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 Regulation
- Status
- Recommendations
Urban Transit Bus Regulation

- Adopted February 2000
  - Zero-Emission Bus Demonstration & Purchase Requirements
- Modified June 2004
  - Changed Implementation Deadlines for ZEB
  - Require 3 Fuel Cell Buses per ZEB demonstration
Zero Emission Bus Regulation

Background

- Goal - Encourage a fleet dominated by zero emission vehicles
- Fuel Cell Buses had demonstrated ability to meet performance needs
- Fuel cell manufacturers anticipated bus cost to be roughly equivalent to overhead trolley by 2004
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 = 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

◆ 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

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<tr>
<th>Transit Agency</th>
<th>Fuel Path</th>
<th>January 1, 2005</th>
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ZEB Demonstration Status

- Two required ZEB demonstrations in process
  - Santa Clara Valley Transit Transportation Authority and San Mateo County Transit District
  - Alameda/Contra Costa Transit District and Golden Gate Bridge Highway and Transportation District

- One voluntary ZEB demonstration in process
  - Sunline Transit in Palm Springs
    - One fuel cell bus
    - One hydrogen Internal Combustion bus
ZEB Demonstration
Status

- FCB demonstrations on current regulatory schedule
- FCBs are operational, meeting street performance goals
- FCBs are quieter than conventional diesel or CNG 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
Buses have demonstrated positive operating performance and public acceptance
Fuel Cell buses are feasible but not yet commercial
Next generation fuel cell bus will likely be a fuel cell dominant electric hybrid
ZEB Regulation

- Goal remains to commercialize full size Zero Emission Buses as quickly as possible
- Modifications to regulation are needed
- Continue demonstrations
- Add more demonstrations
ZEB Regulation

Modifications Under Consideration

- Modify purchase requirement
- Require a second demonstration from Diesel Path transit agencies
- Require a demonstration from Alternative Fuel Path transit agencies
ZEB Regulation

Additional Considerations

- Demonstration required to use “Urban Bus”
- Allow multi agency regional partnership for Urban Bus demonstration
- Provide status report to the Board in 2009
- Fully implement purchase requirements 2012
Shorter buses may be considered under Executive Officer discretion if characteristics similar to “Urban Bus”

- Passenger capacity
- Operating characteristics (hours of operation, refueling)
- Performance (freeway, grades)
- Chasis durability and warranty
- Other
Additional Consideration

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

◆ ARB will continue current technology review
◆ Collect additional input from transit agencies
◆ Third workshop in April
◆ May Release of Staff Report
◆ June Board Hearing
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