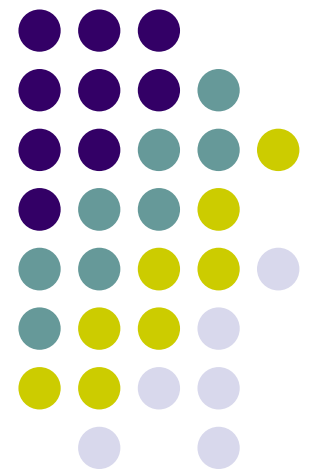


Overview of Policies and Regulations driving Zero Emission Bus Technology In California

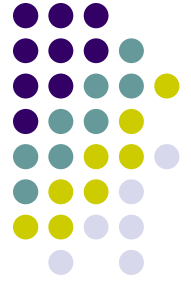
National and International Fuel Cell Bus Workshop
February 24, 2011
Burlingame, California

Gerhard Achtelik



Agenda

- Regulatory History
- Current Requirements
- Demonstrations
- Conclusion



Transit Fleet Rule

- Zero Emission Bus (ZBus) Regulation



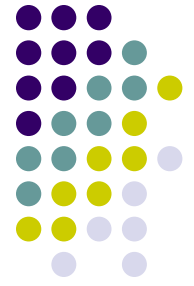
- Adopted in 2000 under Transit Fleet Rule
 - Established engine emission standard
 - Established fleet average emission standard
 - Required fuel choice

Zero Emission Bus (ZBus) Regulation



- Regulation elements:
 - Affects only large agencies (>200 Buses)
 - ZBus demonstration (diesel path only)
 - 15% ZBus purchase requirement
- ZBus is: Battery Electric, Electric Trolley, or Fuel Cell



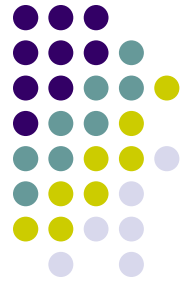


California Transit Fleet Size

Transit Agency	Total # Urban Buses	Fuel Path	15% Purchase Requirement
Los Angeles Metro	2696	CNG	37
San Francisco Muni	800	Diesel	0
Orange County Transportation Authority	730	CNG	11
Alameda-Contra Costa Transit	580	Diesel	9
San Diego MTS	483	CNG	7
Santa Clara Valley Transportation Authority	438	Diesel	7
San Mateo County Transit	324	Diesel	5
Foothill Transit	314	CNG	5
Sacramento Regional Transit	221	CNG	3
Golden Gate District	209	Diesel	3

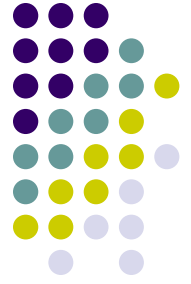
Total Average Annual Purchase = 87 Buses, 12 year fleet turnover, with growth ₅

Current ZBus Regulation



- Includes a Second Phase Demonstration for diesel TAs
- Purchase requirement
 - Diesel and Alternative fuel offset by 1 year
 - Pending status report to the Board by July 2012





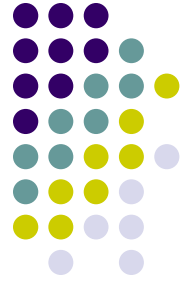
Initial Demonstrations

- Santa Clara Valley (SCV) TA & San Mateo County TA (SamTrans)
 - 3 fuel cell buses – finished 2007
- Alameda-Contra Costa (AC) Transit & Golden Gate Transit
 - 3 hybrid fuel cell buses – finished 2010
- SunLine Transit
 - multiple fuel cell bus - ongoing



Second Phase Demonstration

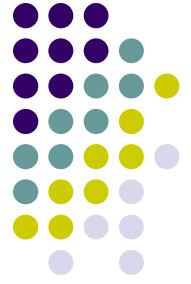
(Zero Emission Bay Area)



- Joint demonstration of 5 Bay Area TAs
 - AC Transit, SCV TA, Golden Gate Transit, San Francisco Muni, SamTrans
 - 12 hybrid fuel cell buses
 - Initial buses deployed summer 2010
 - Data from demo is expected for the report to the Board
 - Will demonstrate larger fleet and fueling deployment

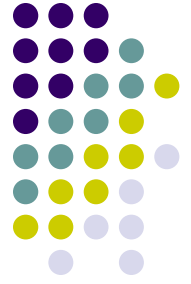


Other California ZBus Demonstrations



- SunLine Transit – Multiple fuel cell buses
- City of Burbank – 1 battery dominant fuel cell bus (start spring 2011)
- Foothill Transit – 3 battery buses (started summer 2010)





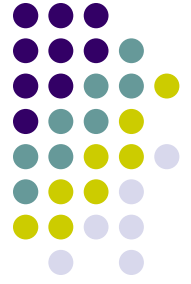
- What are we trying to accomplish?
 - Reduce GHGs
 - Reduce Smog
 - Encourage Zero emission technology commercialization
- Additional Benefit
 - Reduce noise
 - Take California beyond the 2010 fleet rule standard



Next Steps

- Expect ZEBA demonstration to continue to:
 - Demonstrate initial fleet integration
 - Demonstrate initial fleet fueling
 - Demonstrate reliability, durability, efficiency
- Commercial preparatory deployment
 - Target cost reduction

Thank you



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