actual maintenance and repair of such vehicles. This is then delivered to the students, allowing them to become more adept in the workforce from the start of their careers.

Student/Faculty Response

Courses developed with CEC funding will impact an estimated 756 students each year, and 318 students have already attended classes that utilize the new equipment purchased through this contract. The contractor has highlighted program implementation through electronic newsletters over the course of the contract. A few examples are:

As noted in the March 2018 Newsletter – “Joshua Baker is one of those students. He graduated from Saddleback College in May and is now a production manager and senior lead technician at Lithium Cycles. Baker considered other programs but decided on Saddleback once he realized how much the college’s alternative fuel program had to offer. ‘I loved how we spent so much time with hands-on operations,’ Baker said. ‘I was able to learn the theory and apply it right away to get the practice I needed before going into the real world.’”

Chabot College student Estefany Espina appreciates the fact that she can work on several different types of vehicles throughout her program. “If only one car, the Generation II Prius, had been used, it would have left me knowing only about Toyota, from that certain year these cars were used,” Espina said. “Thanks to using various vehicles, I could clearly see the differences between the electronic modules used on the cars, their performance, and the hybrid technology.”

Ashley Moeller is currently working on her associate degree at College of the Desert and her bachelor’s degree from California State University at San Bernardino.

Moeller is the first person in her family to go to college and has been interested in cars and racing since she was young. She hopes to open up her own all-female automotive shop that specializes in high-performance engines. The training she’s receiving will help her achieve that goal. “College of the Desert has taught me so much the past two years. The education, professors, and tools provided by this college are priceless,” Moeller said. “Joining the automotive program as a female made me nervous, but it ended up being one of the best decisions of my life.”

Community college faculty appreciate the opportunities the CEC funding has helped create for them and their students. As noted in the March 2018 Newsletter, Nick Rothman, an instructor at City College of San Francisco, said the college’s hybrid and electric vehicle program has seen enrollment growth and significant media attention thanks to the new vehicles purchased with the funding. “Press events held in March 2017 described the City of San Francisco’s commitment to clean vehicles and infrastructure and the City College of San Francisco Hybrid EV program,” Rothman said. “Students enjoyed hands-on exercises and exploration of new vehicle technology made possible by CEC funded vehicle and equipment purchases.”

Bakersfield College Instructor Andrew Haney said enrollments there have almost doubled since its curriculum revamp, including increased interest from women and underrepresented

students. The new equipment and courses have also resulted in stronger relationships with industry as employers see the value that new graduates can bring to their businesses. "We have seen an increase and willingness from our advisory board to be more involved as business partners with the college," Haney said. "They are noticing that the students we are sending them are more prepared for the workforce than before and have a better understanding of the complexities of today's vehicles."

Training opportunities also extended into the community. American River College hosted a Municipal Fleet Academy that provided training to municipal agencies in its region. The college worked with the Public Equipment Managers Association and Municipal Equipment Maintenance Association to host the event. "Students, staff, and agencies were able to attend this event and receive a certificate specific to the CNG training," said Trish Caldwell, American River College's Dean of Technical Education. "In response to the great attendance and interest by the local industries, there will be a second Annual Municipal Equipment Fleet Academy at the Mather campus in June."

Workforce Training Summary

The CEC also funded workforce technical training through the SCRTTC and through Stanford Transportation Group. Both organizations provided alternative fuel vehicle technical training sessions to the transit workforce including employees of public transportation agencies, academic instructors, and members of Municipal Equipment Maintenance Association in northern and southern California. Through onsite and online training, more than 160 workers were trained on the newest systems and diagnostic applications in their field. In addition, 14 trainers were certified through the SCRTTC program, ensuring trainers are available to continue high-quality workforce training to transit organizations throughout California in natural gas engine diagnostics. Figure 5 shows this training in progress.

Figure 5: SCRTTC Cummins Engine Training



Source: San Diego Community College District

Program Challenges

Overall, the most significant program challenge was to effectively move in sync with the operational systems of the colleges, the State, and the equipment vendors. All of these have respective operational systems with checks and balances, processes, and scheduling. Decisions to approve funding, accept funding, sign contracts, acquire products – including obtaining quotes and invoices, preparing and providing approval for invoices, and paying entities all require time.

There were two primary instances whereby such challenges resulted in the inability to acquire key equipment. For the American River College Automotive Program, the purchase of a Ford F-350 CNG truck was more challenging than expected. The CNG factory system was awaiting California Air Resources Board approval. Once approved, the CNG system was to be installed by A-1 Fuel Systems and delivered to the college. Unfortunately, the timing of the California Air Resources Board approval did not occur during program implementation; therefore, this purchase could not be made and significant funding was unspent. For Hartnell College, due to the college and vendor processing timelines and requirements, including the actual purchasing time for the equipment to be purchased and shipped; the college was not able to complete the purchasing within the project timeline, and was not able to use the entire contracted amount.

Future Program Opportunities

Among the greatest challenges for community college technical training programs is the acquisition of new technology and training faculty on that technology. This program made substantial progress in addressing those issues. For example, the training program at Cypress noted that it had 20 students enter the workforce with Tesla given the upgrades made through its technical training program.

The automotive industry is challenged to ensure continuous technological advances. A good portion of this will occur via substantial integration of computer and electrical system operations. State policy is needed to address energy and/or environmental issues and to drive advancements in automotive, trucking, transit, and related transportation technology.

It remains critical for California's alternative fuel policies to integrate technical training advancement into implementation. This is particularly the case if the intention is for vehicles on the road to meet the policy-driven manufacturer vehicle operating specifications.

In consideration of the above:

- The CEC and the Chancellor's Office, Advanced Transportation and Logistics Initiative should continue to work together to strengthen technical training programs.
- When addressing transportation program improvements, the CEC, could assess technical training needs associated with improvements and determine how such needs are or can be addressed.
- The CEC and Advanced Transportation and Logistics Initiative could work together to review which regional alternative fuel vehicle technical training meets industry and consumer needs in specific regions of the state.
- The CEC and the Chancellor's Office could investigate joint programs to ensure regional needs are met.
- The CEC could encourage other organizations such as the Air Resources Board, South Coast Air Quality Management District, the California Public Utilities Commission, and California's electricity and natural gas utilities to address and participate in funding alternative fuel vehicle technical training.
- The CEC could meet with organizations such as SCRTTC and Municipal Equipment Maintenance Association to ascertain workforce technical training needs, and determine the extent to which those are being met.

GLOSSARY

CALIFORNIA ENERGY COMMISSION (CEC) - The state agency established by the Warren-Alquist State Energy Resources Conservation and Development Act in 1974 (Public Resources Code, Sections 25000 et seq.) responsible for energy policy. The Energy Commission's five major areas of responsibilities are:

- Forecasting future statewide energy needs
- Licensing power plants sufficient to meet those needs
- Promoting energy conservation and efficiency measures
- Developing renewable and alternative energy resources, including providing assistance to develop clean transportation fuels
- Planning for and directing state response to energy emergencies.

COMPRESSED NATURAL GAS (CNG) - Natural gas that has been compressed under high pressure, typically between 2,000 and 3,600 pounds per square inch, held in a container. The gas expands when released for use as a fuel.

ELECTRIC VEHICLES (EV) – A broad category that includes all vehicles that are fully powered by electricity or an electric motor.

SOUTHERN CALIFORNIA REGIONAL TRANSIT TRAINING CONSORTIUM (SCRTTC): A training resource network comprised of Community Colleges, Universities, Transit Agencies, Public and Private Organizations focused on the development and delivery of training and employment of the transit industry workforce that is proficient at the highest standards, practices, and procedures for the industry.¹

¹ [Southern California Regional Transit Training Consortium](https://www.scrttc.com/) <https://www.scrttc.com/>