

Considerations for State I/M Program Optimization

Introduction

The 1990 Clean Air Act (CAA) mandated the implementation of vehicle inspection and maintenance (I/M) programs in areas designated as moderate or worse nonattainment for ozone and/or carbon monoxide (CO)¹. Currently, 33 states have such programs in operation. For a variety of reasons (some of which are mentioned below), many areas are looking at ways to optimize their I/M programs and are asking what programmatic efficiencies and other improvements might be feasible. To facilitate this process, EPA has developed a list of questions and/or issues states should consider as they make choices about their existing and/or future I/M programs.

In providing this list, it is not EPA's intention to advocate for one I/M program type or element versus another, or to make formal recommendations. The history of I/M has clearly shown that what makes sense for one area does not always make sense for another. Nevertheless, the relative effectiveness of options can still be assessed by states using the MOBILE6 emission factor model in conjunction with locally variable parameters such as the distribution of vehicle miles traveled (VMT), the proportion of vehicle types in the fleet, the distribution of vehicle ages, et cetera. It has been EPA's experience that these locally variable parameters frequently drive I/M decisions that make sense in a given area. The following list is therefore intended merely to outline the various factors that need to be taken into consideration when designing (or redesigning) the optimal I/M program for a given area. It should be used to supplement whatever I/M optimization efforts may already be underway, to raise issues that may have been overlooked, and to otherwise ensure that the optimization process is as comprehensive as possible and does not lead to unintended consequences.

The Reasons of Optimization

The reasons a state may want to consider (or may already be considering) optimizing its I/M-related efforts include (but are not limited to) the following:

- The state is preparing for mid-course review of an attainment demonstration that was based on a weight-of-evidence analysis;
- An area has been redesignated to attainment for the 1-hour ozone and/or CO

¹ The 1990 CAA also requires that Metropolitan Statistical Areas (MSAs) with 1990 populations of 100,000 or more within the Northeast Ozone Transport Region (OTR) implement enhanced I/M programs, regardless of their ozone attainment status. As a result, many of the air quality based criteria identified in this document may play less of a role in deciding whether or not to optimize or otherwise revisit an OTR-triggered I/M program. Areas required to implement I/M solely because of their location within the OTR should consult directly with their EPA Regional Office regarding their options as early as possible during the reassessment process.

NAAQS, which might allow the inclusion of other measures in place of I/M for maintenance purposes;

- An area is expected to violate the 8-hour ozone and/or PM_{2.5} NAAQS;
- Previous State Implementation Plan (SIP) credit estimates need to be revised to reflect changes to the program(s) that have been made since SIP approval;
- The program is in the process of incorporating OBD checks;
- I/M operation service contracts are being renegotiated or recompleted;
- A state program evaluation has shown its program is not achieving its projected emission reduction benefit.

Depending on the unique situation of a state with regard to the above issues, the flexibility may exist to modify current programs as deemed appropriate while still complying with Federal statutory and regulatory I/M requirements. States should consult with their EPA Regional offices early in the I/M optimization process, and such efforts should be conducted taking the following factors into consideration²:

Air Quality Planning Considerations

Questions to be Considered

- What portion of the state's emissions inventories for ozone, carbon monoxide (CO), Particulate Matter (PM) and/or air toxics do on-road mobile sources constitute?
- What portion of the state's attainment, maintenance, and/or Rate-of-Progress (ROP) plans does and/or will I/M constitute?
- How important are I/M reductions in demonstrating attainment and transportation conformity? For example, if an I/M program yields significant emission reductions that are necessary to pass conformity, what steps will the area take to ensure that they do not enter a conformity lapse if optimization efforts trade-off emission reductions for other, programmatic efficiencies? Are other measures or control programs for the on-road mobile source sector of the inventory being considered? Or are there additional control measures for the other source sectors that would allow the on-road mobile portion of the inventory to grow without jeopardizing the area's ability to demonstrate conformity?
- Are there additional emission reduction benefits an area may need from a future I/M program compared to the existing program?
- Alternatively, how much credit can an area afford to lose without negatively impacting

² Where EPA has information or recommendations that bear on the factor presented for consideration, that information is noted as a sub-bullet ☐ after the issue statement and will be listed under the heading, "Information That May Be Relevant."

these plans?

- If an area is redesignated to attainment, what changes (if any) can be made without creating the potential for backsliding?
- Even if I/M plays a relatively modest role in a state's 1-hour ozone standard attainment strategy, what role will it play in attaining the 8-hour ozone standard?
- Will an OBD-focused program meet the relevant I/M performance standard for a given area?
- Is the I/M program useful in meeting an area's goal for reducing air toxics? Will an OBD-only program meet this goal?

Information That May Be Relevant

For 1-hour ozone nonattainment areas:

- ▶ The first enhanced I/M performance standard milestone (January 1, 2002) has passed, while the remaining milestone (the area's attainment date) depends upon its classification (i.e., whether serious, severe, or extreme nonattainment).
- ▶ Whether an area can meet this second milestone with an OBD-focused (i.e., no tailpipe test) program is driven by how large a proportion of the area's in-use fleet will be OBD-equipped by the attainment date. The MOBILE6 model can be used in conjunction with local vehicle age distribution projections to make this determination.
- ▶ As a rule of thumb, a later attainment date will mean more fleet turnover to OBD, which, in turn, will mean a greater likelihood of meeting the relevant performance standard.
- ▶ Areas required to meet the basic, low enhanced, or OTR-low enhanced I/M performance standard face a lower hurdle with regard to the emission reduction credit needed compared to areas required to meet the high enhanced I/M performance standard. Such low-hurdle areas will also have greater flexibility when it comes to exempting older model year vehicles. As a result, such low-hurdle areas are more likely to be capable of meeting the applicable performance standard with an OBD-focused program.

For 8-hour ozone nonattainment areas:

- ▶ EPA is still developing the methodology for classifying 8-hour areas, but will likely need to update I/M requirements to take the new standard into consideration. In revisiting its I/M requirements, including the performance standard, EPA intends to highlight the growing role of OBD testing in I/M programs.

- ▶ Given the lead time before implementation, the cost, and the shrinking portion of the non-OBD equipped fleet, any area considering the start-up or continuation of existing dynamometer-based testing programs should carefully weigh the cost, emission benefits and the expected life span and size of any such program.
- ▶ It is likely that EPA will:
 - finalize the 8-hour ozone implementation guidance in the next 12 - 16 months;
 - designate areas in 2004;
 - require SIPs to be due in 2007 - 2008; and
 - expect local control measures to be put in place in the 2006 - 2008 timeframe.

For PM, CO, and/or air toxics nonattainment areas:

- ▶ A number of VOCs are also air toxics (e.g., benzene, 1,3 butadiene, formaldehyde). Therefore, the ability of I/M in general (and OBD checks specifically) to reduce VOCs is directly related to its ability to reduce air toxics. OBD's ability to monitor a vehicle's evaporative emission control system also reduces emissions of air toxics such as benzene.
- ▶ The CO and air toxics benefits of an area's I/M program can be assessed using the MOBILE6.2 emission factor model (a draft of which was recently made available to states).
- ▶ The PM benefits of I/M are more difficult to assess at this time. Nevertheless, I/M's ability to reduce VOC and NOx emissions will have a positive effect on reducing PM, because VOC and NOx are known to be PM precursors.
- ▶ Because performing OBD identified repairs can help lower VOC, CO, and NOx emissions from individual vehicles, enforcing such repairs through OBD-I/M checks will play a significant role in reducing CO, air toxics, and PM. How large a role will vary from area to area, depending upon the proportion of OBD-equipped vehicles in the local in-use fleet.

Program Design and Contract Considerations:

Questions to be Considered

- What are the legal and/or contractual constraints associated with optimizing the I/M program?
- If the program is centralized, is the network at or near capacity? Will growth in the local vehicle population require the building of additional lanes and/or the inclusion of

decentralized testing capacity, or can this growth be offset by incorporating the quicker OBD-based test?

- When will existing contracts expire and/or tailpipe testing equipment be fully amortized?
- What number of model years (MYs) should be exempted to strike the right balance among competing factors such as the likelihood of failure, equity of exposure to program requirements, and the cost of testing clean vehicles?

Information That May Be Relevant

- ▶ Although the impact of MY-based exclusions will vary from area to area depending upon individual vehicle age distributions, MOBILE6 allows for the modeling of both a grace period (i.e., the number of new MY vehicles exempted from the program) and an I/M exemption age (i.e., the age at which a vehicle is no longer required to be I/M tested).

Program Change Considerations:

Questions to be Considered

- How recent was the last change to the I/M program? Will changing the program again undermine public confidence in the program? Will changing the program make it vulnerable to additional, unwelcome changes?
- Will changing the program require changes to the program's legal authority?

Fleet Composition Considerations:

Questions to be Considered

- What is the proportion of pre- to post-MY1996 vehicles in the local fleet? When will post-MY1996 vehicles predominate?
- How do the pre- and post-MY1996 fleets compare in terms of the vehicle miles traveled (VMT) attributed to each? When will MY1996 and newer vehicles make up the majority of the area's VMT?
- What proportion of the local mobile source emission inventory is attributable to pre- vs. post-MY1996 vehicles?
- What are the projected failure rates for the pre- vs. post-MY1996 fleets?