



California Environmental Protection Agency

AIR RESOURCES BOARD

Proposal

Public Transit Bus Fleet Rule and Emission Standards for New Urban Buses

**California Air Resources Board Public Hearing
February 24, 2000**



Today's Presentation

- **Review of January staff proposal**
- **Four Outstanding Issues**
 - ◆ Discussion
 - ◆ Recommendations
- **Conclusions**



Review of Staff Proposal

- **Two paths: Diesel and Alternative-fuel**
 - ◆ Equal NOx reductions
 - ◆ Alt-fuel path yields more PM reductions
- **Each path: (requirements vary)**
 - ◆ More stringent new bus emission standards
 - ◆ PM retrofits and ultra-low sulfur fuel



Diesel Path

- Forego buying cleaner buses until 2004
- More stringent standards introduce advanced technology earlier
 - ◆ NOx catalysts + traps beginning in 2004
 - ◆ Zero emission buses
 - Demonstration in 2003
 - Purchase in 2008



Alternative-Fuel Path

- **Purchase cleaner, alt-fuel buses now and in future**
- **More stringent new bus standards deferred until 2007**
- **Zero emission buses**
 - ◆ **Purchase requirement: 2010**
 - ◆ **No demonstration required**



Both Paths

- **Retrofit existing diesel buses with particulate traps**
 - ◆ **Phased-in 2003-2009**
- **Use 15 ppm sulfur diesel fuel**



Issues for Today's Discussion

- 1. PM retrofit requirements**
- 2. 2004 diesel standards**
- 3. Diesel hybrid buses**
- 4. Local authority to choose the alternative-fuel path**



Issue 1: PM Retrofits

Options:

- **Staff proposal:**
 - ◆ Retrofits phased-in 2003-2009
- **Environmental proposal:**
 - ◆ Accelerate retrofit requirements on diesel path



Issue 1: PM Retrofits

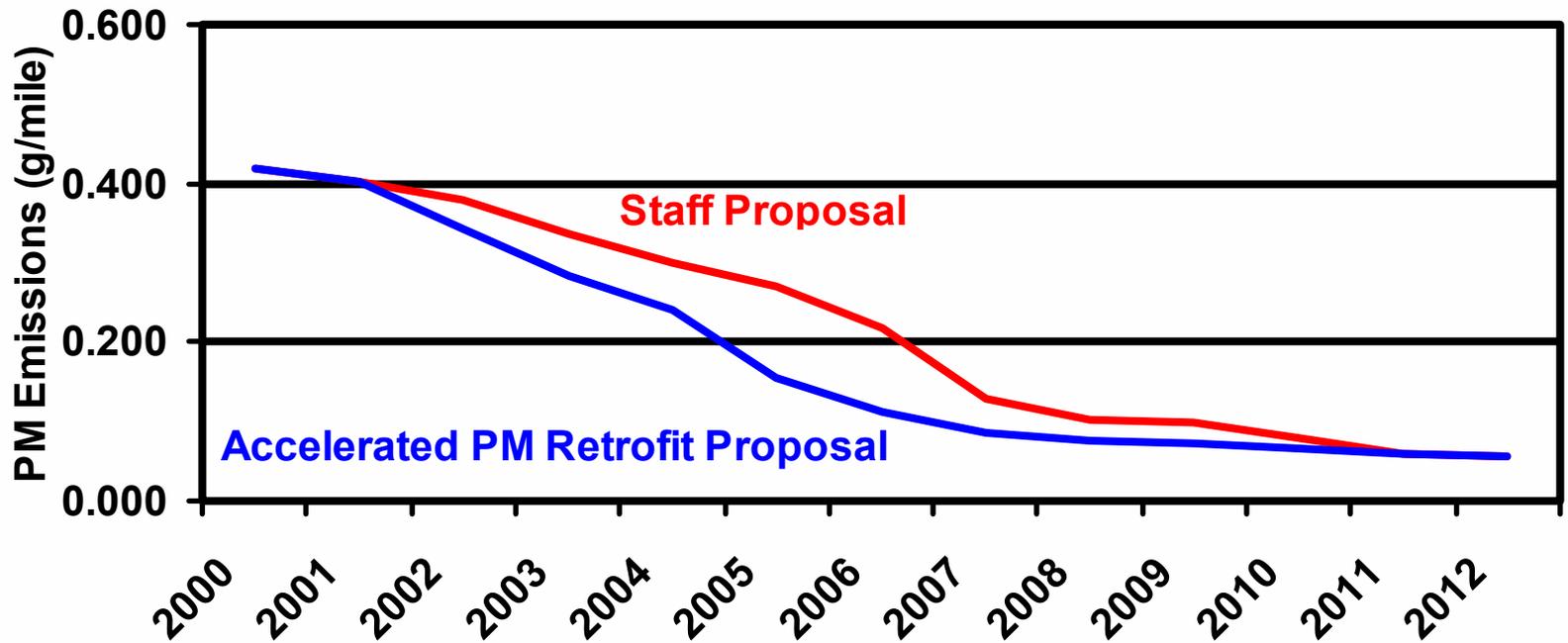
Environmental proposal (diesel path)

- **Tier 1 (pre-91 models): No change**
- **Tier 2 (MY 91-95): Accelerate by 1 year**
 - ◆ 50% by 2003; 100% by 2004
 - ◆ limit exemption for retirement to one year
- **Tier 3 (MY 96-03): Accelerate by 2 years**
 - ◆ 20% by 2005; 75% by 2006; 100% by 2007
 - ◆ eliminate exemption for retirement



Fleet Average In-Use PM Emissions

Staff Proposal vs. Accelerated PM Retrofit Proposal





Issue 1: PM Retrofits

Staff Recommendation:

Accelerate retrofit requirements on the diesel path

- **Technologically feasible**
 - ◆ Traps and low sulfur diesel fuel available
- **Reduces PM gap between paths**
- **No apparent opposition**



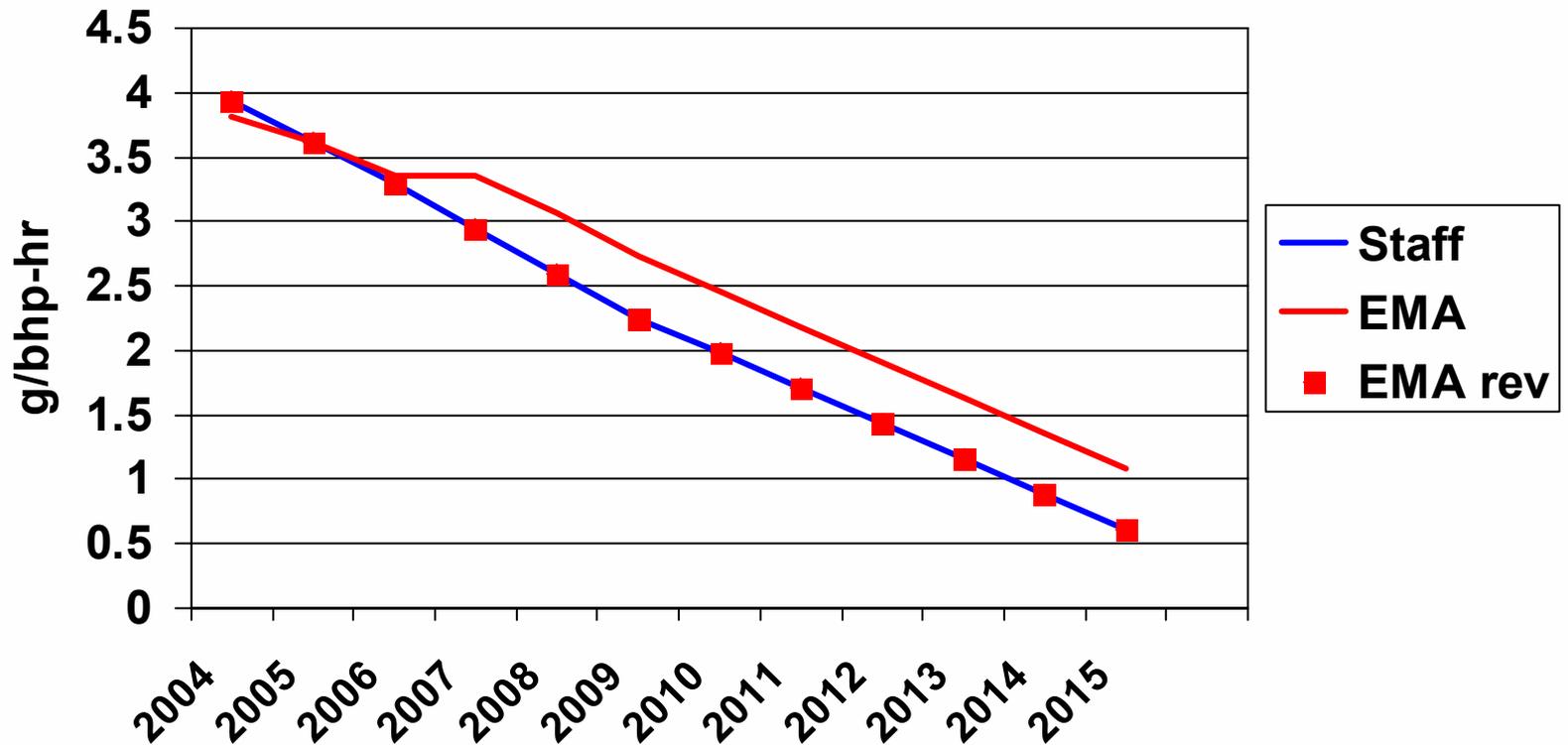
Issue 2: 2004 Diesel Standards

Options:

- **Staff proposal:**
 - ◆ 75% cleaner new bus NOx standard in 2004 (0.5)
 - ◆ 80% cleaner new bus PM standard in 2004 (0.01)
- **EMA proposal:**
 - ◆ NOx fleet average in lieu of 2004 diesel standards
- **Revised EMA proposal:**
 - ◆ EO-approved alternative for fleets to demonstrate NOx emission reduction equivalence
 - ◆ Accelerate 80% cleaner new bus PM standard to 10/02

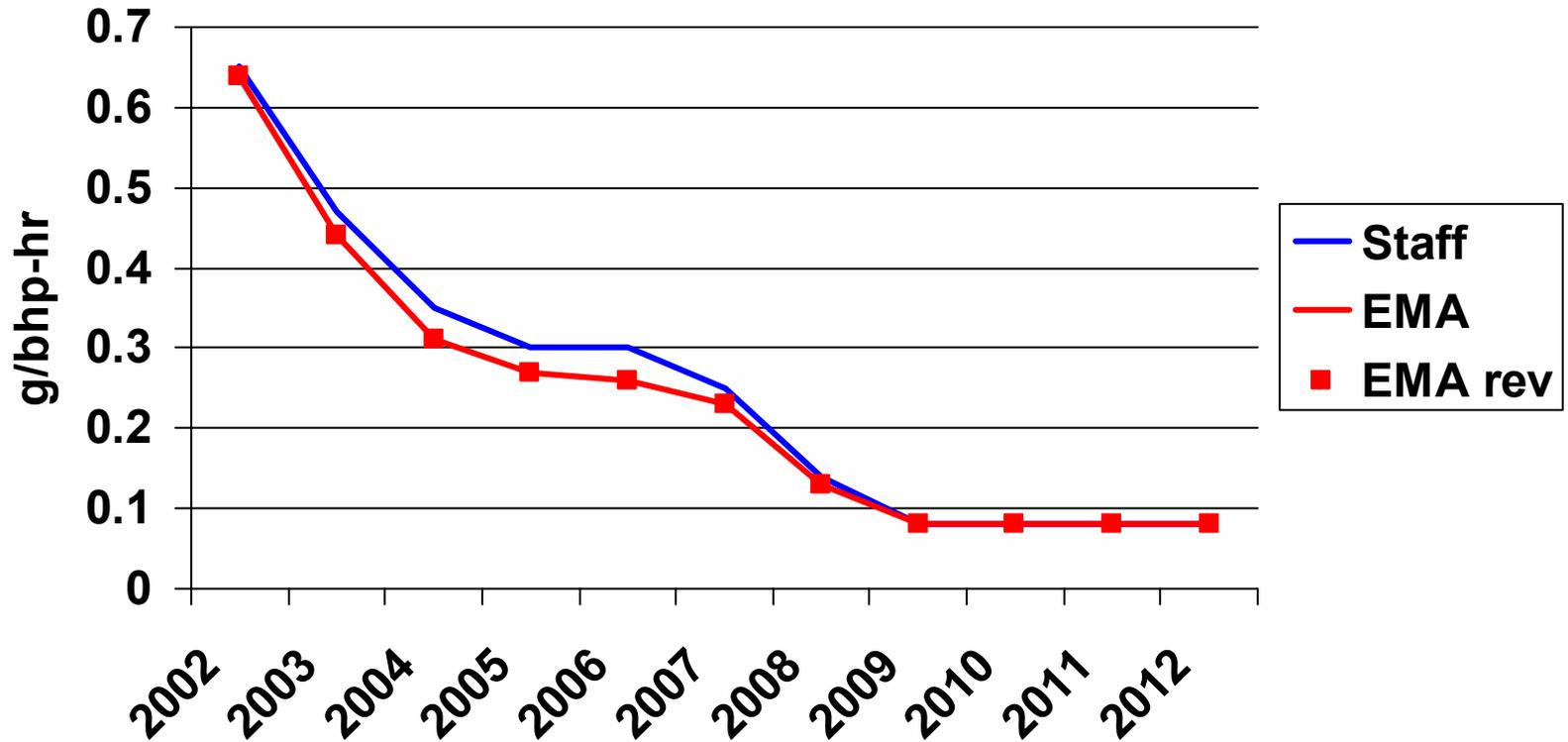


Issue 2: NO_x Comparison





Issue 2: PM Comparison





Issue 2: Summary

- **Original EMA proposal**
 - ◆ Less NO_x benefit, more PM benefit
 - ◆ Technology pull-ahead due to 2004-06 emission standards may not be realized
- **Revised EMA proposal**
 - ◆ Same NO_x, more PM benefit vs staff proposal
 - ◆ Guarantees reductions that may not be realized due to pre-buying, or no complying engines
 - ◆ Potentially lower cost
 - ◆ Includes demonstration of after-treatment in CA



Issue 2: 2004 Diesel Standards

Staff Recommendation:

Adopt revised EMA proposal

- **Equivalent or better NO_x emission reductions**
- **Greater PM emission reductions**
- **Demonstration program for diesel buses with after-treatment**



Issue 3: Diesel Hybrid Buses

Options:

- **Staff proposal**
 - ◆ Diesel hybrids can't exceed 15% of purchases by agencies on alternative-fuel path
- **Industry proposal**
 - ◆ Diesel hybrids qualify as alternative-fuel buses if meet standards



Issue 3: Diesel Hybrid Buses

- **New data available - 2 hybrid buses**
 - ◆ In-use PM (g/mi) for trap-equipped diesel hybrid similar to NG bus
 - ◆ NO_x higher than NG
- **In-use compliance test needed to demonstrate equivalency**



Issue 3: Diesel Hybrid Buses

Staff recommendation:

Staff proposal

- Diesel hybrids don't count as alt-fuel buses
- Staff developing in-use compliance procedure
 - ◆ Return with updated recommendation in 2001
 - ◆ Could qualify buses for incentive funds



Issue 4: Local Authority

Options:

- **Staff proposal**
 - ◆ Does not explicitly address local authority
- **SCAQMD/SJVUAPCD proposal**
 - ◆ Require alt-fuel-only path if districts so choose



Issue 4: Local Authority

- **Authority to regulate bus fleets exists**
 - ◆ ARB legal office opinion
 - ◆ ARB regulatory action unnecessary, *but*
 - ◆ May facilitate local district adoption of alt-fuel only requirement
- **Provides little or no NOx benefit**
 - ◆ Reduces toxic exposure from diesel PM
- **Sets precedent**
 - ◆ Alt-fuel bias



Issue 4: Local Authority

Staff Recommendation:

Staff proposal

- **Maintains dual path flexibility**
 - ◆ **Key principle upon which consensus achieved**
- **Districts free to act to limit bus fleets to alt-fuel purchases**



Other Issues

- **In-use compliance program**
- **In-use/certification test cycle**
- **Staff agrees and will investigate**



Conclusions

Staff Recommendations: Summary

- Accelerate PM retrofit schedule
- Adopt revised EMA proposal allowing alternative compliance with 2004 standards
- Adopt original staff proposal, including
 - ◆ Maintaining dual path flexibility
 - ◆ Diesel hybrids don't count as alt-fuel