Development of a Natural Gas School Bus Training Curriculum

Contractor
The Advanced Transportation Technology Initiative (ATTi) of the California Community Colleges and the College of the Desert Community College District as administrative agent

Cosponsors
West Valley College, Saramento City College, College of the Desert, West Valley College, Sacramento City College, West Valley College, Cerritos College, Long Beach City College, Rio Hondo College, Cypress College,

Project Officer
Connie Day, SCAQMD

Background

The Contractor was tasked to design, develop and beta test a comprehensive standardized school bus curriculum on natural gas engines, CNG Cylinder safety and refueling systems to educate school administrators, children and parent about CNG, CNG vehicles and the SCAQMD 1190 rules.

Project Objective

Task 1.1 Create a one-hour natural gas overview, safety and vehicle Operation PowerPoint presentation designed for school administrators and parents.

Task 1.2 Create a program brochure (1000 copies) that reviews the basic characteristics, expected operation and safety points of a natural gas vehicles.

Task 1.3 Create and produce a video to use as part of the education program fro school administrators, children and parents

Task 2.1 Develop a standardized instruction CNG manual

Task 2.2 Develop 16 hours of classroom Instructional materials for CNG cylinder safety and fueling procedures.

Task 2.3 Develop a PowerPoint presentation that supports the instructor Classroom material

Task 3.1 Develop Standardized Instructional Program for Heavy duty Compress natural Gas (CNG) engine maintenance and repair including and Introduction to Alternative fuels, facility and vehicle safety, Compressed Natural Gas, electronics, scopes and meters.

Task3.2 Develop two-20 hour training programs: Basic Compressed Natural Gas Systems and an Advanced Compressed Natural Gas Systems Curriculum.

Task 3.3 Develop a Teachers Guide for a 40-hour CNG training Class.

Task 3.4 Develop PowerPoint Presentation and Script for classroom Instruction as a compliment to the teacher's guide.

Task 3.5 Develop Lab activities to support the CNG training Class program

Task 4.1 Beta test and validate the training methodology.

Task 4.2 Review Beta test testing and make modifications to improve the final products for SCAQMD.

Status

The Project has been completed on schedule as of February 2005, all final products have been delivered to SCAQMD.

Project Summary:

This partnership focused on the creation, validation, implementation, and dissemination of a modularized training program that supports alternative fuel training for entry level as well as incumbent technicians in the transportation industry. In addition, the partnership developed an outreach brochure and video that are being used to educate parents, teachers, and administrators on the benefits and safety of natural gas fueled school buses.

The public transportation sector has been transitioning to clean fuels for several years, and this trend has been accelerated by the adoption of regulations by the South Coast Air Quality Management District (SCAQMD). This partnership focused on assisting school districts and private school bus operators meet these regulations by transitioning their fleets to clean-burning natural gas. The challenge was to help technicians learn new

competencies in a rapidly-changing industry. The new vehicles are significantly different than the old diesel-powered buses they replaced. The new alternative fuel buses are now powered by spark-ignition engines with sophisticated computer controls and even the method of fuel storage in high-pressure cylinders requires technicians to master new skill sets and adopt new practices.

The need for this project was originally identified in 2002, leading to a formal agreement between the SCAQMD and the participating ATTi Centers in Southern and Northern California in early 2003. The training modules were beta tested, reviewed by a group of Industry and SCAQMD technicians, and final versions adopted in December of 2004. In January of 2005, the finished training modules were delivered to a group of technicians representing 16 public and private transportation providers. In February of 2005, a complete set of documentation was provided to the SCAQMD and a set of materials was prepared for dissemination to all ATTi Centers statewide.

The final instructional product consists of a Compressed Natural Gas (CNG) Instructor's Guide, nine instructional modules with over 1,000 PowerPoint slides, and an activity manual. The ATTi Team also created an instructor's Cylinder Inspection manual, a CNG Brochure, a video overview of safe CNG school bus and infrastructure technologies and a supporting Compressed Natural Gas PowerPoint.

Other outcomes included the engagement of 16 student technicians in the beta test and validation process, another 16 student technicians in 40 hours of instruction, production of both print and electronic documents, and the distribution of documents.

Partners:
Several ATTi Centers collaborated on this project, they were: Rio Hondo, Cypress, Long Beach, Miramar, West Valley College, Sacramento City College and College of the Desert. The content experts, curriculum developers, reviewers and instructors included: Mike Slavich and John Frala (Rio Hondo), Luciano Orozco and Richard Bettendorf (Cypress), Cal Macy (Long Beach), David Esmaili, Melissa Ceresa (West Valley College), Phil Cypret (Sacramento City College), Nina Babiarz and Peter Davis (College of the Desert), and Greg Newhouse and Richard Bettendorf (Miramar).

The SCAQMD provided funding, technical review, beta test coordination and project oversight, while John Deere and several other manufacturers provided products and materials used in the development of the training modules. Industry partners included public and private transportation providers including: Placentia Unified School District, Hemet School District, Los Angeles Unified, Pasadena, Huntington Beach School District, Montebello School District, Redlands School District, Azusa School District, Garden Grove School District, Yorba Linda School District, Capistrano School District, Lake Elsinor School District, Newport Beach School District, Fullerton School District, Hacienda/La Puente School District, Santa Monica School District, Bellflower School District, Menifee School District, and Moreno Valley School District. Each of the participating transportation providers filled a vital role in the partnership. First, they made vehicles available to the curriculum development team for photographing of components, and the development and validation of diagnostic strategies. Second, they provided laboratory vehicles and participants for the beta test process.

Project Impact:
This project has had a significant impact on all the partners, such as air quality, energy conservation, and the reduction of health risks to students and the population in general, and this project will continue to have a positive impact on California's workforce while meeting the state's air quality and energy goals. The ATTi Centers are now positioned to provide train-the-trainer courses, technical assistance, and technical training throughout the state. The ATTi Centers are in the process of including two previously-developed modules that will allow the Initiative to expand delivery to a wide range of transit providers

Outcomes:
The project outcomes to date include assessments, development of the instructional design, curriculum development and validation, 80 hours of training delivery to 32 participants, and the publication and dissemination of training products.

As a result of this project, the SCAQMD has requested that the ATTi Centers propose a training schedule for implementation. In addition, as other regions of the state adopt these technologies, the ATTi Centers will be able to quickly identify and train additional instructional staff to meet the workforce needs of the State. It is anticipated that this project will have a life span of several years with only minor updates.

Projects Costs
The ATTi Centers completed the project on budget. The SCAQMD offered an additional $6000 for a second training opportunity.