



The Gateway Cities Fleet Modernization Program: Cleaner Heavy-Duty Trucks for Port and Goods Movement Applications

Presented to the Alternative Fuels & Vehicles Conference

April 3rd, 2007



Jon Leonard, Principal
Leonard.jon@tiaxllc.com

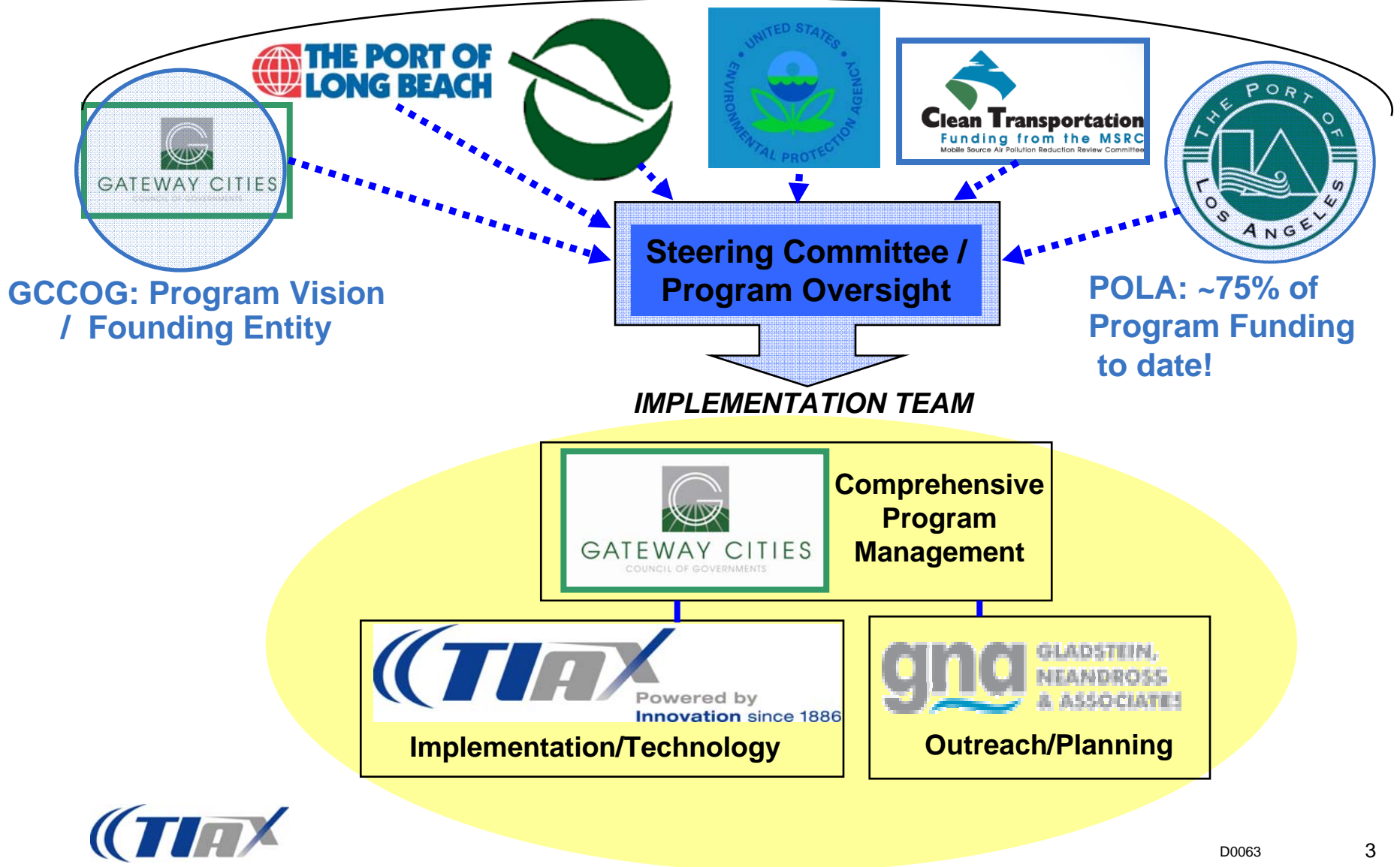
Patrick Couch, Lead Engineer
Couch.patrick@tiaxllc.com

Reference: D0410

- 1** Overview of the Gateway Cities Program
- 2** Relationship to the San Pedro Bay Ports CAAP
- 3** Summary and Conclusions

- 1** Overview of the Gateway Cities Program
- 2 Relationship to the San Pedro Bay Ports CAAP
- 3 Summary and Conclusions

The Program includes oversight and/or funding from 6 government entities . . .



The Gateway Fleet Modernization Program facilitates a 3-step process to reduce emissions from **in-use** heavy-duty diesel vehicles



Step 1: Scrap older truck



**Step 2: Replace with newer truck
(Could be alt fueled)**

**(Newer truck emits ~35% less NOx
and ~80% less PM)**



Step 3 (optional): Retrofit PM-control

**(Reduces replacement truck's PM by
~85%, w/ option for 25% NOx reduction)**



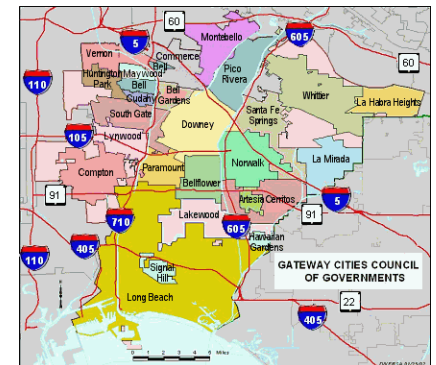
- **Key premise:** truckers with oldest vehicles can't afford newer, cleaner trucks
- Fleet mod helps replace pre-control trucks with more modern, electronic-controlled trucks
 - Incentive-based, voluntary program
 - Trucker / awardee pays about 25 to 30 percent of total replacement truck's cost
 - Old truck engine / chassis are destroyed
- Allows site- and vocation-specific targeting (e.g., ports and local freight)
 - POLA requires minimum trips/year "to or from" its boundaries (500-750 typical)
 - MSRC focuses on "Goods Movement"
- AQ benefits: compelling and cost effective
- Other benefits also realized, e.g.:
 - Improved reliability and safety
 - Trucker reduces annual fuel costs (~35%)



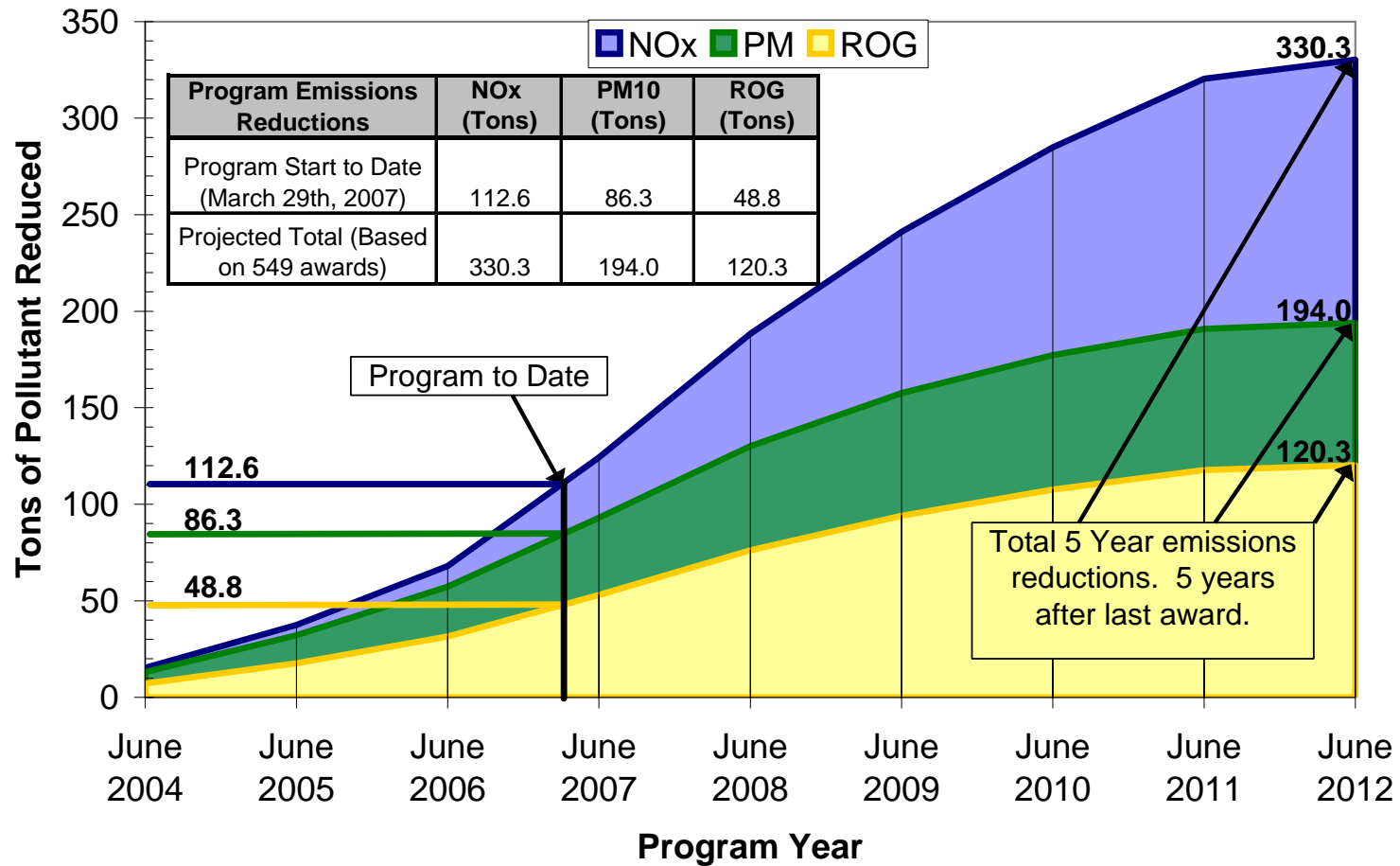
A pre-1987 Gateway Cities truck undergoing scrappage process

AVFC 2007 : Gateway Cities Program *Snapshot of Current Program*

- Program began in September 2002 (~4.5 years)
- Approximately \$18.3 million in grant funds have been expended to replace **549** older trucks (mostly pre-1987 MY)
 - **\$14 million / 396 trucks** – special program funded by the Port of Los Angeles
 - **\$4.3 million / 153 trucks** - original program funded by ARB, EPA and MSRC (includes latest infusion of \$1.75 million from MSRC)
- Replacement trucks now receive installation of GPS-based “Automatic Vehicle Locator” (AVL) device
- Program enhancements are ongoing, customized to the needs of each individual funding agency
 - Formula for calculating grant awards
 - Adoption of latest emissions factors
 - Tailoring of aftertreatment options
- POLA-funded program is being transitioned into longer-term San Pedro Bay Ports Clean Air Action Plan
- “Bridge” funding has recently been allocated by both Ports
 - \$3.3 million from POLA
 - \$3.0 million from POLB



**Gateway Cities Clean Air Pilot Program Emissions Reductions
(All Gateway Awards to Date, 549 Trucks)**

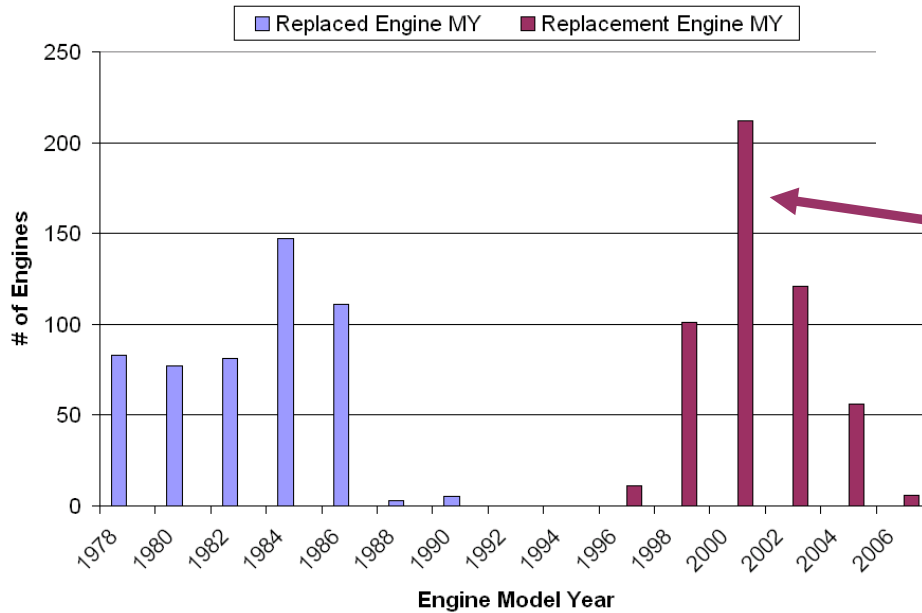
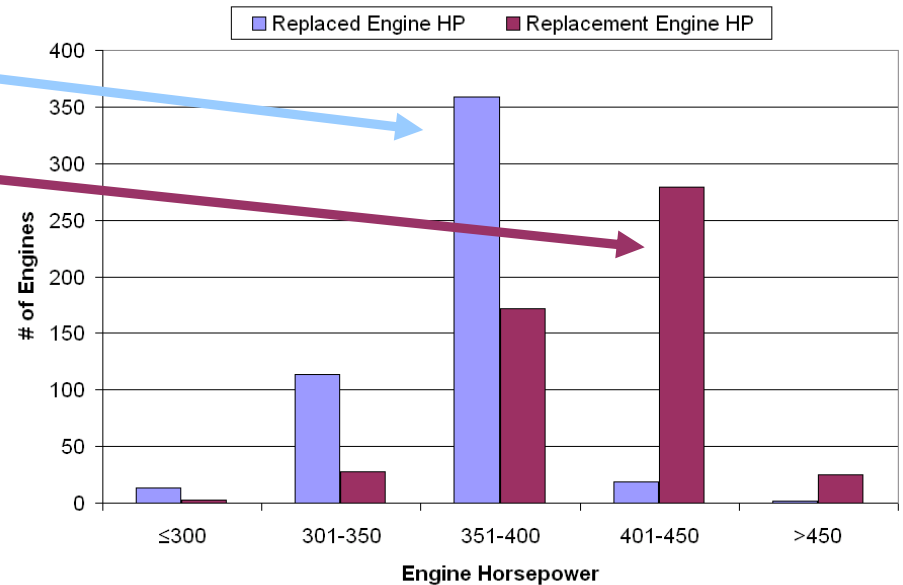


- Estimates are based on mileage estimates for all replacement trucks using EMFAC '07
- Provides a snapshot of the current program status (assumes no further awards are made)



Fleet Mod Under Gateway Cities Program (549 Older Trucks Destroyed & Replaced)

- Replaced trucks (pre-1987) are dominated by Cummins Big Cam engines at 350 to 400 HP
- Replacement trucks (1994 and newer) mostly have 400 to 450 HP engines (e.g., DDC S60)
- “De-rating” replacement truck’s HP is frequently necessary to maintain HP rating within 20% of original truck



- Most common engines for replacement trucks have been MYs 2000, 2001 (affordable)
- 2004+ MY engines becoming more popular as truck prices drop; EGR engines exhibit improved cost effectiveness / higher awards
- Some Level 1 retrofits have been implemented on replacement trucks (with mixed results)



All Gateway Cities Replacement Trucks Receive an Automatic Vehicle Locator (AVL)

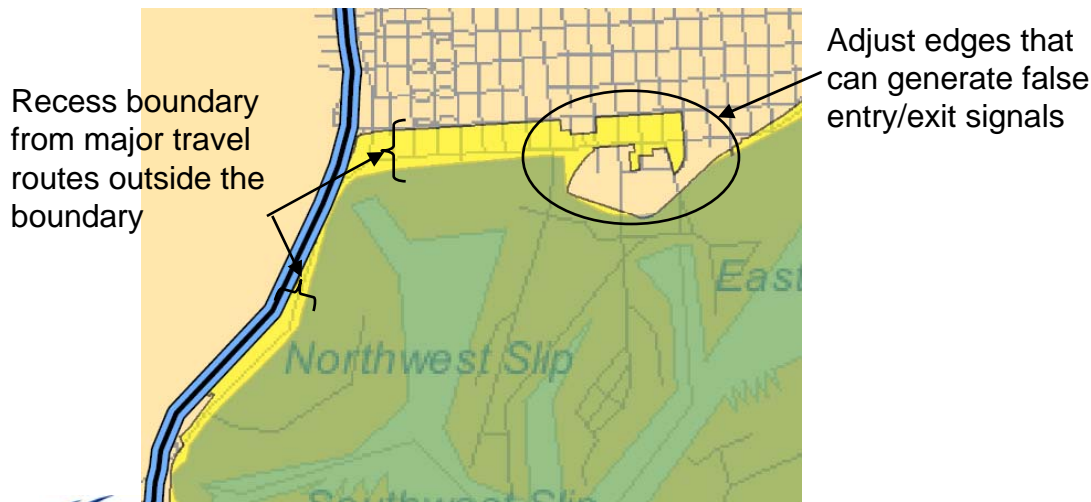
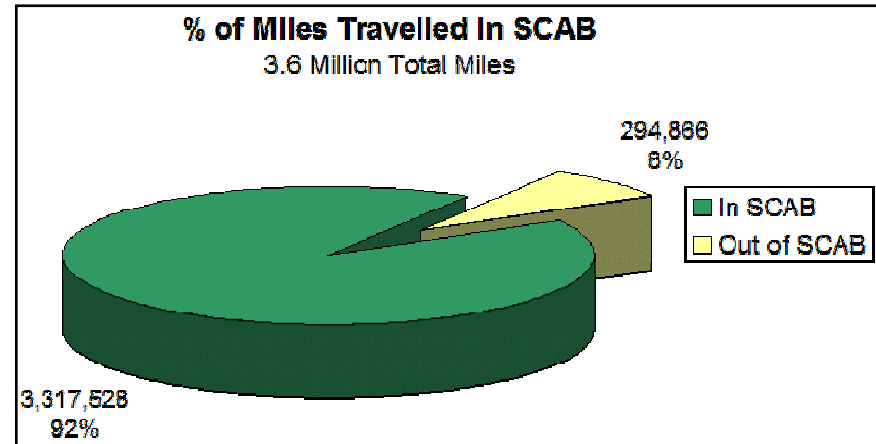
- Purpose:
 - Automatically monitor vehicle usage by air basin (SCAB) and POLA boundaries
 - Help ensure emissions benefits are **Real, Surplus, Verifiable and Permanent**
 - Eliminate biannual self-reporting forms for participants
- Logistics:
 - Installed on replacement trucks at dealership by vendor's authorized technician
 - Truck usage data automatically transmitted to vendor
 - Summarized data provided to GCCOG (TIAX) on monthly basis

Important Note: Only parameters affecting the program's air quality benefits are monitored. No "real-time" monitoring is conducted by the GCCOG (unless vehicle theft or safety are involved).



AVL Data Collected to Date under the Gateway Cities Program

- 247 replacement trucks with AVLs have logged over 3.6 million miles
- In aggregate, strong compliance with 85% in-SCAB requirement
- AVLs help monitor
 - “Vocation jumping” (e.g., into line-haul business)
 - Downtime (accidents, mechanical problems, driver illness, etc.)



Use of AVLs provides clear benefits, but also entails significant challenges, e.g.:

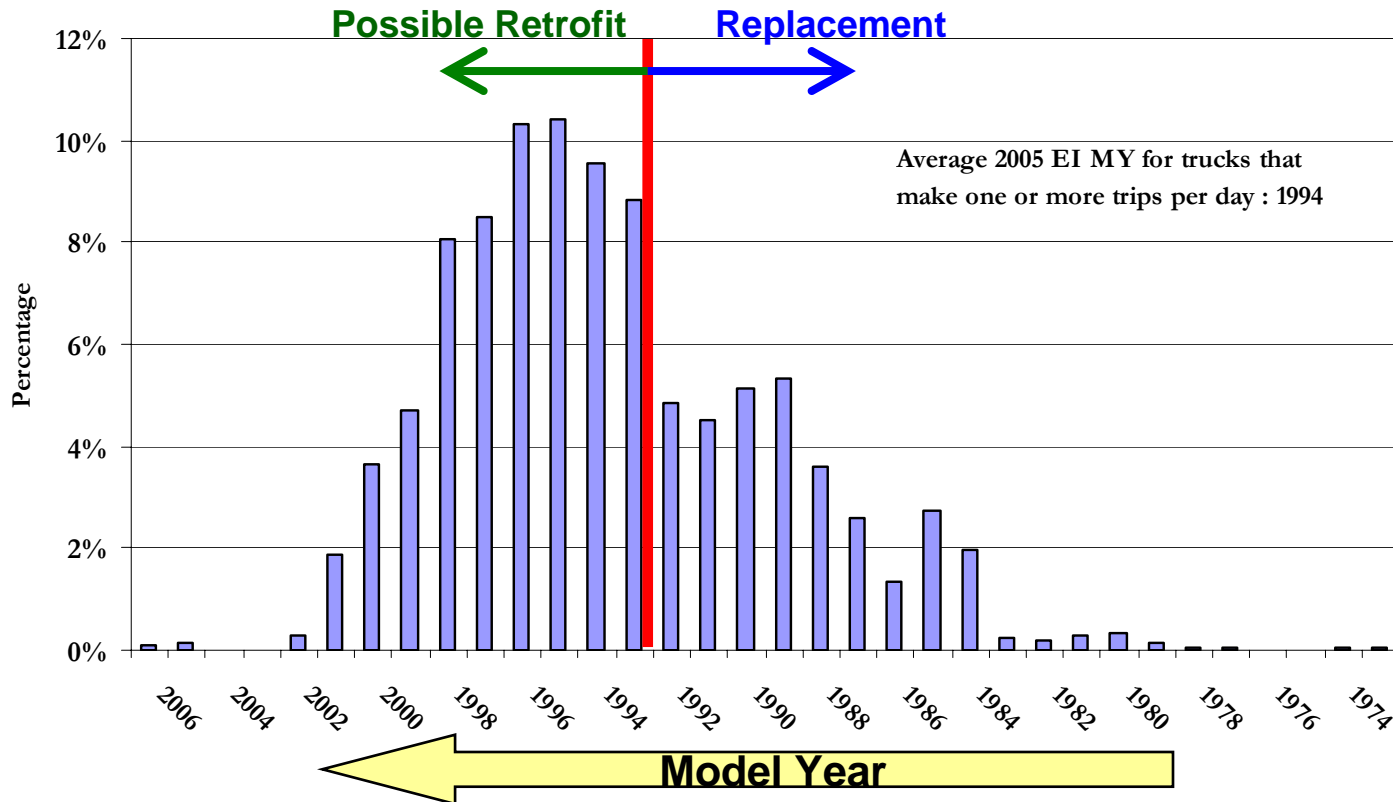
- Timeliness and accuracy of data from vendor have been ongoing issues
- Requires careful geo-fencing in micro-areas (e.g., port boundaries)



- 1 Overview of the Gateway Cities Program
- 2 Relationship to the San Pedro Bay Ports CAAP**
- 3 Summary and Conclusions

CAAP Control Measure HDV-1: Replace or Retrofit Thousands of Port Trucks

- MY 1992 and older trucks to be **replaced** with new port trucks meeting 2007 emissions standards (both diesel and LNG technologies)
- MY 1994 to 2002 trucks (as many as possible) will be **retrofitted** w/ verified Diesel Emissions Control Strategies
 - Focus: Level 3 “BACT” device that provides 85% PM / 25% NOx reductions

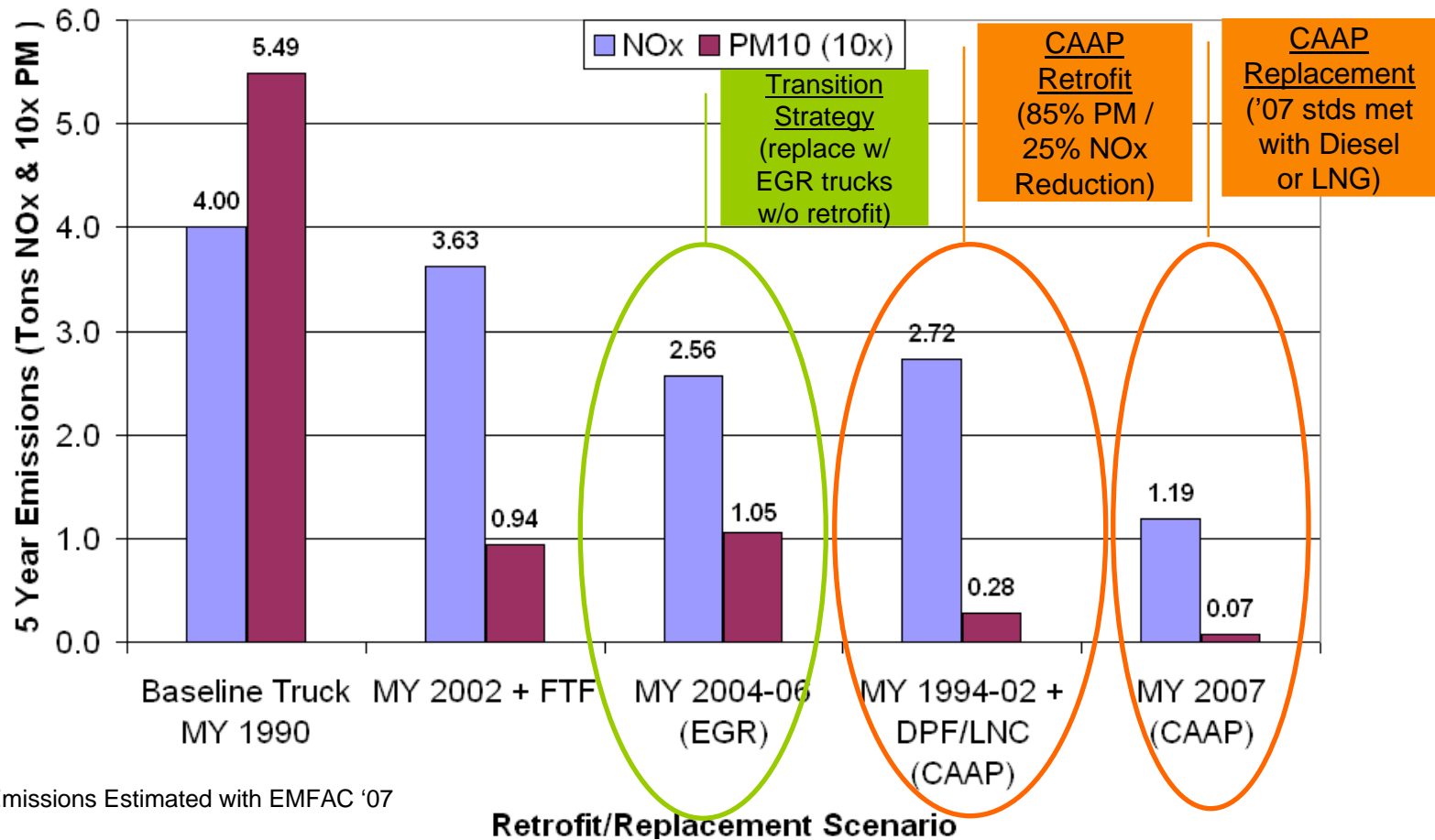


Source: Final 2006 San Pedro Bay Ports Clean Air Action Plan Technical Report

AVFC 2007 : Gateway Cities Program *Relationship to SPBP Clean Air Action Plan (cont'd)*

- The CAAP seeks replacement / retrofit scenarios that maximize PM10 and NOx reductions
- The GCCOG team has assessed and recommended a strategy that can best transition current POLA-funded Gateway program into HDV-1 of longer-term CAAP

Five-Year Per Truck Emissions for Port Trucks Under Various Scenarios



NOTE: Emissions Estimated with EMFAC '07



To accomplish these preliminary goals under HDV-1 of the CAAP:

“The current Gateway Cities truck modernization program will be refocused (or a new program developed) to allow only the purchase of new cleaner diesel and alternative fueled trucks, as well as retrofits that meet the proposed . . . (emissions) standards.”

--San Pedro Bay Ports Clean Air Action Plan

“The Ports (will) begin this program with an infusion of cash to the Gateway Cities Program that would fund a 500-truck program (demonstrating) the applicability of new retrofit technologies. This demonstration program will be activated in the 1st quarter of 2007, and the full 16,800-truck program will be rolled out shortly thereafter.”

--Motion approved with CAAP by both Harbor Commission Boards

- 1 Overview of the Gateway Cities Program
- 2 Relationship to the San Pedro Bay Ports CAAP
- 3 Summary and Conclusions**

- The Gateway Cities Fleet Modernization program continues to be very successful in reducing emissions from in-use heavy-duty trucks used in port and goods movement applications
 - 549 trucks replaced (and counting)
 - Approximately 248 tons of NOx / PM / ROG reduced to date (and counting)
- Fleet Modernization is a “fuel neutral” process capable of implementing the technologies selected by each funding agency.
- The program provides an important opportunity to “capture” replacement trucks at the point of sale for upgrades (e.g., low-NOx reflash) and retrofitting of a CARB-verified DECS
- A new infusion of funding has been received from the Ports, to transition into the larger-scale program envisioned under the San Pedro Bay Ports Clean Air Action Plan
 - **REPLACE** oldest trucks with new trucks meeting ‘07 emissions standards (diesel and LNG)
 - **RETROFIT** suitable existing port trucks with DPF / LNC system to approach ‘07 standards
- The Gateway program will continue to evolve to meet the needs of specific funding agencies such as the San Pedro Bay Ports

Thank You For Your Attention!



TIAX wishes to thank the following key program supporters:

- Gateway Cities Council of Governments
- Port of Los Angeles
- Port of Long Beach
- U.S. EPA
- Cal EPA / CARB
- Mobile Source Air Pollution Reduction Review Committee (MSRC)

Contacts:

Jack Joseph, Gateway Cities COG
jackjoseph@earthlink.net

Jon Leonard, TIAX
leonard.jon@tiaxllc.com

Patrick Couch, TIAX
couch.patrick@tiaxllc.com

