NYSERDA’S CLEAN DIESEL TECHNOLOGY: NON-ROAD FIELD DEMONSTRATION PROGRAM

Abstract
NYSERDA has recently initiated the Clean Diesel Technology Non-Road Field Testing Program in collaboration with the New York State Department of Environmental Conservation (NYSDEC). The goal of the NYSERDA program is to provide quality data and information to potential technology end-users, regulators, and others such that implementation of diesel emission control strategies can be encouraged and widely adopted. This will ultimately provide significant reductions in the impacts of diesel emissions in New York State. This project is part of a broader NYSERDA Clean Diesel Program that was designed to support the development and implementation of new clean diesel technologies in the non-road sector in New York State. As part of its overall clean diesel program, NYSERDA has also sponsored a statewide Clean Air School bus retrofit program and heavy retrofit program focused on New York Harbor.

The Non-Road Field Testing Program will assess the performance of retrofit emission control technologies through use testing in select non-road diesel powered equipment applications. Non-road emissions inventories will be developed for the State and the 10-county New York City Metropolitan Area (NYCMA) and refined via surveys of equipment owners focusing on the construction/mining equipment (NYCMA) and locomotive (statewide) sectors. Commercially available control technologies, primarily focusing on the control of particulate matter (PM) and oxides of nitrogen (NOx), will be assessed from technical, economic, and operational perspectives. Certification of these technologies by the U.S. Environmental Protection Agency (EPA) or California Air Resources Board (ARB) will also be a factor in the screening process. Based on the inventory and control technology evaluations, the field testing program will be designed. Prior to implementation of the field testing program, an in-use test protocol will be developed that will be used to provide real-world performance data that will complement the USEPA and ARB alternate system certification programs. Emission control technologies will be evaluated for emission control (NOx, PM, CO, CO2, THC, fuel consumption, operational (engine power, etc.), maintenance, and economic performance.

Goal
Provide assessments of the in-use performance of commercially available diesel retrofit control technologies to expand energy-efficient diesel emission control technology options for non-road applications in New York State

Project Tasks
Task 1: Project Management and Reporting
- Develop improved emission inventory data for NYS and the NYCMA

Task 2: Emission & Equipment Inventory, Control Strategy Feasibility Evaluation, and Field Test Matrix Development
- Baseline inventory with EPA’s draft NONROAD2004 model for the 2002 base year.
- Survey of equipment owners and regulators to develop a more accurate inventory of equipment, application and activity in NYS. This allows for development of refined metrics and model inputs for the NONROAD2004 model.
- Develop an up-to-date inventory for equipment database used as a baseline for comparing the in-use test results.
- Field test matrix development and data collection.
- Interface opportunities for maximum off-road emission reduction for potential sectors of interest for PM and NOx.
- Collect data and information regarding available retrofit and other control strategies for PM and NOx in sectors of interest.
- Evaluate and rank strategies based on control efficiency, durability, installation/maintenance, acceptability, cost, fuel economy impacts, and verification status.
- Identify and prioritize sectors/applications and emission control technologies warranting field demonstration based on the revised inventory and feasibility evaluation of controls.

Task 3: In-Use Field Testing Protocol Development
- Currently, no generic testing protocol exists for non-road equipment. A generic protocol will:
  - Provide standardized procedures for tests of varying types of equipment
  - Ensure uniformity of data, reporting, and quality
  - Allow for direct comparison of data obtained
- Generic protocol considerations:
  - Base on existing protocols, where available (for example, EPA 40 CFR 1065, etc.)
  - Measure: emissions of NOx, CO, THC, CO2, TPM, may measure PM2.5, speciated PM, and toxics
  - Monitor and record operational parameters: fuel consumption, exhaust temperature, power output, engine speed, test pressure, etc.
  - Duty cycle: ensure duty cycles are repeatable, representative of real world use, and minimize the influence of operators and other factors
  - Reporting/Analysis: standardizing reporting, evaluation of control system impacts, calculation procedures and statistical analysis of data, and data quality specifications
- Emission Testing Methods

Task 4: In-Use Field Demonstration
- Task 4 will conduct in-use field demonstrations and evaluations of the non-road equipment and emission control strategies selected in Task 2 using the operation and test procedures developed in Task 3. Currently, test support will provide the following services:
  - NYC Dept. of Sanitation
  - W.A. Gries Construction
  - Yonkers Contracting Co.
  - DeFire Corp.

- Environment Canada
- Emisstar
- Tech. Install
- Pre-Screen Candidate Tests (~15)
- Phase II Field Testing.
- Specific Field Testing Technology Evaluation Plan – Feb 2006

- Environment Canada S3E05 Portable Portal Station System
- Portable Emission Monitoring System (PEMS)
- Field data from in-use testing, with emissions sampling procedures
- Reporting/Analysis: standardizing reporting, evaluation of control system impacts, calculation procedures and statistical analysis of data, and data quality specifications