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
  ◆ New Standards for Urban Bus Engines
  ◆ Fleet Rule for Transit Agencies
    ◆ Dual Path
    ◆ NOx & PM Reductions
Zero Emission Bus Regulation

Background

- Goal was to 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
  ♦ Three ZEBs per Agency by 7/1/2003

◆ ZEB Purchase Requirements
  ♦ Diesel Path: 15% 2008-2015
  ♦ Alternative Fuel Path: 15% 2010-2015
## Affected Transit Agencies

<table>
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<tr>
<th>Transit Agency</th>
<th>Fuel Path</th>
<th>January 1, 2005</th>
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ZEB Regulation
Modifications - June 2004

◆ Changed Implementation Deadlines
  ◆ Operation by February 28, 2006 (was July 1, 2003)
  ◆ Preliminary Report by July 31, 2005
  ◆ Final Report by July 31, 2007 (was January 31, 2005)
◆ Require Three Fuel Cell Buses per demonstration (was three per participant)
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
- FCB are operational meeting street performance goals
- FCB are quieter than conventional diesel or CNG buses
- Public has 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 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 hybrid
Goal remains to get full size Zero Emission Buses out as quickly as possible

Modify purchase requirement

- Require a second demonstration from Diesel Path transit agencies starting in 2008
- Require a demonstration from Alternative Fuel Path transit agencies starting in 2010
- Allow shorter buses to substitute for some of the required urban buses
ZEB Regulation
Additional Considerations

- Demonstration required to use “Urban Bus”
- Allow multi agency partnership for Urban bus demonstration
- Provide status report to the Board in 2009 and 2011
- Fully implement purchase requirements 2012
Next Steps

- ARB will continue current technology review
- Collect additional input from transit agencies
- Second workshop in November?
- January/February Release of Staff Report
- February/March Board Hearing?
Additional Consideration

- Form state wide fuel cell bus working group
  - Coordinate and leverage statewide effort
  - Share technology leanings
  - Discuss resource options
Contact Information

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