ZERO EMISSION BUS
REGULATION

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California Air Resources Board

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Today’s Presentation

- Urban Transit Bus Regulation / Zero-Emission Bus (ZEB) Regulation
- Status
- Recommendations
Zero Emission Bus Regulation

Background

- Goal - Encourage a fleet dominated by zero emission vehicles
- Fuel cell buses demonstrated ability to meet performance needs
- Fuel cell manufacturers anticipated bus cost to be roughly equivalent to overhead trolley by 2004
Zero Emission Bus (ZEB) Regulation

- ZEB = hydrogen-fuel cell, electric trolley, or battery electric bus
- ZEB demonstration project
  - Diesel path transit agencies
    - >200 buses as of January 31, 2001
  - 3 ZEBs per demonstration by Feb. 28, 2006
  - Final report by July 31, 2007
Zero Emission Bus Regulation

Background

◆ Fuel cell bus applications would lead light duty applications
  ♦ Buses could better handle size and weight requirements of initial fuel cells
  ♦ Buses operated and serviced by trained staff
  ♦ Buses could be centrally fueled
Zero Emission Bus Regulation

◆ ZEB purchase requirements
  ◆ Diesel path
    ◦ Based on number of buses January 1, 2007
    ◦ Agencies with > 200 buses
    ◦ 15% 2008-2015
  ◆ Alternative-Fuel path
    ◦ Based on number of buses January 1, 2009
    ◦ Agencies with > 200 buses
    ◦ 15% 2010-2015
## Affected Transit Agencies

<table>
<thead>
<tr>
<th>Transit Agency</th>
<th>Fuel Path</th>
<th>January 1, 2005</th>
<th>15 %</th>
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<tbody>
<tr>
<td>Long Beach Transit</td>
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<td>Golden Gate Transit</td>
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<td>Santa Monica Big Blue Bus</td>
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<td>Omnitrans</td>
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<td>Los Angeles County MTA</td>
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ZEB Demonstration Status

- FCB demonstrations on current regulatory schedule
- FCBs are operational, meeting street performance goals
- FCBs are quieter than conventional diesel or compressed natural gas buses
- Public response has been positive or neutral
ZEB Challenges

◆ Current Bus cost greater than anticipated
  ◇ (Positive news - Next bus of current AC Transit release likely to be ~1/3 less costly)

◆ Reliability

◆ Availability

◆ Fuel cell service life

◆ Fueling infrastructure
ZEB Demonstration

Conclusion

- Buses demonstrated
  - positive operating performance and
  - public acceptance
- Fuel cell buses are feasible but not yet commercial
- Most successful demonstration – fuel cell dominant battery hybrid bus
ZEB Regulation

- Goal remains to commercialize full size ZEBs as quickly as possible
- Modifications to regulation are needed
- Advanced demonstration added to enable Federal funding option
- Postpone purchase requirement by 2 years
Initiates purchase requirement through advanced demonstration.

Advanced demonstration benefits
- Allows transit agencies to phase in ZEBs
- Federal funding
- Diesel path to start in 2009
- Alternative-Fuel to start in 2011
- Buses count towards purchase requirements

15 Percent purchase requirement
- Diesel path - January 2010
- Alternative-Fuel path - January 2012
# Advanced ZEB Demonstration (Diesel and Alternative Fuel Path)

<table>
<thead>
<tr>
<th></th>
<th>Diesel</th>
<th>Alt.-Fuel</th>
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<td>Solicit Bid Proposals</td>
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<td>Zero Emission Buses in Operation</td>
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<td>Fueling Infrastructure</td>
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<td>January 2011</td>
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<td>Initial Report</td>
<td>July 2009</td>
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<tr>
<td>Final Report</td>
<td>January 2010</td>
<td>January 2012</td>
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Advanced Demonstration
Single Agency Option

◆ Zero emission buses
  ♦ 10 per demonstration
  ♦ In operation by January 2009
◆ Fueling infrastructure
  ♦ In place by January 2009
◆ Maintenance & operating training
Advanced Demonstration
Multi-Transit Agency Option

- Zero emission buses
  - 12 per demonstration
  - 3 per participating transit agency (TA)
  - Rotate 9 bus fleet for 1 month per TA

- Fueling infrastructure
  - In place for half of TAs by January 2009
  - All TAs by end of demonstration

- Maintenance & operating training for all TAs
ZEB Regulation

Additional Consideration - Shorter Buses

- Shorter buses may be considered under Executive Officer discretion if operation characteristics meet TA needs
- The following characteristics need to be addressed and discussed
  - Passenger capacity
  - Operating characteristics (hours of operation, refueling)
  - Performance (freeway, grades)
  - Chasis durability and warranty
  - Other
- Early implementation credits reduced
Additional Consideration

- Form state wide fuel cell bus working group
  - Coordinate and leverage statewide effort
  - Share technology learnings
  - Discuss resource options
Next Steps

◆ Collect additional input from transit agencies
◆ May release of staff report
◆ July 2006 Board hearing
◆ July 2010 Board update
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