

## Demonstration and Evaluation of U.S. Postal Service Electric Carrier Route Vehicles

### Southern California Edison

Electric Vehicle Technical Center  
An ISO 9001 Certified Facility



### Project Sponsor

SCAQMD

### Cosponsors

USPS

DOE

### Background

In December 1998 the United States Postal Service (USPS) issued Specification USPS-E-PURC for the procurement of six Pilot Model Electric Carrier Route Vehicles (ECRVs) “for examination and testing...to prove that the production methods will produce vehicles that meet the requirements specified herein”. A year later the USPS announced that Ford Motor Company had been selected to build the first 500 units of a demonstration program aimed at a nationwide deployment of ECRVs. Subsequently, in April 2000, the USPS and South Coast Air Quality Management District (SCAQMD) selected Southern California Edison (SCE) to perform Baseline Performance and Accelerated Reliability Tests at the Electric Vehicle Technical Center (EVTC) in Pomona, California, with oversight of the Department of Energy (DOE) Field Operations Program.

### Project Objectives

The following objectives were set at the beginning of the project:

- Understand USPS Mission Requirements
- Review USPS ECRV Characteristics
- Review Existing Field Operations Test Procedures
- Confirm Relevant Existing Procedures
- Propose USPS Specific Procedures
- Finalize Alternate Procedures
- Conduct Tests
- Prepare Test Reports

And the following tasks were included in the contract:

- Task 1: Baseline Test Procedure Evaluation and Modification
- Task 2: Accelerated Reliability Test Procedure Evaluation and Modification
- Task 3: Baseline Test Two EVs
  - 2 Months, 10 Tests
- Task 4: Accelerated Reliability Test Two EVs
  - 1 Year, 20,000 Miles Minimum

### Technology Description

**Manufacturer:** Ford Motor Company

**CARB Certification:** Zero-Emission Vehicle

**Curb Weight:** 4,950 lbs

**Payload:** 1,250 lbs

**Range:** 50 miles

**Maximum Speed:** 60 mph

**Traction Motor Type:** AC Induction

**Traction Motor Power:** 90 HP

**Transaxle:** Single speed – rear wheels

**Battery Type:** Lead-Acid

**Battery Voltage:** 39 modules X 8 Volts = 312 Volts

**Battery Weight:** 2,000 lbs

**Charging System Type:** Conductive

**Charging System Voltage:** 240 Volts

**Charging System Current:** 24 Amperes

**Charging System Location:** On-board

**Charging Time:** 5 hrs



### Status

As of December 2001, all the project objectives had been met and all the tasks of the contract had been completed.

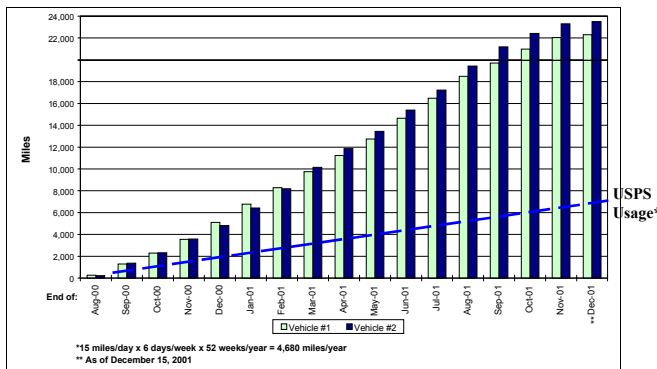
## Results

The following Baseline Tests were performed and produced the results tabulated in the “Requirements” column:

Test	Requirements	
	Met	Exceeded
Acceleration		✓
Maximum Speed		✓
Braking	✓	
Gradeability	✓	
Road Handling	✓	
Water Test	✓	
Dynamometer Range	*	*
Road Range	*	*
Battery Charging	✓	
Sound Levels		✓
EMF Levels	NA	NA
Compatibility with Electrical Devices	✓	

\*USPS required 50 miles on UDDS cycle. Tests were performed with UDS/HWFET on the dynamometer.  
N/A: Measurements only – no required value.

The Reliability Tests met the 20,000-mile goal as seen below:



Vehicle Component Reliability was tracked and is summarized as follows:

Component	Number of Incidents	
	Vehicle No. 1	Vehicle No. 2
Traction Battery	5	2
Charging System	2	2
DC/DC Converter	1	
Battery Control Module	1	
Power Steering		1
Shift Indicator		1

Baseline performance testing determined that the vehicles met all the USPS requirements tested except range on a dynamometer with the UDDS driving cycle (only the UDS/HWFET cycle could be tested). During Accelerated Reliability testing, the long-term suitability of ECRVs for USPS was assessed by driving as many miles as reasonably

possible with two vehicles during the test period. From August 2000 to December 2001, a combined total of 45,813 miles had been logged with the two vehicles. Vehicle operation, efficiency, and reliability were carefully documented by these tests. One vehicle recorded 97.5% availability during the period. The other achieved 98.6% availability. Some concerns were raised regarding the management (battery charging and maintenance software) of the traction batteries and its impact on battery life and vehicle efficiency (AC kWh/mile).

## Benefits

The ECRVs tested are zero-emission vehicles and are replacing gasoline-powered mail carriers driven approximately 5,000 miles per year. SCE assumes that each EV of its fleet eliminates 0.24 lbs of pollutants per mile driven. Therefore, a fleet of 500 ECRVs, as current USPS plans call for in their first phase of deployment, driven 5,000 miles per year would eliminate  $0.24 \times 500 \times 5,000 = 600,000$  lbs or 300 tons of pollutants per year.

## Commercialization and Applications

At the end of the project, ECRVs were being deployed by the USPS in Southern California and other parts of the U.S. User feedback was good and the vehicles were meeting their mission requirements. The photograph below shows the ECRVs operated at the Fountain Valley USPS site and being charged at their charging stations.



For additional information on this project or on services offered at the EV Tech Center, please contact Juan Argueta at (909) 469-0315 or [juan.argueta@sce.com](mailto:juan.argueta@sce.com).