



## Regional Transit

Sacramento Regional  
Transit District  
A Public Transit Agency  
and Equal Opportunity Employer

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November 30, 2007

Mr. Jason Crow  
Sacramento Area Council of Governments  
1415 L Street, Suite 300  
Sacramento, CA 95814

Dear Mr. Okhade:

This is to request a grant in the current round of discretionary Air Quality (SECAT) grants. The grant would be for the purchase of two replacement buses under our existing neighborhood ride replacement program. These would be mid-size (24-passenger) hybrid-electric vehicles, costing about \$200,000 each. RT would provide ~~\$40,000~~ in local matching funds.

*44,000 RTM*

The project manager for these grant will be Mark Lonergan, Chief Operating Officer. Mr. Lonergan has years of experience in managing grant-funded capital projects. The bus purchase is in the current MTP, and planned for the next three years. The local match will be provided from a refund of CNG excise taxes, made possible by the Energy Policy Act of 2005.

I look forward to undertaking this experimental purchase of hybrid-electric buses, which may facilitate RT's switch to a next generation technology with significant environmental and operational benefits.

Sincerely,

Michael R. Wiley  
Interim General Manager/CEO

Enclosure

## PROJECT SUMMARY

Project Title	Hybrid Electric Bus Purchase
Local Agency Contact Information	Mark Lonergan, Chief Operating Officer Sacramento Regional Transit District 1400 29 <sup>th</sup> Street – P.O. Box 2110 Sacramento, CA 95812-2110
Partners	
Project Number in SACOG MTIP (If applicable)	
Scope of Project and Location (not to exceed 150 words) Include aspects of project/program that contribute to goals of the funding program	This is to acquire two Hybrid Electric buses for our Neighborhood Ride service. These will be acquired as part of a 14 vehicle replacement program, to test the vehicles in operation, determine their viability in ongoing service and their acceptance by the riding public.
Project Schedule and Milestones <ul style="list-style-type: none"> <li>• Start work</li> <li>• Final Ed approved</li> <li>• R/W acquired</li> <li>• Final plans approved</li> <li>• Environmental permits secured</li> <li>• Award Construction contract</li> <li>• Work completed</li> </ul>	RFP initiated June 2008 September 2008 N/A vehicle purchase February 2010 N/A vehicle purchase March 2010 (execute purchase contract) June 2011 (Receive first bus)
Overall Total Cost Estimate	\$400,000
Total Funding sought and funding committed from other sources	\$356,000 – STIP grant
Local funding commitment from each partner. Local match must be at least 11.47% of requested amount	\$44,000 – RT Local Matching Funds
Risks to schedule or cost	Costs may be higher if competitions is limited due to fewer suppliers. Schedule may be lengthened if RT's order has to be combined with another agency order.
Phases/divisibility	The project is not easily divided or phased, as a single bus purchase would not provide any solid basis for drawing conclusions about the technology or viability in service.

## EXHIBITS



This mid-size chassis is available in Hybrid-Electric drive train configuration, usable for neighborhood ride services. This is one of at least two available manufacturers.

COST ESTIMATE

<b>Funding Categories</b>	<b>Tasks</b>	<b>Cost Estimate</b>
Environmental	Environmental Studies	N/A Categorical exclusion
Engineering	Engineering & Design	N/A
Right-of-way*	Right-of-Way Acquisition	N/A
	Utility relocation & lighting	
Construction*	Environmental Mitigation	N/A
	Grading	N/A
	Foundation & Pavement	N/A
	Bridges & Tunnels	N/A
	Drainage, curb/gutter, street furniture, planting, irrigation	N/A
	Signage, signals & striping	N/A
	Buildings/structures	N/A
	Non-capital staff activities	
	Non-capital materials (maps, brochures, manuals, printing, etc.)	N/A
Misc.*	Other project components	\$400,000

\*If project applicant is Caltrans, please provide cost estimate for the following two additional cost components:

- Right-Of-Way Support: \_\_\_\_\_
- Construction Support: \_\_\_\_\_

## Project Benefit Estimate

### RT Hybrid Electric Bus purchase

RT proposes to replace two CNG neighborhood ride buses with hybrid electric vehicles.

#### Inputs to calculate cost-effectiveness:

Funding Dollars (Funding) = \$200,000

(Funding is usually limited to the incremental project cost -- the difference between the cost of the cleaner truck and a typical new truck -- or less, to ensure cost-effectiveness of better than \$10/lb.)

Effectiveness Period (Life): **5 years**

Annual Vehicle Miles Traveled (VMT): **40,000 miles**

#### Emissions Factors (From Table 5):

	"Before" Emission Factor	"After" Emission Factor	
ROG Factor	not applicable	not applicable	
NOx Factor	4.8 grams/mi	3.4 grams/mi.*	(Hybrid electric may be much less)
PM10 Factor	0.3 "	0.05 "	

\* From Table 5: Assume 80% NOx for 1.8 NOx + NMHC certification, or 1.44 g/bhp-hr.  
1.44 x 2.6 (conversion factor) = 3.74 grams/mi

#### Calculations:

$$\text{Annual Emission Reductions (ROG, NOx, and PM10)} = (\text{VMT}) * [(\text{Before Emission Factor}) - (\text{After Emission Factor})]/454$$

**ROG:** 0 lbs. per year reduced

**NOx:** 40,000 \* [(4.80) - (2.04)]/454 = **243.2 lbs. per year reduced**

**PM10:** 40,000 \* [(0.30) - (0.025)]/454 = **24.2 lbs. per year reduced**

$$\text{Capital Recovery Factor (CRF)} = \frac{(1+i)^n(I)}{(1+i)^n - 1} \quad \text{where: } n = \text{project life (10 years)} \\ \text{(From Table 8)} \quad \quad \quad i = \text{discount rate (3\%)}$$

$$\text{CRF} = \frac{(1 + .03)^5(.03)}{(1 + .03)^5 - 1} = 0.218$$

$$\text{Cost-Effectiveness of Funding Dollars} = (\text{CRF} * \text{Funding}) / (\text{ROG} + \text{NOx} + \text{PM10}) \\ = (0.218 * 40,000) / (0 + 243.2 + 24.2) \\ = \mathbf{\$32.61 \text{ per lb.}}$$

The technology is likely to be a gasoline-hybrid electric, which has a totally different emission profile from the current CNG vehicles. There is also no accepted standard for

emission testing of hybrid electric vehicles (one is under development at Altoona Bus Testing Center with West Virginia University). Thus, the foregoing cost-benefit analysis is likely inaccurate, sharply understating the environmental benefits.

## Environmental Justice

These vehicles will be used to provide neighborhood ride services, which benefit low-income and disadvantaged communities. To the extent that these buses prove themselves in operation, they could result in increased purchases and use of lower-polluting and quieter vehicles throughout the RT service area.