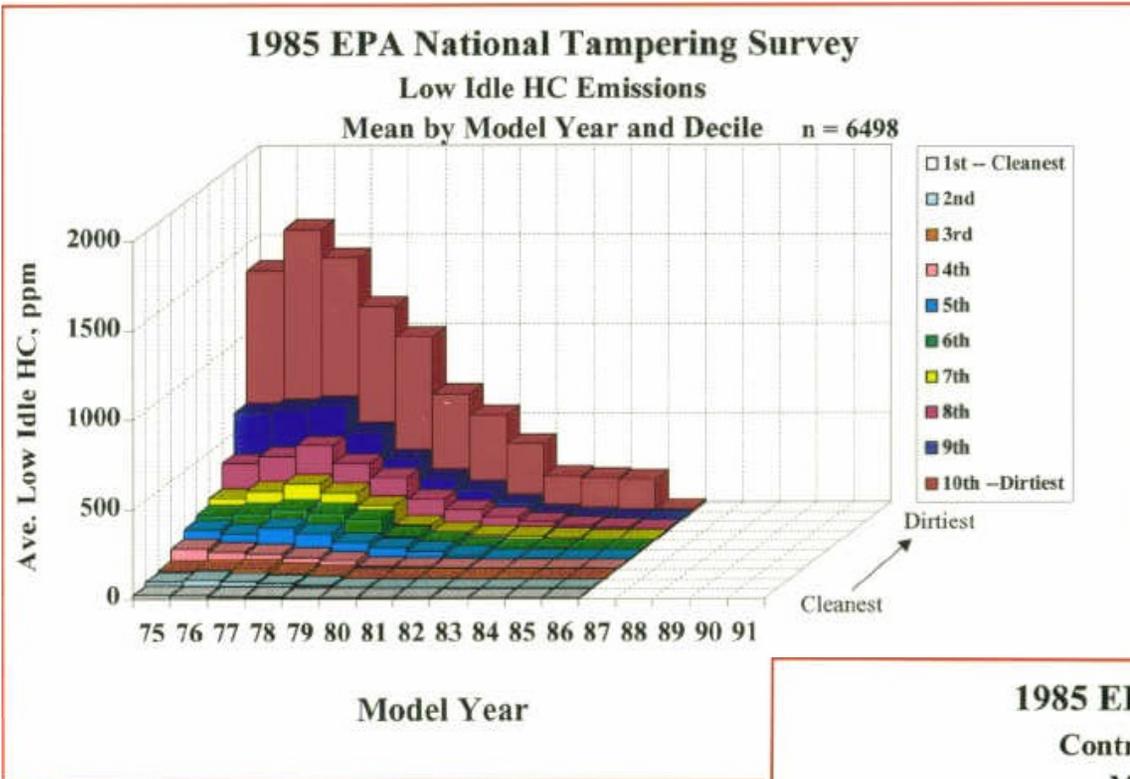


Nationwide On-Road Idle HC Emissions

EPA's 1985 National Tampering Survey

6498 vehicles

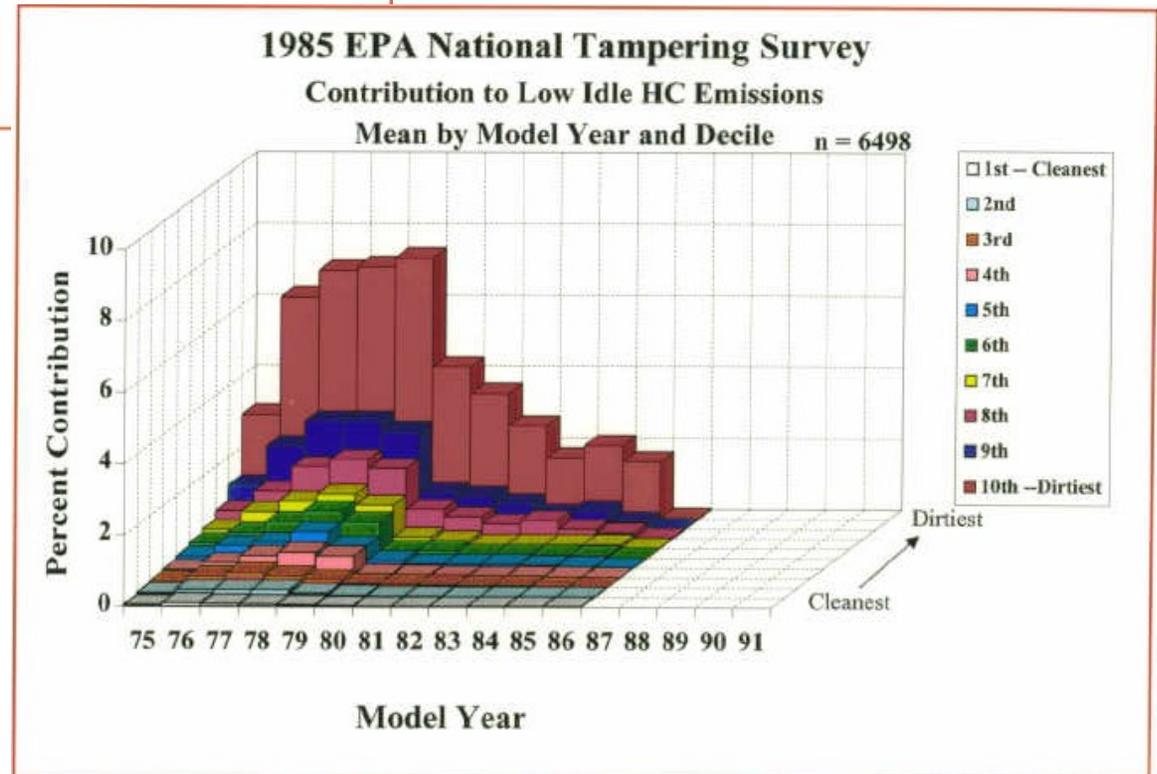


On average, fleet emissions increase as vehicles age; mean fleet emissions driven by high emitters

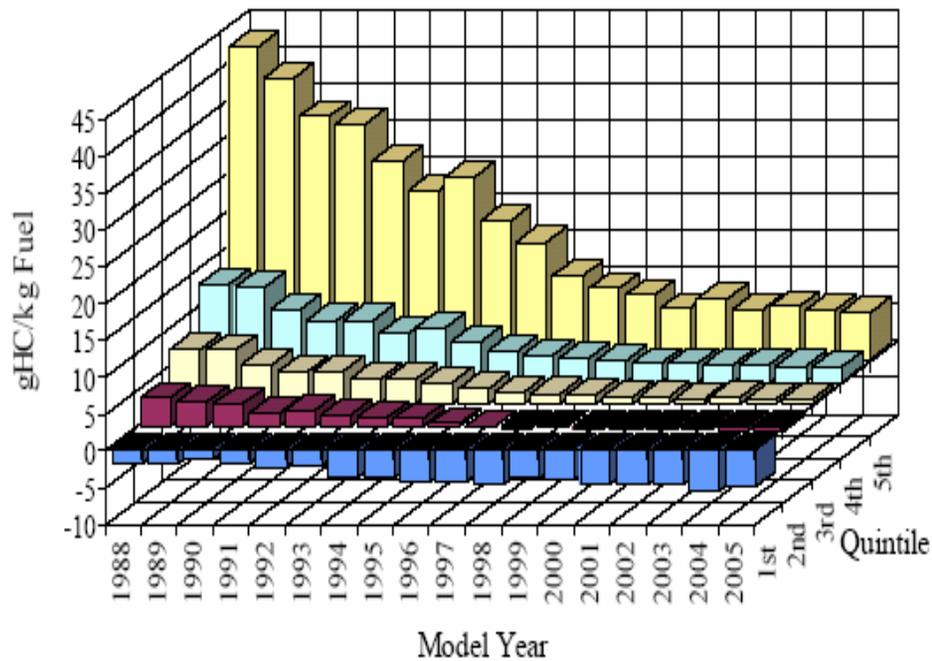
Most new cars are clean; a few new vehicles are dirty; new vehicles irrelevant to air quality

Most old cars are “clean”

Ref: Lawson *et al.* 1996

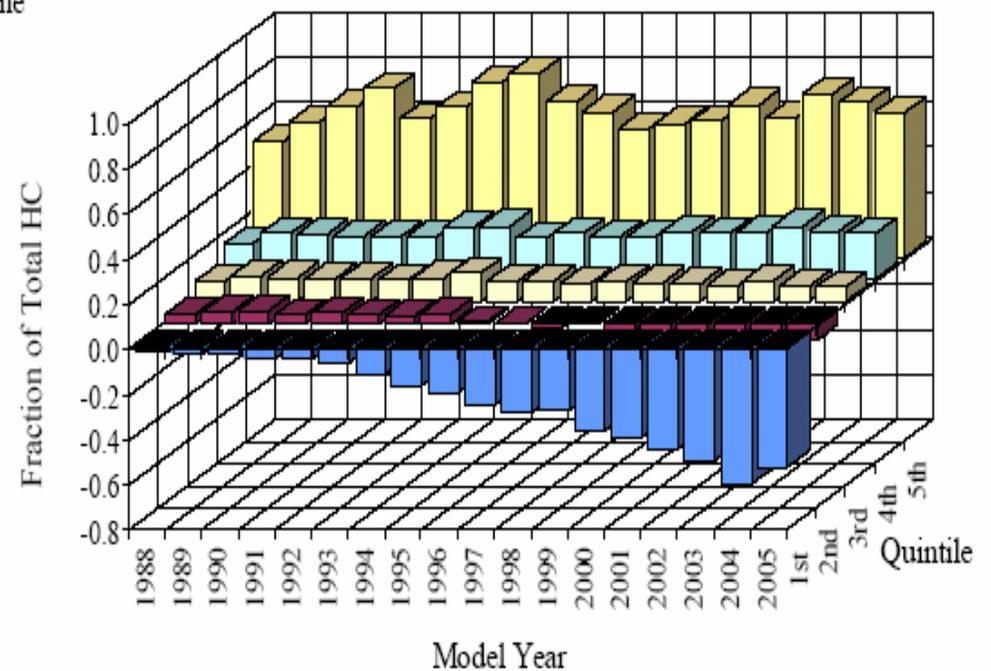


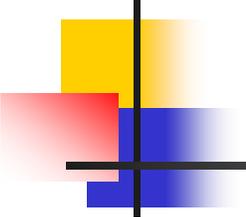
Remote Sensing HC Emissions by Quintile



19,500 measurements,
October 17-21, 2005

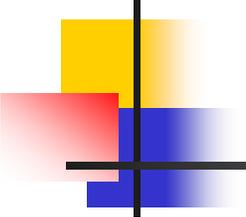
Ref: On-Road Remote Sensing of Automobile Emissions in West Los Angeles: Year 4, October 2005, CRC Contract E-23-9, April 2006 (<http://crcao.com>)





On-road High Emitter Distributions

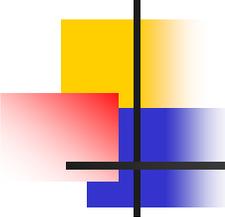
- High emitter “wall” moves forward with time; yesterday’s clean vehicles are today’s high emitters
- For the majority of the fleet there is little or no deterioration of emissions because of owner maintenance
- The highest number of high emitters by model year in any year is about 12 years ago.
- Fewer high emitters among the oldest part of the fleet
- Many high emitters among the newest part of the fleet.



Valley CAN Tune In & Tune Up Program - Summary of Results

Tom Knox and Doug Lawson
– Presentation –
Car Scrapping and Repair Programs Technology Forum
South Coast Air Quality Management District
February 25, 2009

Sponsored by
Valley CAN Program
Advanced Transportation Technology and Energy Initiative Center
California Department of Consumer Affairs/Bureau of Automotive Repair

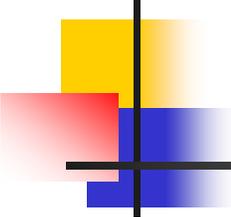


Valley Clean Air Now (CAN)

Valley CAN (Clean Air Now) is a non-profit organization committed to improving air quality in communities throughout California's San Joaquin Valley.

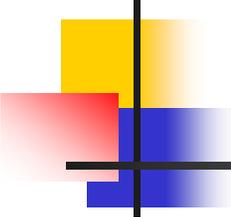
As a part of its purpose, Valley CAN will:

- Serve as a leader in educating the public in the need to take personal responsibility for the reduction of air pollution.
- Promote voluntary actions to reduce air pollution by individuals, government, agriculture, business and industry.
- Seek to initiate and publicize creative new approaches to reduce air pollution.
- Sponsor pilot programs and educational efforts dedicated to providing solutions to high emissions sources.



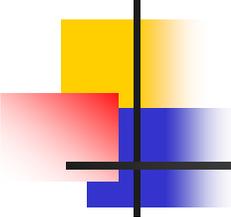
2009 Valley CAN Board of Directors

- **President** - **Douglass W. Wilhoit, Jr.**, CEO, Greater Stockton Chamber of Commerce
- **Vice President** - **K.C. Bishop**, Manager Strategic Projects, Chevron
- **Secretary/Treasurer** - **Paul Betancourt**, VF Farms
- **Octavia Diener**, President/Owner, Tavied Farms
- **Joseph E. Drew**, Senior VP of Real Estate, Tejon Ranch
- **John Harris**, President, Harris Ranch
- **Michael Martin**, Senior Account Manager, PG&E
- **Fred Ruiz**, Chairman & Co-Founder, Ruiz Foods
- **Rick Schellenberg**, Schellenberg Farms



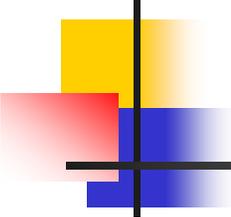
Tune In & Tune Up Program

- Valley CAN sponsors a vehicle clean-up program to help reduce pollutants generated by out-of-tune vehicles in the San Joaquin Valley called Tune In & Tune Up.
- The Valley is home to a large number of older vehicles, some of which are not registered and do not meet smog standards.
- The Tune In & Tune Up program helps vehicle owners take voluntary steps to improve air quality by providing financial assistance for emission-related repairs.
- Additional funding from a grant awarded to The Maddy Institute by the California Partnership for the San Joaquin Valley has enabled Valley CAN to outreach to smaller environmental justice communities. In 2007 and 2008 Valley CAN held Tune In and Tune Ups in Arvin, Avenal and Parlier.
- A typical Tune In & Tune Up event removes approximately 3,000 tons of carbon monoxide, 300 tons of hydrocarbons, and 150 tons of oxides of nitrogen from the air in one year.



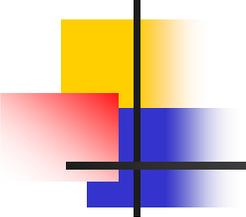
Tune In & Tune Up Program

- 12 TI&TU events held in the San Joaquin Valley, starting in September 2005 -
 - Fresno - 2 events
 - Bakersfield
 - Visalia
 - Stockton - 2 events
 - Merced
 - Arvin - 2 events
 - Modesto
 - Parlier
 - Avenal
- One event held in the South Coast Air Basin - South El Monte - October 4, 2008 - Coordinated with Rio Hondo Community College, South Coast Air Quality Management District, and DCA/BAR staff



Program Objectives

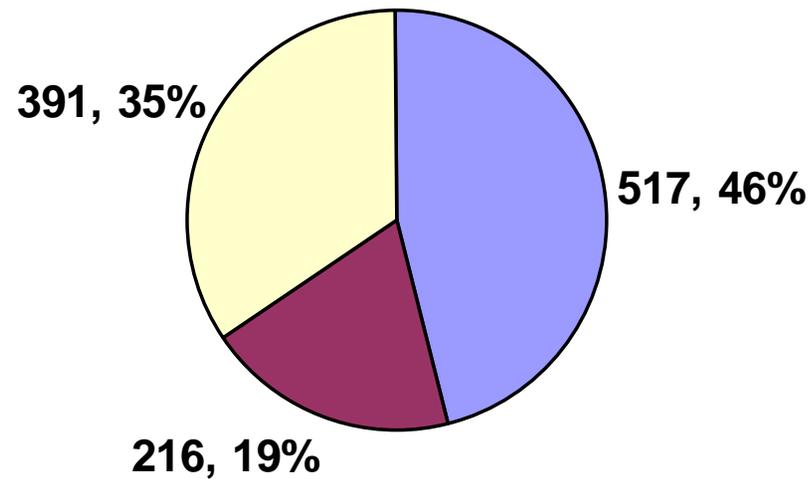
- Use remote sensing and portable analyzers to identify high emitters for repair
- Calculate emission benefit and cost-effectiveness of Tune In & Tune UP Program



Tune In & Tune Up Program - Visalia (2006), Merced, Fresno, Modesto (2007) events

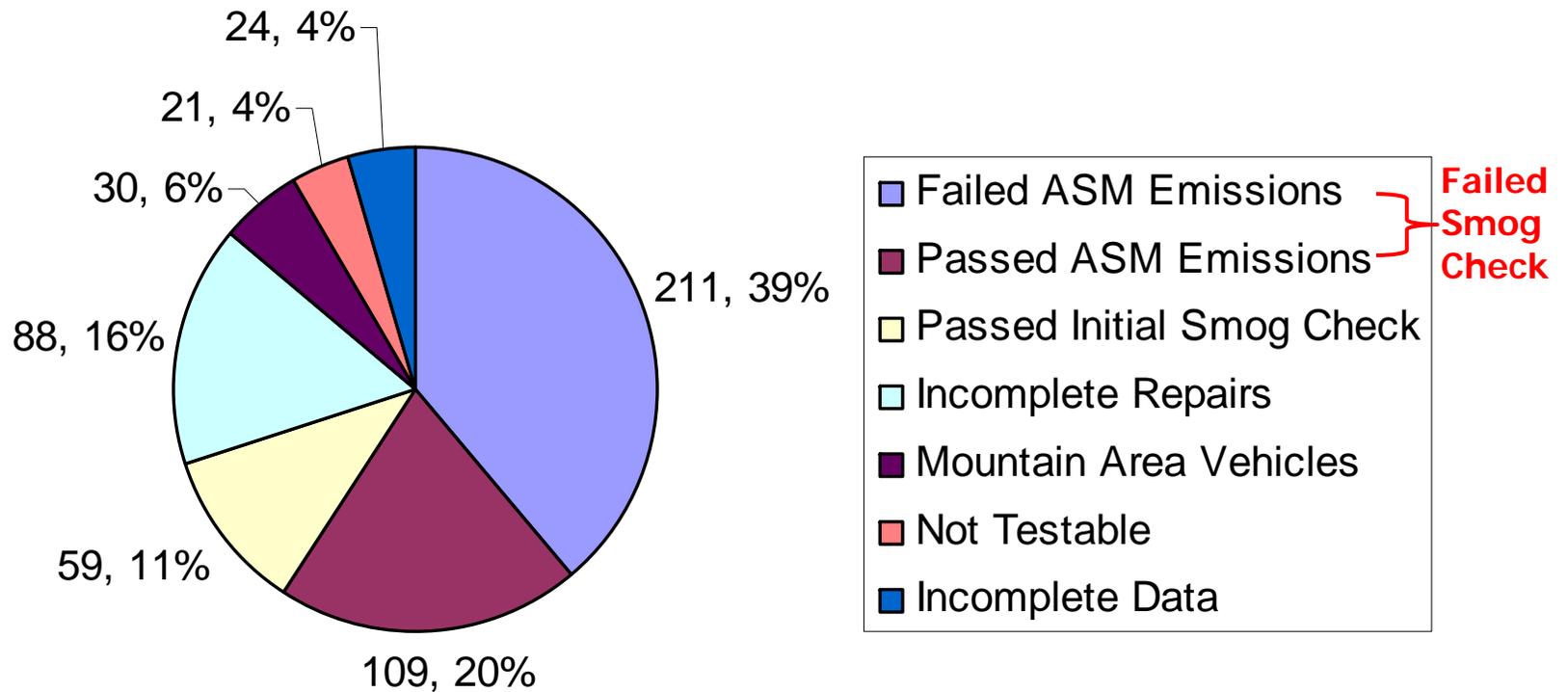
- Visalia Event - Remote sensing measurements made between 8:30 a.m. and 1:30 p.m. at Visalia event
 - Motorists drove their own vehicle past two remote sensing devices (RSD) in series on voluntary basis to obtain emissions reading
 - Approximately 260 vehicles drove past the remote sensors
 - CO high emitter cutpoint was >5%
 - HC and NO high emitter cutpoint was >1000 ppm
 - RSD units and data provided by BAR
- Merced, Fresno, and Modesto Events - Portable emissions analyzers operated by BAR staff; measured CO and HC idle test emissions
- \$500 repair voucher offered to drivers of vehicles that failed the event inspection

Visalia, Merced, Fresno, Modesto events 1124 Vehicles Tested

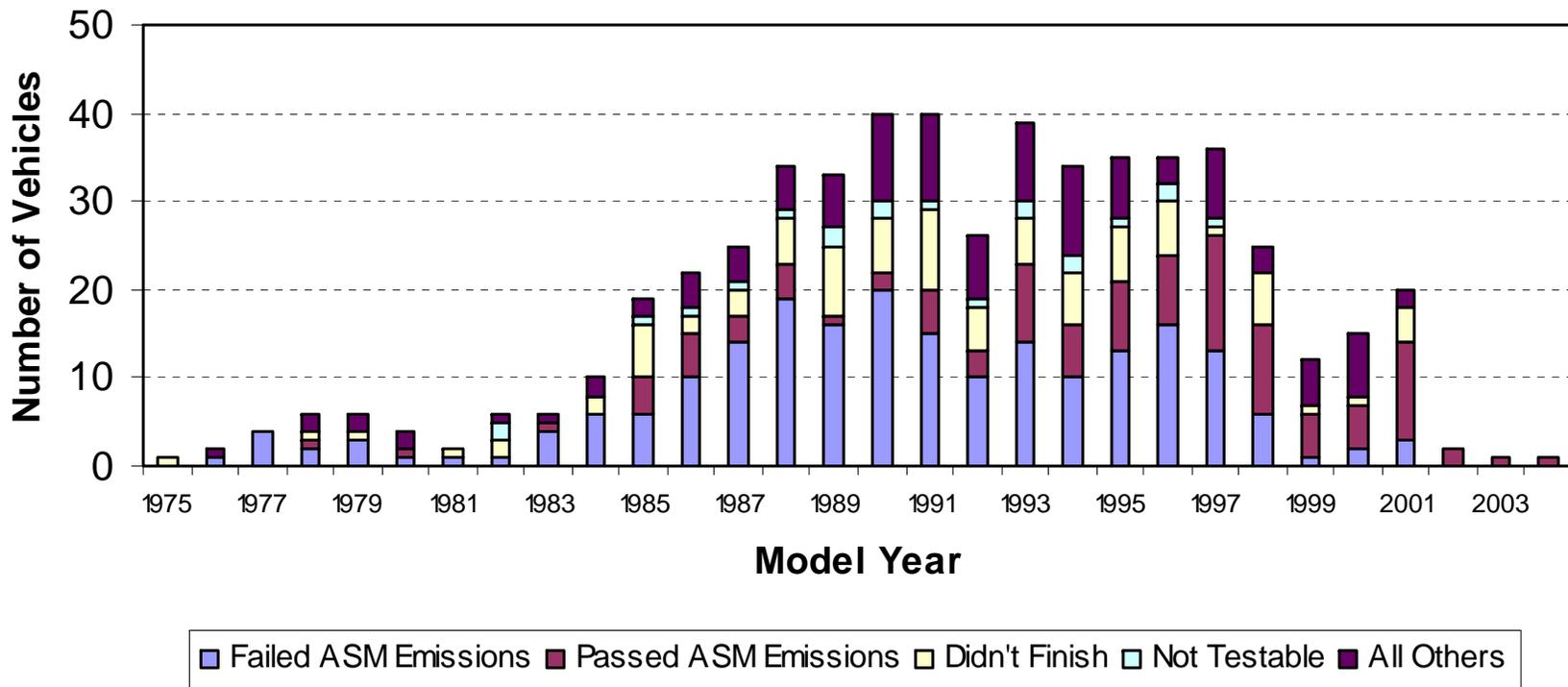


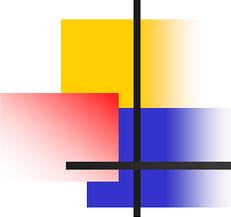
■ Vouchers Redeemed ■ Vouchers Not Used ■ Passed Inspection

Vehicles' Status at Repair Shops



Model Year Distribution and Status of Vehicles in Program



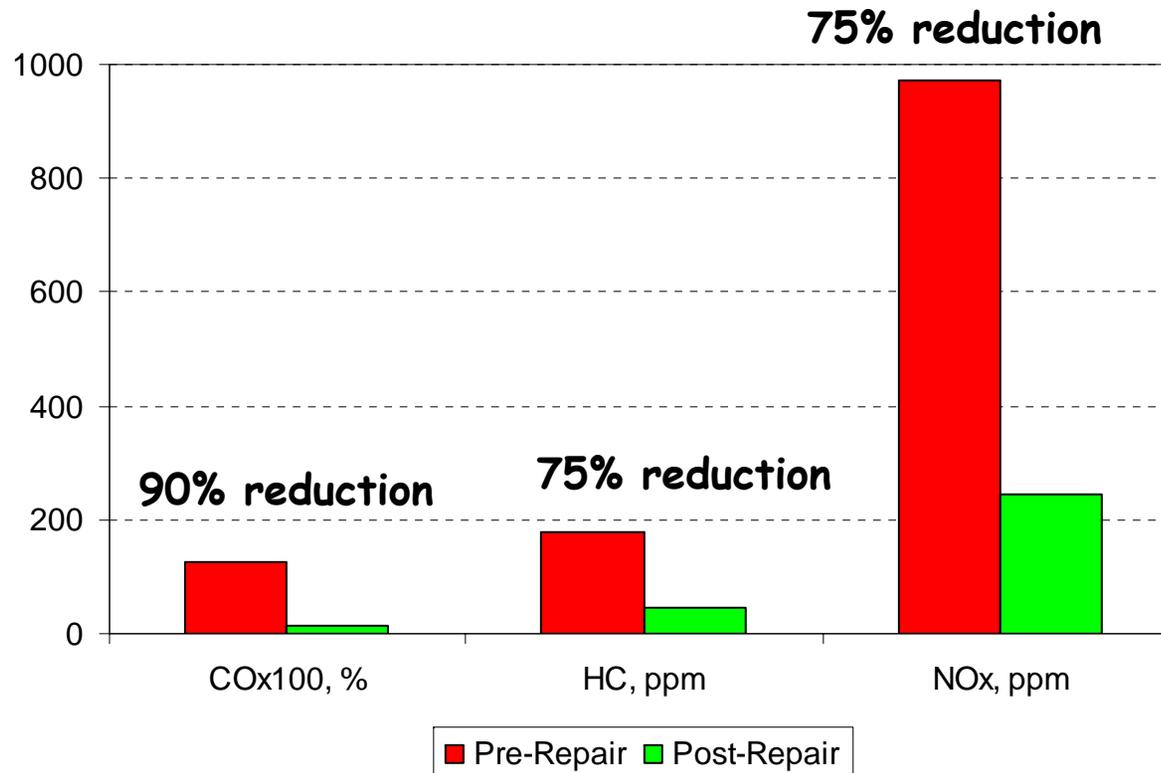


Visalia, Merced, Fresno, Modesto Vehicles

| Vehicle Status | Ave. Costs/Vehicle (Inc. Smog Check) |
|--|---|
| Failed Smog Check and successfully repaired, n = 320 | \$547 |
| Failed ASM Emissions and Repaired, n = 211 | \$574 |
| Passed ASM Emissions and Repaired, n = 109 | \$496 |
| Partial repairs/left program, n = 88 | \$300 |
| No NOx requirements (outside program area), n = 30 | \$398 |
| Didn't test; extensive repairs needed, n = 21 | --- |
| Incomplete Data, n = 24 | \$433 |
| Passed Smog Check, n = 59 | \$65 |

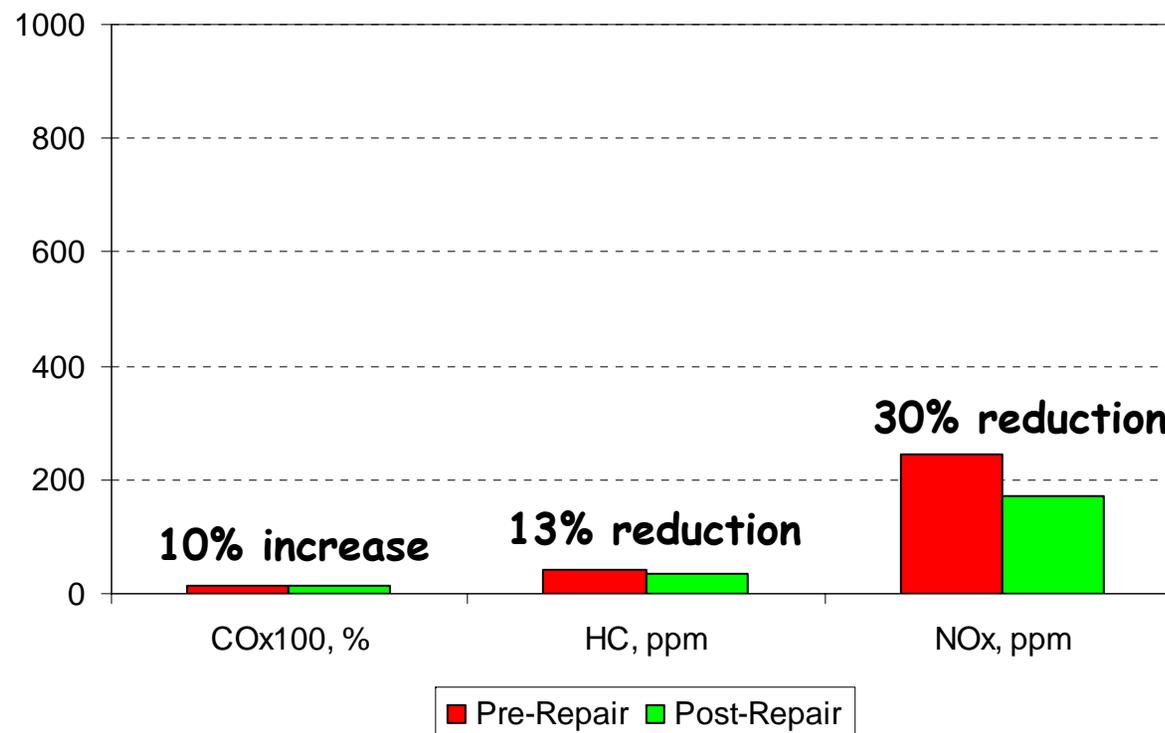
Vehicles that failed emissions portion of Smog Check inspection

211 "Successfully Repaired" Vehicles

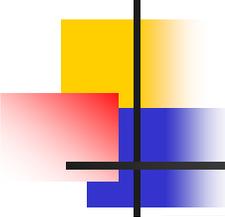


Vehicles that passed emissions portion of Smog Check inspection but failed Smog Check

109 "Successfully Repaired" Vehicles



Note: Same scale as in previous slide.



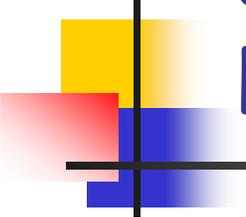
Emission reductions from 211 repaired vehicles that initially failed emissions portion of Smog Check

| Emission Reductions | CO | HC | NOx |
|--------------------------|---------|--------|-------|
| Pounds per vehicle | 475 | 48 | 29 |
| Pounds from 211 vehicles | 100,124 | 10,175 | 6,200 |
| Tons from 211 vehicles | 50 | 5.1 | 3.1 |

Assumption: Repairs are good for 10,000 miles

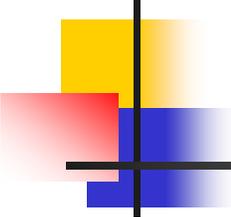
Pre- and Post-Repair Data from Previous TI&TU Events

| Event | Pre- / Post-Repair Ave. ASM Emissions | | | Percent Reduction | | |
|---|--|---------------|--------------------------|----------------------|-----------|-----------------|
| | CO, % | HC, ppm | NO _x , ppm | CO | HC | NO _x |
| Fresno TI&TU 2005 | 1.39/0.09 | 131/46 | 710/335 | 94 | 65 | 53 |
| Bakersfield TI&TU 2006 | 1.68/0.27 | 210/67 | 923/333 | 84 | 69 | 64 |
| Stockton TI&TU 2006 | 0.98/0.18 | 127/51 | 666/221 | 82 | 60 | 67 |
| Arvin TI&TU 2007 | 1.53/0.20 | 140/57 | 602/249 | 87 | 59 | 59 |
| 2006 Visalia and 2007 Merced, Fresno, and Modesto TI&TU Programs | | | | | | |
| Failed Pre-Repair ASM Emissions | 1.26/0.13 | 177/45 | 972/244 | 90 | 75 | 75 |
| Passed Pre-Repair ASM Emissions | 0.12/0.14 | 40/35 | 244/171 | -10 | 13 | 30 |
| CA I/M Pilot Program 1995 | 1.36/0.22 | 160/50 | 884/419 | 84 | 69 | 52 |



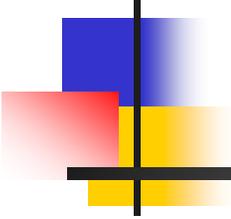
Gross Polluters from Visalia, Merced, Fresno, and Modesto Events

| Vehicle Class | Number | Percent |
|--|--------------------|---------|
| Failed ASM Emissions and Repaired, n = 211 | 62 | 29 |
| Passed ASM Emissions and Repaired, n = 109 | 0 | 0 |
| Partial repairs/Left program, n = 88 | 45 | 51 |
| Not testable, n = 20 | Data not available | - - - |
| All others, n = 113 | >5 | >4 |



Cost-effectiveness of repairs to for 211 emissions-failing vehicles that were "successfully repaired"

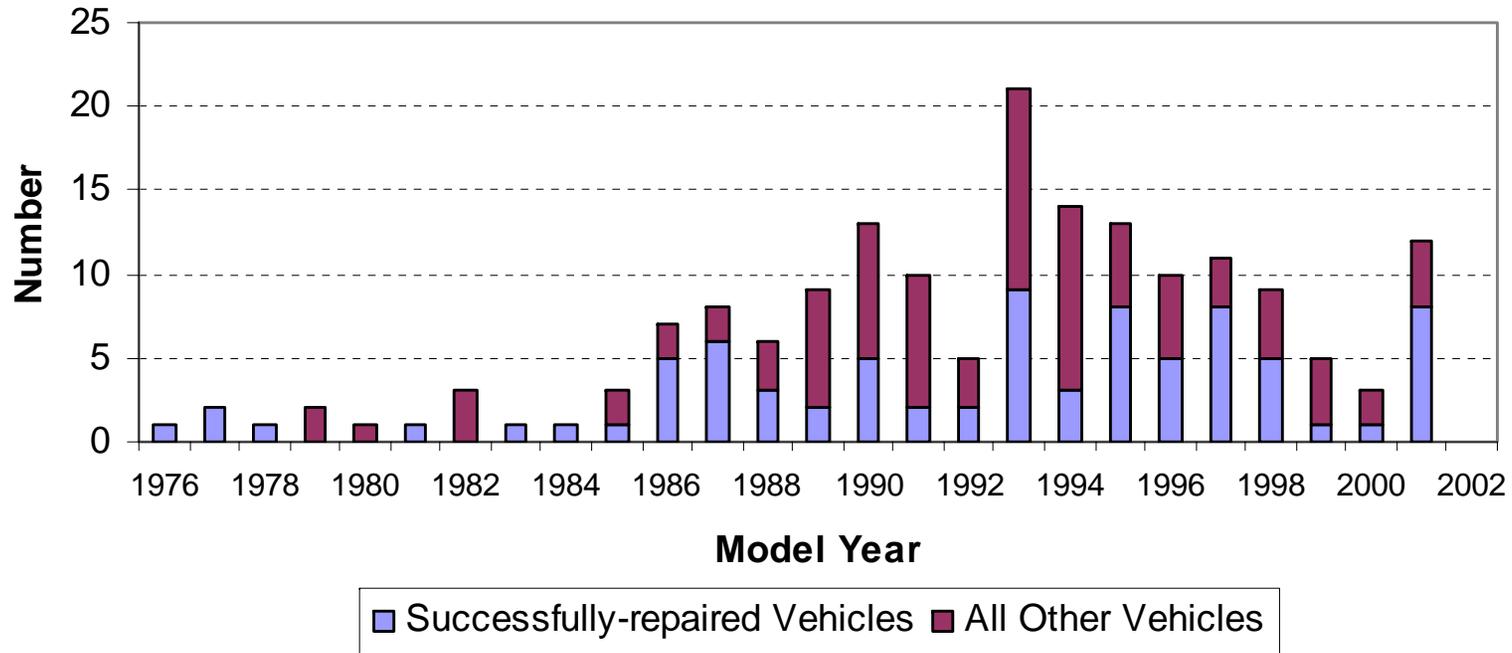
- $[CO + HC + NO_x] = <\$2100/\text{ton}$
- $[HC + NO_x] = <\$14,800/\text{ton}$
- For vehicles that passed the initial ASM emissions but failed the Smog Check and were successfully repaired, cost-effectiveness of $[HC + NO_x]$ is at least \$150,000/ton
 - These are maximum costs; do not include nontailpipe or evaporative HC reductions or PM emission reductions as they were not measured. True costs are lower than these amounts.
 - Assumption: Repairs are good for 10,000 mi.



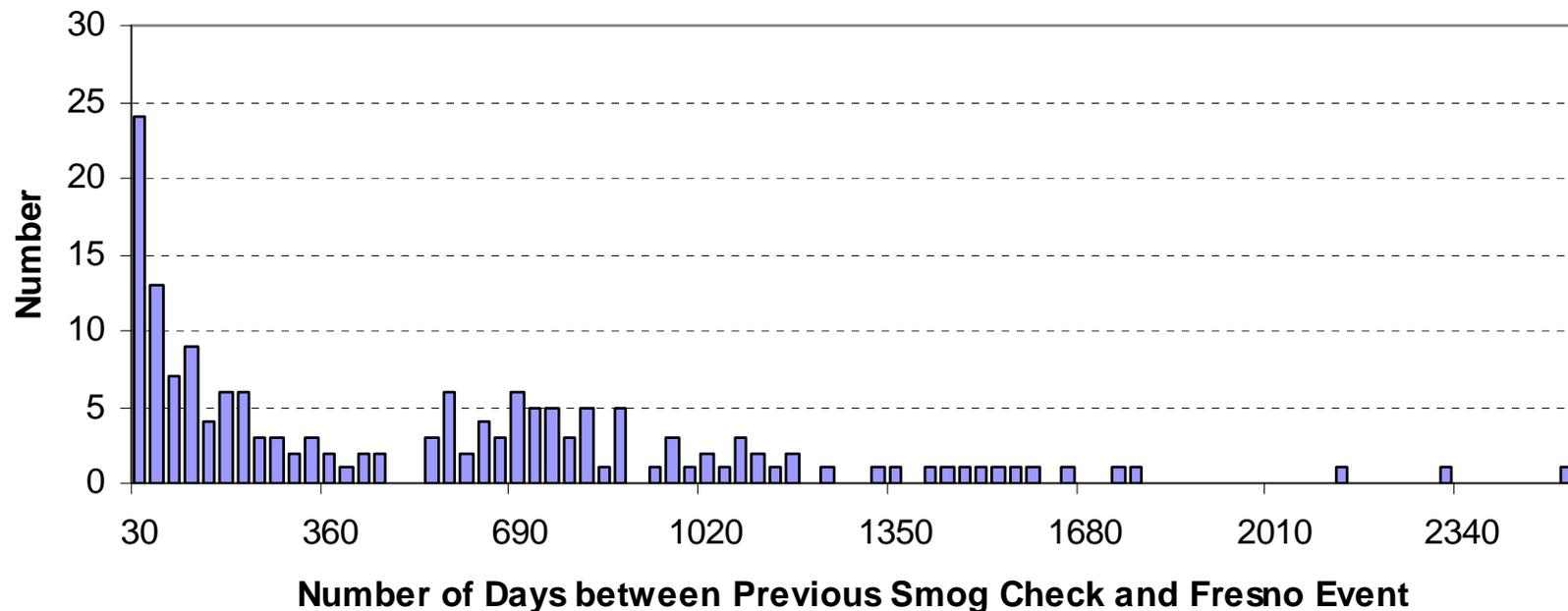
In-depth Analysis of Data from Fresno 2007 Event

Acknowledgment - Cindy Stover of the Foundation for California Community Colleges for input and data from registration records

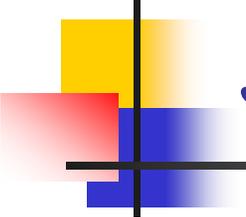
Model Year Distribution of Vehicles in Fresno Event



Fresno Vehicles - Time Between Previous Smog Check and Event



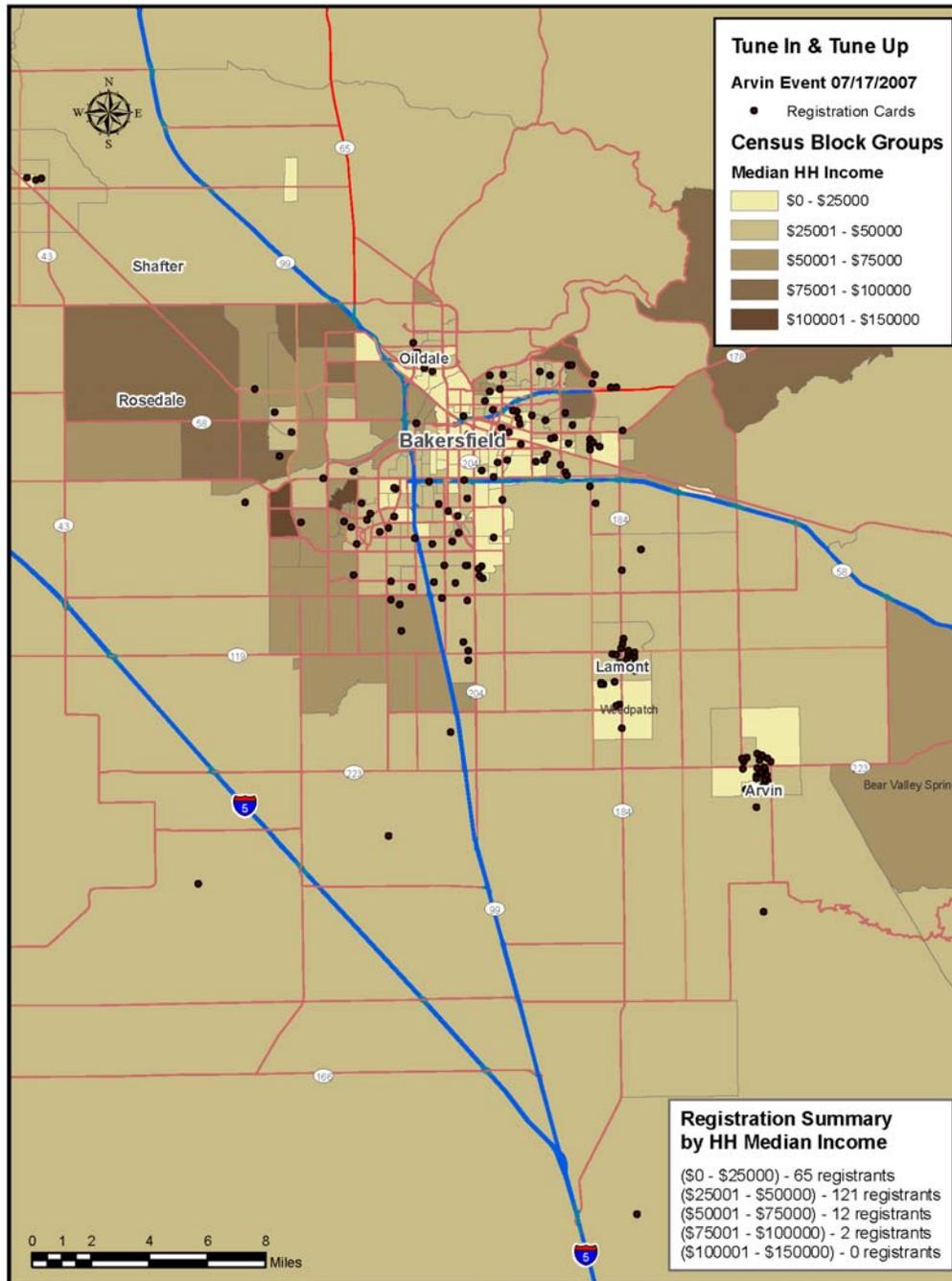
14% of vehicles received Smog Check <30 days prior to event
8% of vehicles received Smog Check 30-60 days prior to event
Minimum interval = 1 day; maximum interval 2520 days



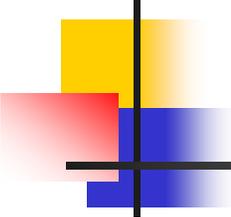
Fresno Vehicles - Registration Status and Moyer Eligibility

- Only 32% of all participating vehicles currently registered on the day of the event
- At least 66% of the vehicles did not meet Moyer eligibility requirements
 - Needed to participate >90 days prior to regularly scheduled Smog Check inspection
 - Other criteria were not evaluated, such as 2-years' continuous registration and vehicle weight.

Arvin TI&TU Event Data



- Held July 17, 2007
- Targeted publicity for event
- 341 motorists came to the event
- 280 failed the on-site emissions test
- 230 participated in the repair program
- 93% had household incomes <\$50,000/yr



Summary

- Tune In & Tune Up Programs are very successful in achieving emission reductions from light-duty vehicles
- Emission reductions are comparable to or greater than those obtained in ARB's 1995 I/M Pilot Study
 - Quantifiable emission reductions (not modeled)
- Even more emission reductions would be obtained if all vehicles were repaired. A significant fraction of vehicles left the program prior to complete repairs
- As with all programs (including Smog Check) we need more information on retaining vehicles in repair program and understanding duration of repairs (should the gross polluters be repaired or scrapped?)

Governor Names Valley CAN Winner of 2008 Top Environmental Leadership Award

Valley CAN won the 2008 Governor's Environmental and Economic Leadership Award for the Tune In and Tune Up Program



Questions?

