

# Clean Air Fleets Diesel Program Update

Steve McCannon  
RAQC  
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Background

# Why Diesel Retrofit?

- Diesel emissions are highly visible to the public and could be hazardous to human health – “less is better”
- National priority through Congress and federal agencies with millions of dollars dedicated to the effort
- 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 and costs via engine preheat technology
- Excellent PR

# What is Diesel Retrofit? The Five "R's"

RAQC and its partners have focused on one and two; fleets focus on 3 and 4:

- Retrofit
- Refuel
- Repair
- Replace
- Repower – no one really focusing on this at this time

# Retrofit Technology and Refuel Options

- **Diesel oxidation catalysts (DOC)**
- **Closed crankcase filtration device**
- **Engine preheaters**
- **Diesel Multistage filter**
- **Diesel particulate filter**
- **Biodiesel fuels (B20)**
- **Ultra-low sulfur diesel fuel (ULSD)**

# Other Options - 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
- Cities/Counties/Districts can “green” contracts
  - Include bonus points in contracts for fleets bidding for district projects that demonstrate they are clean
    - Incent contractors use post-1994 or even cleaner 1997 vehicles
    - Incent contractor's to use retrofitted or refueled vehicles that require reductions of a certain percentage of emissions

# 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
  - EPA Region 8, CDPHE, RAQC, C&C of Denver with additional membership added in the future
  - Held our first RMCDC Conference on Nov. 1<sup>st</sup> and 2<sup>nd</sup> last week

# Clean Air Fleets – Retrofits

- First RAQC effort ([www.cleanairfleets.org](http://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)

# RAQC 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
  - \$185,000 in biodiesel fuel

# Clean Yellow Fleets for Blue Skies - Phase I

- Participating districts include:
  - ◆ Adams 12
  - ◆ Adams 50
  - ◆ Aurora
  - ◆ Boulder
  - ◆ Cherry Creek
  - ◆ Colo. Springs 11
  - ◆ Colo. Springs 20
  - ◆ Denver
  - ◆ Douglas
  - ◆ Englewood
  - ◆ Jefferson
  - ◆ Littleton
  - ◆ Mapleton
  - ◆ St. Vrain
  - ◆ Thompson

# RFP Equipment Costs

- DPS/districts and RAQC developed two RFPs for school bus equipment
- Both bids were awarded to Instrument Sales and Service
- Reduced pricing through RFP process:
  - Secured DOCs \$750 uninstalled (\$830 installed) per unit
    - Estimated price \$1,200 prior to RFP
  - Secured engine preheat systems at \$1,245 for TSL17
    - Estimated price \$1,500 prior to RFP
- Another RFP benefit was a better understanding of equipment, fuel and vendor capabilities
- Currently bidding out white fleet equipment through Poudre School District

# 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

# Phase II School Districts

- Adams 12
- Adams 50
- Aurora
- Boulder
- Cherry Creek
- Denver
- Douglas
- Jefferson
- Littleton
- Mapleton
- St. Vrain

# RAQC 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

# State/County/Municipal Fleets

- CDOT
- City and County of Denver
- Englewood
- Brighton
- Littleton
- Castle Rock
- Thornton
- Arvada
- Louisville
- Lakewood
- Broomfield
- City of Boulder
- Boulder County

# RAQC 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 with Brannan Sand and Gravel Company to expend funding

# Other Projects

# Diesel Retrofit Program – Statewide Expansion

- CDPHE Project modeling the Clean Yellow Fleets Program to expand school bus retrofit efforts statewide
  - RAQC offering program implementation assistance
- High priority for CDPHE
- First expansion to Pueblo Districts 60 and 70
  - Districts have committed to utilizing preheaters and closed crankcase filtration
- \$200,000 currently secured through SEP funds - potentially another \$250,000 available

# 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
- Held our first Clean Diesel Conference November 1<sup>st</sup> and 2<sup>nd</sup>
  - Presentations on EPA's grant funds and how to apply, technologies, fuels and retrofit programs
  - Approximately 110 attendees from public and private fleets, government and vendors.

# Program Recap, Costs and Benefits

# Program Evaluation – Overall CAF

- Installed 619 DOCs, 117 CCV and 390 engine preheaters
- Displaced approximately 240,000 gallons of petroleum through use of biodiesel (B100)
- Potential to reduce up to 114,000 - 146,000 gallons of fuel annually by reducing idling with 390 preheaters

# Emissions Benefits – Overall CAF

- Emissions Reductions (Equipment and biodiesel)
  - 7 TPY PM
  - 1,720 TPY CO
  - 0.5 TPY NO<sub>x</sub>
  - 165 TPY HC
- Projected benefits last a minimum of 7 years

# Total Retrofits

- By the end of FFY08:
  - ~1,250 DOCs
  - ~840 engine preheaters
  - ~450 closed crankcase filtration units
  - \$185,000 in biodiesel
  - Potential for more equipment in Pueblo

# Program Challenges Moving Forward

- Retrofitted an estimated 40% 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 many trade associations with multiple one-on-ones and very little interest
  - Only way seems to be greening contracts to incent contractors to public agencies to utilize newer or retrofitted vehicles, however, someone must enforce contract
- What technologies will be available?
  - How do you manage RFPs for equipment so that you are not in a perpetual state of bidding new technologies?

# Lessons Learned

# Lessons Learned

- School districts' can-do attitude led to program success and replication to other fleets, sectors and states.
- Attempt to keep it simple
- Program costs are limited and these efforts have proven to be cost-effective
- RAQC able to leverage resources more effectively with a large number of fleets and secure funding through partnerships
- Emissions reductions are great but can we also save fleets money?
- Must develop RFPs to be flexible and allow for new technologies or you are in a never ending RFP process which is not cost-effective
- Most of the equipment is simple and easy to work with
- Some other vehicles are too difficult to retrofit
- Biodiesel/alternative fuels success lies with the supplier

Questions?