Reducing Emissions from High-Polluting Automobiles

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The Big Picture

- Future air quality depends on the rate at which old and middle-aged high-polluting cars leave the fleet, not on making new cars any cleaner
  - The long-term problem of automobile air pollution has been solved by actions we've already taken
  - An effective in-use program is a "rush charge" to get cleaner air sooner
- Cars account for most VOC, and gross polluters for most VOC from cars
  - If we want to significantly reduce VOC in the near term, that's where we need to look
- Is an effective repair/scrap program a good idea? Compared to what? What's the alternative?

What Are “Gross Polluters”?

- A small portion of automobile fleet contributes most of the emissions
- 1990s: worst 10% of HC(CO) emitters contributed ~50% of tailpipe HC(CO) emissions; ~10%=30% for NOx
  - Remote sensing, roadside I/M, lane I/M
- Recent Riverside RSD
  - 5% = 50% of tailpipe HC or CO; 5% = 35% NOx (based on cars with at least 2 measurements)
- Substantial overlap between HC and CO high emitters

Why Focus on Gross Polluters? (1)

- Smog check failing to ensure repair/removal
  - Gross polluters on road in spite of Smog check
    - Avoid program; Fraud; Ineffective, incomplete repairs; Exempt from program
- That's where the emissions are
  - Most VOC (~70%-75%) comes from gasoline vehicles, mainly autos
    - Most of these emissions are concentrated in a small percentage of vehicles
- Dovetails with desirable ozone control strategy
  - Most of California needs VOC/CO reductions for ozone control

Why Focus on Gross Polluters? (2)

- Cost effective reductions
  - Probably a few thousand $/ton
  - Cheaper than other options

Design/Implementation Issues (1)

- How to fund?
  - Exempt cars up to 8 or 10 years old from Smog Check; collect $10 registration surcharge
    - More than 70% of Smog Check money goes to testing clean cars and program admin.
    - Smog Check for newer cars costs tens to hundreds of thousands per ton for newer cars, even if program works as intended

Design/Implementation Issues (2)

- What will people do for alternative transportation if they scrap their car?
  - No need to be patronizing. People won't scrap their car unless it's worth more to them dead than alive.
- Ensuring compliance
  - Experience with Smog Check and pilot pullover studies suggests many people will turn down even free repairs
    - Repair subsidy combined with "backstop" sanctions may hold most promise for encouraging participation
  - But always remember to compare with real alternatives: Gross polluters are out there. If on-road program doesn't deal with them, what will?

Design/Implementation Issues (3)

- Emissions of replacement vehicle
  - Specious concern if no vehicles are imported
    - Even if buy another high emitter, seller of high emitter must buy another car, etc. In a “closed system,” each scrapped car can only be replaced by a new car.
- Importation of vehicles from elsewhere
  - Could reduce by requiring past local registration
  - Run program for limited times
  - Publicize program *after* doing remote sensing
  - Only so many old gross polluters out there

Design/Implementation Issues (4)

- Raising price of used vehicles
  - Scrapping large numbers of vehicles could do this
    - RAND Study: Scrapping 0.5% of fleet each year for 10 years would increase average price by $66
      - Cost increase partially offset by quality increase

Design/Implementation Issues (5)

- Will motorists avoid the remote sensors?
  - Some motorists will try to avoid being measured
    - Avoid RSD sites
    - Coat license plate to foil RSD camera
  - Potential responses
    - Unmanned, low-profile units
    - Require annual Smog Check for cars not seen by remote sensor
  - Design flexible program to evolve based on field experience
  - Remember to ask “what’s the alternative?”
    - Either find and repair/scrap the gross polluters, or give up and wait for them to die a natural death

Political/institutional barriers (1)

- Prospective SIP credit system
  - Make believe Smog Check has already achieved reductions, so no additional SIP credit for real reductions from gross-polluter repair/scrap
- Incorrect emissions inventory
  - Understates importance of automobile VOC
- Unwillingness to acknowledge Smog Check's inefficiency and ineffectiveness
- "Every ton is sacred" mentality
  - Even if Smog Check worked as intended, cost effectiveness is tens to hundreds of thousands per ton for vehicles <10 years old

Political/institutional barriers (2)

- Resistance to prioritizing
  - Regulators/activists ignore harm from failing to choose the cheapest available reductions
  - No acknowledgement that we have many needs/goals/aspirations and limited resources
  - Must make trade-offs
    - Choosing unnecessarily expensive or ineffective measures means less air pollution cleanup

Political/institutional barriers (3)

- Why have regulators and activists opposed and suppressed remote sensing?
  - Threatens power and jobs of entrenched state and federal I/M bureaucracies and professional activists
    - Potential to rapidly and cheaply solve the problem; no need for large, ongoing programs that affect everyone
  - RSD does not compute in an FTP world
    - FTP emissions, rather than real-world emissions, are what matter in the regulatory world
  - Realistic inventory shifts emissions from industry to motorists, particularly poorer motorists
  - RSD shows that a few motorists account for most of the problem
    - It’s not growth or suburbs or SUVs—it’s the gross polluters

Regulatory system underrates potential benefits of dealing with gross polluters

- Example:
  - Worst 5% of VOC emitters contributes 1/3 or more of total VOC inventory in South Coast
  - Therefore, in principle, could get rid of 25% to 30% of South Coast VOC inventory by repairing or scrapping these cars
  - 5% ~ 600,000 cars; $600 million at $1,000/car
- Is there any other way to get rid of 1/4th of South Coast's VOC inventory for anywhere near $600 million, or even $1 billion?
- Yet CARB/air district plans don't mention gross polluters, while at the same time saying they can't find enough VOC reductions to reach attainment
- Policy-relevant assessment must compare realistic assessments of costs and emission reductions of all alternatives; all estimates must be reconciled to a common, correctly apportioned emissions inventory

What's the Alternative?

- Gross polluters are out there; Smog Check is not dealing with them and is wasting scarce funds on testing clean cars
- Must find and repair or scrap gross polluters if we want to reduce emissions faster
  - Do we have a better option than on-road identification and follow-up?
  - Or do we just wait for cars to die natural deaths, knowing that long-term problem will be solved by fleet turnover