

Clean Air Fleets Diesel Retrofit Program

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EPA Air Innovations
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Background

Regional Air Quality Council

- Lead air quality planning agency for the 7 county Denver metro area since 1989
- Created by Executive Order of the Governor
- RAQC mission: develop cost-effective programs to reduce air pollution with input from local governments, the private sector, stakeholder groups and citizens
- Currently addressing particulate matter (PM), carbon monoxide (CO) and hydrocarbons (HC)

Why Diesel Retrofit?

- Diesel emissions are highly visible to the public and could be hazardous to your health – our message is “less is better”
- National priority through Congress and federal agencies
- Union of Concerned Scientists graded Colorado’s school bus fleet at a D and a “poor” smog rank
- Reduce exposures to children, drivers, parents, teachers from idling buses/vehicles in neighborhoods/schools
- Reduce idling fuel use via engine preheat technology
- Excellent PR for your organization and region

Technologies and Fuels

- **Diesel oxidation catalysts (DOC)**
 - Simple, no maintenance, 20%-65% reductions (\$900)
- **Closed crankcase filtration device**
 - 100% elimination of primary contributor of in-cab emissions but has ongoing filter cost (\$950)
- **Engine preheaters**
 - Eliminates need for idling and saves fuel (\$1,200 - \$2,500)
- **Alternative Power Units**
 - Provide auxiliary power to reduce idling and save fuel (\$4,000)
- **Diesel Multistage filter**
 - No cleaning, 70% emissions reduction but requires ULSD (\$5,000)
- **Diesel particulate filter**
 - Complicated bus identification process, difficult install, requires ULSD but 60%-90% emissions reductions (\$8,000 - \$10,000)
- **Biodiesel fuels (B20)**
 - Reduce emissions and renewable fuel good for American farmers
- **Ultra-low sulfur diesel fuel (ULSD)**
 - Necessary to operate newer technologies

Idling and Green Contracts

- Implement and enforce idle reduction policies at vehicle yards, schools and no idle zones
 - Limited cost but requires training and signage
 - Save organizations fuel and reduce engine wear and emissions
 - City of Toronto has an innovative program
- State/Cities/Counties/Districts can “green” contracts
 - Require any contractors to use post-1994 or even cleaner 1997 vehicles
 - Also could require retrofitted or refueled vehicles that require reductions of a certain percentage of emissions
 - A 20% particulate matter reduction is a fairly easy target to hit with all technologies

RAQC Programs

Overall CAF Program Structure

- Clean Air Fleets Program
 - Three main CAF Program elements
 - School buses (Clean Yellow Fleets for Blue Skies)
 - Front range/metro area and potential statewide expansion
 - Off-road HDDV (D.I.R.T)
 - On-road HDDV (Local govt./private fleet retrofits)
- Rocky Mountain Clean Diesel Collaborative being formed outside CAF

Clean Air Fleets – Retrofits

- First RAQC effort (www.cleanairfleets.org)
- Retrofits and outreach were the primary program components
- \$95,000 program for DOCs, closed crankcase filtration units, engine preheat systems, biodiesel fuel (B20)
- Retrofits
 - 29 closed crankcase filtration devices
 - 6 diesel oxidation catalysts
 - 19 engine preheaters
 - 19 biodiesel projects funded (\$1,000 subgrants)

School Bus Retrofits

Clean Yellow Fleets for Blue Skies – Phase I

- Phase I
 - \$400,000 EPA Clean School Bus USA grant
 - \$950,000 CMAQ grant
 - Retrofit large, route school buses and use biodiesel fuel
- 15 Front Range school districts participated
 - 800 total buses retrofitted (1,070 retrofits)
 - ~600 DOCs
 - ~360 Preheaters
 - ~85 closed crankcase filtration units
 - \$200,000 in biodiesel fuel

Clean Yellow Fleets for Blue Skies – Phase II

- Submitted grant through CMAQ for two year project FFY07/08 funding
 - \$950,000 in equipment for this effort
- Designed as idling reduction project
- 11 school districts participating
 - 200 DOCs
 - 330 Preheaters
 - 260 closed crankcase filtration units

DOE Idle Reduction Grant – Phase II

- Requested \$100,000 from DOE's idle reduction grant program to purchase engine monitoring equipment and public relations material
- Monitor 100 buses across 10 districts
- Hope to hear this fall on award

Non-Bus On-road Retrofit

State/County/Municipal Retrofit Program

- Submitted grant through CMAQ for two year project FFY07/08 funding
 - \$1.45M in equipment for this effort
- Designed as an idle reduction project
- 13 counties and municipalities and CDOT participating:
 - 380 DOCs
 - 200 Preheaters
 - 140 closed crankcase filtration units

Off-road HDDV

Diesel Initiative for Retrofit Technology (D.I.R.T.)

- \$75,000 EPA grant for diesel retrofit of off-road vehicles in sensitive areas
- Retrofitted 4 tandem dump truck/snow plows with closed crankcase filtration and diesel oxidation catalysts
 - Commerce City offered to retrofit 15 vehicles but they were not good candidates for retrofit
- ~\$60,000 remaining to retrofit eligible heavy-duty diesel vehicles
- Currently working to find a private fleet

Total CAF Retrofits

- If current CMAQ grant is awarded, by end of 2008:
 - ~1,250 DOCs
 - ~840 engine preheaters
 - ~450 closed crankcase filtration units
 - \$200,000 in biodiesel
 - Potential for more equipment in Pueblo

Draft CAF Emissions Reductions

- Equipment Reductions
 - 6 TPY PM
 - 1,400 TPY CO
 - 15 TPY NO_x
 - 150 TPY HC
- Projected equipment benefits last a minimum of 7 years

Draft Fuel Analysis

- Displaced approximately 220,000 gallons of petroleum through use of biodiesel (B100)
- Potential to reduce up to 136,000 gallons of fuel annually by reducing idling with preheaters

Other Projects

Diesel Retrofit Program – Statewide Expansion

- Colorado Department of Public Health and Environment Project modeling the Clean Yellow Fleets Program to expand school bus retrofit efforts statewide
 - RAQC offering program implementation assistance
- High priority for CDPHE
- Seeking funding through CDPHE and EPA
 - Potentially up to \$450,000 for Pueblo school districts
 - \$200,000 SEP from Rocky Mountain Steel
 - \$250,000 donation from Xcel Energy

Rocky Mountain Clean Diesel Collaborative (RMCDC)

- EPA, CDPHE, RAQC and City and County of Denver effort to expand retrofit programs
- Forum to discuss diesel related issues, federal and state funding opportunities and potential projects
- RMCDC hosting a Clean Diesel Conference November 1st and 2nd. Monitor www.cleanairfleets.org for details.

Program Successes and Challenges

Program Innovations, Successes and Challenges

- Partnership development
- Program development
- Technology
- Resource leveraging
- Challenges moving forward
- Further down the road on diesel retrofit

Partnership Development

- The number one key to victory
 - Without can-do partners, you can't do anything
 - Can-do partners in a voluntary setting create innovation
- RAQC surveyed local fleets initially to determine interest
 - A district included us in a Metro Area Transportation Efficiency Study (MATES) group meeting and the group jumped at the chance to develop a partnership
 - You must seek out these groups or trade associations
- Another key partnership is development of the Rocky Mountain Clean Diesel Collaborative
 - Coordinating all levels of government from federal, state, regional and local perspectives ensures good policy

Program Development

- Starting small and building program
 - Allows agencies to build processes and controls and understand expectations
 - It has taken 4+ years to develop this effort
- Must attempt to keep it simple
 - Can't overburden fleets with so many regulations, procedures and reporting they are totally confused
 - Fleets understand bidding, purchasing and equipment installation within these projects but not Federal Grant Management 301
- Be aware of challenges managing a large group of fleets
 - Districts have different needs
 - RFP process must be simple and manageable
 - Districts are married to their fuel providers

Technology & Fuels

- Understanding technology, fuels and needs of fleets
- Emissions reductions are great but can you also save fleets money?
- Most of the equipment is simple and easy to work with
 - However, some technologies don't work in certain applications as well as others
- Biodiesel success lies with the supplier
 - Bad handling or processing causes major problems
 - Sometimes a bad batch of fuel (of any type) is delivered
 - Fleets are usually married to their fuel provider because of the customer service related to these issues

Resource Leveraging

- Understanding and utilizing multiple funding sources is critical
 - Utilized sources from CMAQ, SEPs, CDPHE in addition to EPA funds
 - Up to a 20% match required - provided by fleet and RAQC resources and equipment discounts
- RAQC able to leverage resources more effectively with 15 fleets
- Allows more effective use of management resources instead of meeting one-on-one with fleets

Program Challenges Moving Forward

- Retrofitted a high percentage of buses in participating districts with at least one piece of technology
 - Now working with newer model years which provide less bang for buck
 - Pre-1991 vehicles present problems due to limited approved technology and emissions volume
- How do we penetrate the private sector?
 - Worked with CMCA, AGC, multiple one-on-ones and very little interest
 - Only way seems to be greening contracts to require contractors to public agencies to utilize newer or retrofitted vehicles, however, someone must enforce contract
- What technologies will become available in the future?
 - How do you manage RFPs for equipment so that you are not in a perpetual state of bidding new technologies?

Further Down the Road on Diesel Retrofit

- Utilizing DMF mufflers
- Implementing idling reduction
 - Install simple on-board monitoring equipment
 - Districts in Front range area are installing tracking equipment
 - Install engine preheat units
 - Idle reduction policy implementation
 - Provide simple driver training
- Further use of DOCs and closed crankcase filtration units
- Vehicle repowers
- Strong interest from OTR truckers in APUs

Questions?

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