



Clean Air Initiatives

San Francisco Municipal Railway

*Municipal Transportation Agency Board Meeting
May 21, 2002*

Muni's Clean Air Initiatives

- Background
- 11-Point Agreement with Transportation Authority
- Initiatives
- Preliminary Findings of pilot program
- Summary

BACKGROUND AND HISTORY

Clean Air Initiatives

- Decision: In January 2001 Muni chose diesel fuel path in response to CARB emission regulations.
- Exercise Option: In Feb. 2001, Muni attempted to exercise option for additional 175 clean diesel buses.
- Negotiations: Muni, environmental groups and SFCTA negotiated an alternative fuel program for Muni in March 2001. One of the conditions was the initiation of an alternative fuel pilot program (AFPP).

BACKGROUND AND HISTORY

Clean Air Initiatives (cont.)

- Procurement of '02 Neoplans: The negotiated agreement approved the purchase of 95 conventional clean diesel buses, deferring the purchase of the remaining buses until the conclusion of the AFPP.
- AFPP: With the oversight and technical support of an Independent Oversight Committee (IOC) and UC Davis, Phase One of the AFPP began in October 2001 and concluded in March 2002. Eight buses were tested.

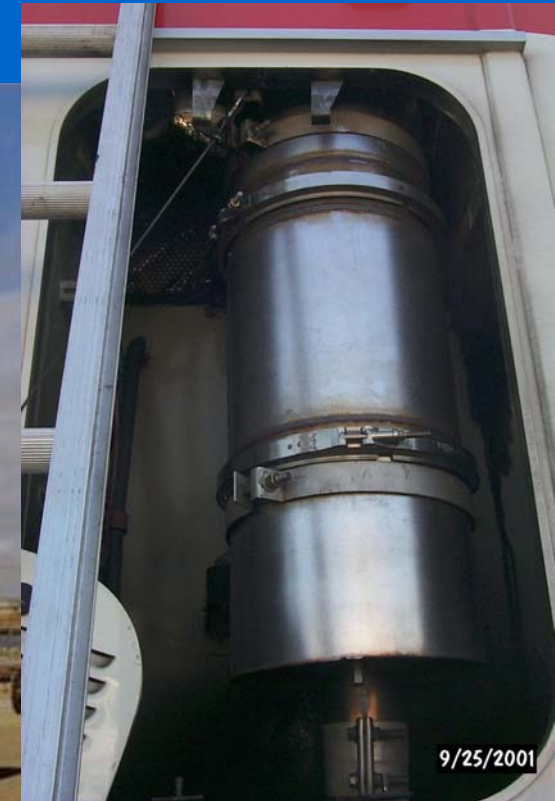
2 Compressed Nat'l Gas, 40-foot Low Floor Buses



2 Clean Diesel Hybrid-Electric, 40-ft Low Floor Buses



2 Baseline Clean Diesel Buses w/ PM Filter, 40-foot High Floor



Muni's progress on the 11-point agreement

1. Buy 95 clean diesels, defer 80
2. Start an Alt Fuels Pilot Program
3. Write specs for 80 CNGs / hybrids
4. Buy 15 forty-foot CNGs if
 - *Free fueling infrastructure*
 - *Fuel price < diesel price*
 - OR*
 - *TA must find funding*

Muni's progress on the 11-point agreement

- 5. **Replace 25 thirty-foot Orions with CNGs**
- 6. **Redesign Islais Creek & Woods**
- 7. **Develop plan to expand electric fleet**
- 8. **Participate in fuel-cell pilot program**

Muni's progress on the 11-point agreement

- 9. Use cleanest buses in polluted neighborhoods
- 10. Develop plan for Bayview/HP health
- 11. Retrofit with PM traps; use ultra-low sulfur diesel /

Findings of AFPP to date

- **CNG**

- » *High facility costs*
- » *Poor performance on hills*
- » *CARB standards allow purchase in 2004-2006*

- **Hybrids**

- » *Good performance*
- » *Low noise levels*
- » *Not yet CARB-approved*

- **Clean diesel**

- » *Lowest operating cost*
- » *CARB standards do not allow purchase in 2004–2006*

Performance Comparison

CNG

Hybrid

- Top Speed (flat)
- Acceleration (grade)
- Fuel Economy
- Reliability



Cost Comparison

	CNG	Hybrid
● Incremental Capital Cost <u>Islais</u>	6.9M*	1.05M
● Incremental Capital Cost <u>Woods</u>	5.0M	0
● Total Incremental Cost I+W	11.9M**	1.05M

*PG&E costs still to be determined

**Muni can operate large fleet of CNG buses with one facility

Projected Operating Costs

» Annual Battery Replacement	0	0.4M
» Ongoing annual maint&train. (incr.cost)	0.55M	0
» Fuel Costs (commodity)	0.95/dge	0.92/dge
» Compression & pumping costs	Incl.	.01/dge

Feedback Comparison

CNG

Hybrid

- Operators
- Passengers



Emissions Comparison

- **Conducted by UC Davis Institute of Transportation Studies**
 - **New York City and other models being analyzed**
 - **UC Davis will create a new San Francisco emissions model**
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Emissions Comparison

- CNG, hybrid and diesel buses with traps had cleaner emissions than conventional diesel.
 - NOx: CNG was lowest.
 - PM: CNG, hybrid and diesel with traps were comparable and often below detectable limits. All emitted less PM than conventional diesel.
 - Fuel Economy: Poorest on CNG bus; best on conventional diesel.
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Other Clean Air Initiatives

- **Retire oldest buses**
- **Use ultra-low sulfur fuel in all buses**
- **Install soot-reducing kits on older diesel buses**
- **Request Congressional earmark for alternative fuel and pm traps**
- **Install bicycle racks on all new buses**
- **Initiate pilot program to reduce NOx emissions**

Summary to date

- **All modes are feasible for limited number of routes**
- **Each mode has its own set of special requirements**
- **More definitive results are expected by conclusion of AFPP in July 2003**