

AGENDA ITEM NO. 1C

COUNCIL MEETING 03-01-12

APPROVED BY


DEPARTMENT DIRECTOR

CITY MANAGER 

March 1, 2012

TO: CLINT OLIVIER, Council President
Council Members
City Manager

FROM: KENNETH P. HAMM, Director
Transportation Department

BY: JIM SCHAAD, Manager
Fleet Management Division

SUBJECT: AUTHORIZE THE TRANSPORTATION DIRECTOR OR DESIGNEE TO EXECUTE DOCUMENTS TO APPLY FOR AND ACCEPT GRANT FUNDS FROM THE SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT (SJVAPCD) REMOVE II GRANT PROGRAM FOR \$15,000 FOR ALTERNATIVE FUEL VEHICLE MECHANIC TRAINING

RECOMMENDATION

Staff recommends that the Council approve the attached resolution to authorize the Transportation Director or designee to execute documents to apply for and accept grant funds from the San Joaquin Valley Air Pollution Control District (SJVAPCD) REMOVE II grant program for \$15,000 for alternative fuel vehicle mechanic training.

EXECUTIVE SUMMARY

The Fleet Management Division of the Transportation Department plans to provide specialized alternative fuel vehicle maintenance training to heavy equipment and bus mechanics that maintain and repair 181 alternatively fueled vehicles, refuse trucks, and buses within the City fleet. The SJVAPCD will fund up to \$15,000 of the cost of training mechanics through their alternatively fueled vehicle mechanic training program funded through the REMOVE II grant program. Council approval of the attached resolution is requested to authorize the Transportation Director or designee to execute documents to apply for and accept these grant funds from the SJVAPCD.

BACKGROUND

In an effort to reduce emissions from on-road heavy duty motor vehicles, the SJVAPCD has developed a program to provide incentive funding to buy down the cost of training for mechanics that repair and maintain alternatively fueled vehicles. Funding is provided for up to \$15,000 for the cost of training through their Alternative Fuel Mechanic Training Component Remove II Program. An alternative-fueled vehicle is defined as one that uses compressed or liquid natural gas, liquefied petroleum gas, methanol, ethanol, or electricity.

This grant program will provide \$15,000 to the City for training of heavy equipment and bus mechanics regarding the maintenance and repair of 181 alternatively fueled vehicles within the City fleet. Council approval of the attached resolution to facilitate receipt of these grant funds is requested. The proposed resolution attached with this report has been reviewed by the City Attorney's Office and approved as to form.

FISCAL IMPACT

None

**ALTERNATIVE FUEL VEHICLE MECHANIC TRAINING
INCENTIVE COMPONENT
REMOVE II PROGRAM APPLICATION**

Application to the San Joaquin Valley Air Pollution Control District (SJVAPCD) for incentive funds for the training of mechanics, technicians and related personnel in the proficiency of alternative fuels vehicle or fueling infrastructure technology.

Please provide the following information regarding your proposed training and application. Additional information may be requested during the review process if needed. Applicant acknowledges that award of cash incentive is conditional upon approval of the SJVAPCD and must meet the minimum eligibility criteria.

The applicant will be informed as to whether or not the application meets the minimum qualifications. If the application does not meet the minimum qualifications SJVAPCD staff will provide the applicant with a list of deficiencies. If you have any questions regarding the application process, please contact the SJVAPCD's central region office:

Please submit applications to the following location only. Applications will not be accepted at any other location.

**San Joaquin Valley Air Pollution Control District
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244**

**Central Region
Fresno
(559)230-5800**

✓ CHECK LIST FOR APPLICATION ITEMS ✓

Be sure the following items are included with your application submittal. Check each applicable box below to indicate inclusion of material.

- Completed Applicant Information Form.
- Course description or outline of the training in alternative fuel technology provided by the instructional coordinator. Include the cost analysis list or breakdown of training fees.
- Co-funding information (other public grants or funding sources).
- Other _____

✓ CHECK LIST FOR ELIGIBILITY CRITERIA ✓

Please check each applicable box to indicate eligibility of proposed alternative fuels training.

The training course program is specifically for the training in the mechanics, operational safety and maintenance of alternative fuels vehicle technology or alternative fuels infrastructure technology.

The training components in alternative fuels technology include:

Compressed Natural Gas (CNG)

Liquid Natural Gas (LNG)

Electric (EV)/Hybrid Vehicle Technology (Heavy-Duty)

Hydrogen Fuel Cell (HFC) Technology Fueling Infrastructure (fueling station, storage systems, fuel delivery systems, etc.)

Other _____

The technicians, operational staff and related personnel to participate in the training include:

Vehicle or Facility Mechanics

Vehicle or Facility Fuelers

Vehicle Drivers or System Operators

Maintenance Technicians

Facility Engineers, Department Managers, or Trainers

Other _____

The college or institution that will provide the training in alternative fuel technology:

California Community Colleges Advanced Transportation Technologies:

Natural Gas Vehicle Institute

Other Cummins Inc. will provide onsite training at COF DOT

The alternative fuels technology training course includes:

Vehicle or Infrastructure Fuel Systems

Alternative Fuel Engine Systems

Fueling Practices and Procedures

Fueling Station Components

Operational Safety

- Driver Training or Operator Training
 - Mechanic Training
 - Maintenance Procedures and Practices General Alternative Fuels Technology Overview
 - Other _____
-
- The training and equipment location:
 - In-house Training Site Option (operator's site)
 - College/Institutional Training Site Option
 - Other _____
-
- The training program duration:
 - Workshop Course up to ten (10) consecutive days
 - Semester course
 - Other _____
-
- Provide a Cost Analysis List stating the separate fees for the course program, instructional materials, equipment, and facility costs relative to the number of individuals in the training group.
 - Provide a detailed course description or outline provided by the training coordinator.
 - Provide a description of the current training needs of the mechanics and operational technicians.
 - Provide a description of the organization's alternative fuel fleet and infrastructure composition.
 - Provide an explanation of how the training will contribute to the development and transition to the incorporation of alternative fuels technology in the fleet or infrastructure operations.
 - The organization or agency is based within the geographic area of the SJVAPCD and the operational activities of the fleet or infrastructure is within the boundaries of the SJVAPCD
 - The organization is actively pursuing measures for the development and transition to alternative fuel technology:
 - The organization is conducting its first major transitional action for the incorporation of alternative fuel technology (first time purchase of alternative fuel vehicles, modification of infrastructure, etc.).
 - The organization is making a substantial incremental change to increase or expand the existing alternative fuel technology in the current fleet or infrastructure operations (purchase additional alternative fuel vehicles, modification/retrofit technology, infrastructure equipment/components, etc.)

Incentive Amounts

Program incentive for alternative fuels technology training will be evaluated on the following standards:

- Training program proposal or course outline description for alternative fuels technology.
- Improvement in the fleet or infrastructure operations for the development and transition to alternative fuel technology.
- Need of the training for mechanics, technicians and related personnel.
- Not to exceed \$15,000 per application. In addition, the maximum incentive is \$15,000 per fiscal year to an organization.

ALTERNATIVE FUELS MECHANIC TRAINING REMOVE II PROGRAM APPLICATION

A. APPLICANT INFORMATION		
Organization: City of Fresno Department of Transportation (DOT) [Including the Fleet Division and the FAX Maintenance Division]		
Contact name: Jim Schaad		
Person with contract signing authority: Kenneth Hamm		
Street/mailling address: 2223 G Street		
City: Fresno	State: CA	Zip code: 93706
Phone: (559) 621-1101	Fax: (559) 485-2167	
E-mail: jim.schaad@fresno.gov	Mobile Phone: ()	
Geographic area served by organization: City of Fresno		
Geographic area to be served by the alternative fuels technology training (if different than above): Same		

I hereby certify that all information provided in this application and any attachments are true and correct to the best of my knowledge, and that I have read the separate Guidelines, Policies and Procedures document for this program component.

Printed Name of Responsible Party: Kenneth Hamm	Title: Director of Transportation
Signature of Responsible Party: (Must sign in BLUE INK ONLY) 	Date: 9-1-11

INFORMATION ABOUT THE TRAINING PROGRAM

All requested information below must be provided.

B. GENERAL INFORMATION ABOUT TRAINING PROGRAM	
1. Funding dollars requested (\$): \$15,000	2. Total project cost: \$18,750
3. Educational institution or college training program and address (street address, city, state, zip, and phone number): Training to be provided onsite at DOT by the manufacturer: Cummins Inc. 1950 Burroughs San Leandro CA 94577 510-614-5145	
4. Course training topics and description: <p>The alt fuel engines are new to many DOT mechanics/techs. Thus training is crucial for long-term maintenance and engine overhaul. DOT currently wants Cummins specific training on trouble shooting and repairing drivability problems with these engines. Drivability problems can come from a multitude of different areas, and since the engine warranties will be ending soon, DOT will be doing the trouble shooting and repairs.</p> <p>For specific topic areas to be covered, see attached lesson plan.</p>	
5. Training coordinator contact information (street address, city, state, zip, and phone number) such as course instructors and/or program director: Stu Frampton Cummins Inc. 1950 Burroughs San Leandro CA 94577 510-614-5145	
4. Total number of technicians to be trained: 15 total for DOT (Nine from Fleet Division and Six from FAX Maintenance)	5. Cost per technician (student) to be trained: \$1,250.00 - Includes all instructional materials, equipment, and trainer costs.
6. Provide the address location (street address, city, state, zip, and phone number) for the training and identify if the course will be conducted from on-site business operations or from educational facility: On-site training at: City of Fresno Department of Transportation 2223 G Street Fresno, CA 93706	

7.	Date of the scheduled course and the duration of the training (workshop days or semester): The training date will be scheduled once funding is secured. It will be a 4 or 5 day class depending on scheduling constraints.
8.	Additional funding sources solicited and amounts, if available: No additional funding will be solicited for this training. The overage will be funded by existing, already budgeted, state funding. Please note: this training will not be possible without this funding. Due to the current economic climate and extensive cutbacks at the City of Fresno, training budgets have been drastically reduced or eliminated. This grant would have a tremendously positive impact for the Department by increasing maintenance efficiencies, and thus keeping service available to the public.

C. INFORMATION OF THE FLEET AND INFRASTRUCTURE	
1.	Number and description of alternative fuel vehicles currently in the fleet: 145 LNG refuse trucks 70 CNG full size buses 5 CNG small (paratransit) buses 11 CNG street sweepers
2.	Proposed expansion or modification to the current alternative fuel fleet: The City of Fresno Department of Transportation has made significant strides over the last several years to convert its fleet of Refuse Trucks, Street Sweepers, and Fixed-Route Buses to alternative fuel. This includes Liquid Natural Gas (LNG), Compressed Natural Gas (CNG), and Electric Hybrids. Currently, for example, the bus fleet is more than 50% CNG, with most of the rest of the fleet being diesel. As the buses reach the end of their useful lives and funding is available to replace them, CNG, all-electric, or electric-hybrid vehicles are purchased to replace them. This will continue until all buses are alt fuel.
3.	Description of current alternative fuel infrastructure: DOT has a fleet of 145 refuse trucks, 114 fixed-route buses, 55 paratransit vehicles, and 11 street sweepers. All of the refuse trucks run on ether LNG, and 60% of the fixed-route bus fleet, all of the street sweepers, and a few paratransit vehicles run on CNG. DOT currently has an LNG storage capacity of 37,000 gallons, and a two-CNG compressor fueling station that will soon be expanded to three compressors.

4. Proposed expansion or modification to the current alternative fuels infrastructure:

The LNG station was expanded to 37,000 gallon capacity about 18 months ago. Also at that time a third LNG dispenser was added. The CNG station has two 1600 cfm compressors with three dispensers. CNG capacity will be expanded soon when a third CNG compressor is installed.

Natural Gas Engine Familiarization

Day 1

I) Introduction

- A) Instructor
- B) Students
- C) Course Objectives
 - 1) The student will know the unique characteristics of Natural Gas as an Alternative Fuel.
 - 2) The student will demonstrate a working knowledge of the L Gas fuel system and components.
 - 3) The student will demonstrate proper diagnostic procedures for the L Gas fuel system
 - 4) The student will understand the operation and diagnostic procedures of the L Gas ignition system and components
 - 5) The student will understand the principles of "Cooled EGR" system.
 - 6) The student will understand the principles of the 3-way exhaust catalyst system.
 - 7) The student will become familiar with the CM2180A Electronic Control System.
 - 8) The students will demonstrate to the instructor their ability to properly perform diagnostic and repair procedures to the L Gas engine systems.
- D) Starting Time
 - 1) 8:00 am
 - 2) Breaks

II) 2007 L Gas Engine Overview

- A) 07 L Gas PowerPoint
 - 1) Talk briefly through slides.
 - 2) Engine Walk Around
 - 3) Key Points
 - a) Explain stoichiometric
 - b) Cooled EGR
 - c) 3 way catalyst
 - d) New Sensors
 - (1) Oxygen sensors

III) Natural Gas Familiarization

- A) PPT of Natural Gas and Safety. (Option 2 – play video tape or Virtual College)
 - 1) Gas Quality
 - a) 90% methane
 - (1) Explain that the performance spec of Natural Gas now is calculated by "Methane Number".
 - (2) AEB 79.01
 - (i) Refer to page 2 "Motor Methane Number"
 - (ii) Refer to page 4 for methane number of 80.
 - (3) AEB 79.02 – Wide Range Fuel
 - (i) Refer to page 4 Methane number 65.
 - b) Show fuel calculation chart.
 - (1) Explain – 2007 L Gas Engine must have a minimum Methane Number of 75.
 - c) 1300 to 1377 Wobbe Index.
 - (1) WOBBE Index = ratio of heating value to Sq. root of specific gravity.
 - d) Less than 1.7 % propane
 - e) Less than 4 % Ethane limit

Natural Gas Engine Familiarization

- f) 130 octane. If too much propane, octane can change to 110 and cause preignition and engine damage.
 - g) Natural Gas is 3 times lighter than air.
 - h) Propane is heavier than air.
 - i) Corrosive agents
 - j) Oil contamination
 - (1) Talk about effect on laminar flow device in the Gas Mass Flow Sensor.
 - k) Show overhead on fuel quality
 - l) Show overhead on power verses lower heating value
 - m) Show overhead on effects of gas products on an engine.
 - n) Show sample bag for gas testing.
- 2) Standard Cubit Feet (SCF)
 - a) 140 SCF = 1 Gal diesel
 - b) 20% lower fuel mileage
 - 3) Tank Quality
 - a) Tanks must be inspected every 3 years by a certified inspector.
 - b) 15 year replacement
 - (1) Hydrogen embrittlement
 - 4) LNG
 - a) Minimum of 98% methane
 - b) Filling
 - (1) Leave 4 to 16% volume of air
 - (2) If filled improperly, not enough air to provide build of pressure - will have to let set.
 - (3) Run almost out before refilling.
 - (4) If set too long the tank will vent and the valve will freeze open, dumping all the fuel.
 - (5) Must have ground strap from tank to frame.

IV) Maintenance

- A) Maintenance schedule
 - 1) Show each maintenance step.
 - 2) Go out to vehicle or module and point out maintenance components.
 - 3) Refer to recall book and go over oil recommendations.
 - 4) Drain fuel filter daily at first then once a week.
 - 5) 6 months on CCV
 - a) Notice mounting for drain back, oil in intake.
 - 6) Spark Plug Maintenance.
 - a) Sometimes are changed without proper inspection.
 - b) Use correct plugs
 - 7) Refer to " Paschens Law "
 - a) Explain necessity of changing plugs and insulators.
 - b) Use two sockets.
 - 8) Use alcohol to clean plugs and coil insulator.
 - 9) Exhaust Back Pressure.
 - 10) Valve lash is greater .012 in .024 ex.
 - a) Talk about valve setting procedure
- B) Out to engines. Go over Maintenance to Spark Plugs and Valve Adjustment.
- C) Lubricating Oil Recommendations
 - 1) CES 20074

Natural Gas Engine Familiarization

Day 2

V) Base Engine

- A) L Gas Introduction Service Topic
- B) L Gas Family Data Sheet
- C) Specific engine specs.
- D) Plus Engines Installation Guidelines
- E) Engine Views

VI) Combustion Air System

- A) Show Intake Air Flow
 - 1) Note location of Throttle Actuator.
 - a) Only controls air flow not air fuel mixture as on previous product.
 - 2) Explain flow through EGR System
 - a) Review the principle of CEGR and how it reduces Nox. Use PowerPoint
- B) Review Exhaust Flow
 - 1) Review purpose of the Wastegate
 - a) As it relates to boost pressure
 - b) As it relates to CEGR flow
 - 2) Review WasteGate Control
 - a) Function of Wastegate Control Valve
 - 3) Review Function of 3-way Catalyst
 - a) Explain Nox Reduction Catalyst operation
 - b) Explain Oxidation Catalyst operation
 - c) Explain function of second O2 sensor
- C) Out to engines
 - 1) Identify fuel & Combustion Air system parts and flow.

VII) Fuel System

- A) OEM Fuel System Guidelines
 - 1) LNG Recommendations
 - 2) CNG Recommendations
- B) Show first PPT slide of fuel components in order of flow. Past out parts.
 - 1) High pressure shut off
 - 2) High Pressure regulator
 - a) When failed will usually fail open
 - 3) Filter
 - a) Gasket is prelubed
 - b) In to out
 - 4) Low Pressure Regulator
 - 5) Fuel Shut off valve
 - 6) Gas Mass Flow Sensor
 - a) Laminer Flow Device
 - b) Talk about oil contamination
 - 7) Fuel Control Valve
 - 8) Mixer
 - 9) O2 sensor

Natural Gas Engine Familiarization

- C) Continue with PowerPoint
 - 1) Discuss Fuel Control
 - a) Show Slide of Fuel Control.

Day 3

VIII) Ignition Control

- A) L Gas VC
 - 1) Coil On Plug (COP)
 - a) Multiple Spark Discharge (MSD)
 - b) 15 MS Pulse
 - c) 4 times greater on MSD.
 - d) MSD is controlled by MAP Sensor
 - (1) Rising to 7 psi turn off
 - (2) Falling to 5 psi turn on

IX) Electronic Controls

- A) Show PowerPoint of ECM Inputs and Outputs.
- B) Show PowerPoint of Electronic Components.
- C) Go Over Wiring Diagram
- D) Go Out to engine and find components on the engine and Wiring Diagram.
 - 1) Utilize exercise.

X) INSITE 6X Familiarization

- A) Show INSITE 6X PowerPoint or just review major points - depending on students and time.
- B) Programming

Day 4

Qualification

XI) Practical Exercises

- A) Pressure readings
- B) Identify all components.
- C) INSITE (Pass out exercise)
 - 1) Monitor
 - 2) Fault codes

XII) Overall Review

- A) Answer all Questions
- B) Hand Out Certificates
- C) Dismiss