TRANSIT BUS PROJECTS

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Zero Emission Transit Buses

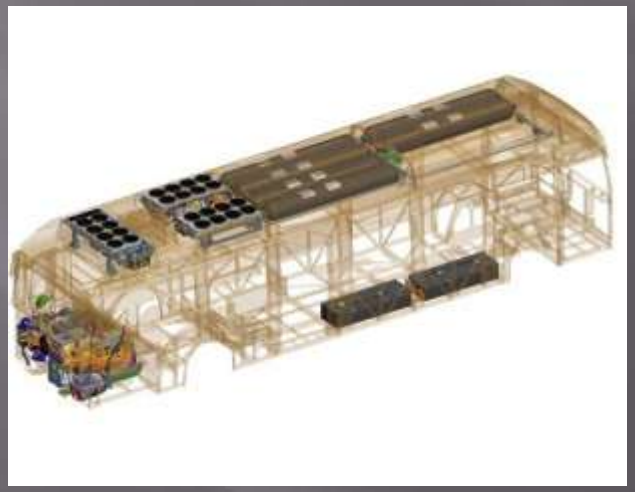
- Advanced Technology Fuel Cell Transit Bus
  - Improved Technology Over The First Hybrid Electric Fuel Cell Bus
- American Fuel Cell Bus
  - Newly Designed Fuel Cell Bus With A North American Chassis And Domestically Sourced Fuel Cell And Drive Components
- Foothill Transit Quick Charge Electric Bus
  - Demonstrates Quick Charge Battery & Infrastructure

Advanced Technology Fuel Cell Transit Bus

- Original Plan To Convert Thor/ISE Bus From 1st Generation To 2nd Generation Technology
- Plan Changed With The Development Of BC Transit Bus For Winter Olympics
- BC Transit Bus Had All The Improvements Desired For The AT Bus With A New Bus Chassis
- BC Transit Prototype Became The AT Bus

Advanced Technology Fuel Cell Transit Bus

- The AT Bus Demonstrated The Second Generation Of Fuel Cell, Batteries And Hydrogen Storage System
  - 60 Kw UTC Fuel Cell To 150kw Ballard Stack
  - Pba Battery To Li-ion Battery
  - 3600 Psi H2 Tanks To 5000 Psi Tanks



Advanced Technology Fuel Cell Transit Bus

DEMONSTRATION

- The Bus Was Delivered To SunLine In Early February 2010
- The Bus Is Capable Of Climbing A 20% Grade Fully Loaded From A Stop
- And Will Climb An 8% Grade Fully Loaded At A Steady 25mph
- Vehicle Range Is In Excess Of 310 Miles

FUNDING

Source	Amount
CARB	$640,000
AQMD	$325,000
SunLine Transit/FTA	$120,000
SunLine Operations	$60,000
CalStart	$140,000
Total	**$1,285,000**

Advanced Technology Fuel Cell Transit Bus

- Accomplishments:
  - Demonstrated State Of The Art Technology In Fuel Cells, Batteries And Storage Systems
  - Tested In Extreme Cold And Hot Environments
  - 20 Identical Vehicles Were Deployed In Whistler, BC

American Fuel Cell Bus

- SunLine Transit Organizes Team Of Developers For An American Made Fuel Cell Bus:
  - BAE Systems – Drive System And Integrator
  - El Dorado National – Bus Chassis Manufacturer
  - Ballard Power Systems – Fuel Cell Manufacturer
- SunLine/Calstart Organize Funding

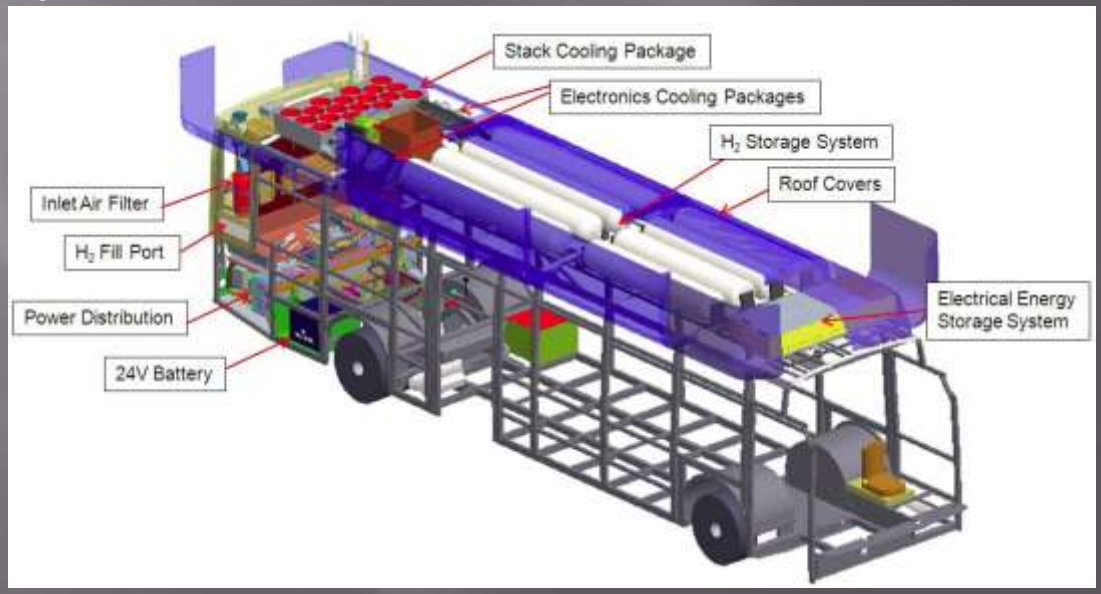
Source	Amount
FTA	$4.2 M
CARB	$800K
AQMD	$400K
Partners	$4.9 M
Total	$10.3M

American Fuel Cell Bus

- Manufacturability Is A Key Step To Move From Demonstration To Commercialization
  - Reduces Costs
  - Preparation For Volume Production
- FTA US Content Provision Is A Major Hurdle For Transit Agencies To Receive Funding For A FCB
- Total Project Funding Exceeds $10 Million Demonstrates Project Team's Commitment

American Fuel Cell Bus

- FTA "Buy America" Provision Requires 90% US Manufactured Content – AFCB Is Expected To Exceed That
- El Dorado Chassis Will Be Designed And Tooled To Package The Drive System, Fuel Cell And Energy Storage System



American Fuel Cell Bus

- Lightweight Chassis To Accommodate US Built Storage System To Enable 350+ Mile Range
- US Built Traction System Proven On Hybrid Electric Buses Throughout North America

American Fuel Cell Bus

- Ballard Power Systems 150 Kw Fuel Cell Built In Lowell, MA
- System Warranty For 12,000 Hours Or 5 Years
- Lithium-ion Energy Storage System

American Fuel Cell Bus Project Status

- Bus layout concept was completed including placement of all components
- The majority of the bus (glider) was built at ElDorado National-CA
- Hydrogen Storage System was delivered
- Fuel Cell Final Acceptance electrical test was completed

American Fuel Cell Bus

- Upon Completion Of The Bus Slated For Q4 2011, SunLine Will Incorporate The Bus Into Revenue Service In The Coachella Valley

American Fuel Cell Bus

- Cost of FCB's remain high and out of reach of Transit Authorities
- Component manufacturers continue to make system cost reductions
- In parallel with those efforts AFCB seeks to reduce costs with a bus platform from which volume production can be realized

Foothill Transit Quick Charge Electric Bus

- Three Zero Emission Electric Buses Replacing Three Diesel Buses
- Buses Utilize A Smaller Battery That Can Be Quick Charged
- Quick Charge Infrastructure Can Re-charge Batteries In Ten Minutes
- Buses Will Be Used In Revenue Service From La Verne To Pamona

Funding Source	Amount
ARRA	$4,770,000
AQMD	$290,000
Total	$5,060,000

Foothill Transit Quick Charge Electric Bus

ELECTRIC BUS DESIGN

- Composite body: lighter weight, longer life, less cost to maintain
- Battery: <10 minute recharge time, safe chemistry, tested>10,000 cycles
- Drive System: improved fuel economy, reduced noise, low maintenance, lower operating costs

Foothill Transit Quick Charge Electric Bus Status

ELECTRIC BUS STATUS

- All Three Ecoliner Buses Are Running In Daily Revenue Service On Line 291
- The Three Buses Have Accumulated Nearly 5,000 In-service Miles
- Protera Data Collection Indicates Overall Energy Efficiency Is As Good As Or Better Than Initially Expected

Foothill Transit Quick Charge Electric Bus

INFRASTRUCTURE DESIGN

- Aerovironment Design & Manaufactured Quick Charger
- 500KW Charger Can Rapid Charge The Battery From 10% To 95% In 10 Minutes Or Less
- Unique Architecture Allows For Lower Cost And Lower Impact Grid Connections While Maintaining High Charge Rates
- Safe, No Operator Contact With Charger

Foothill Transit Quick Charge Electric Bus

INFRASTRUCTURE STATUS

- In December, The Chargers Were Installed At The Pomona Transit Center
- The Pole And Mast Arm Were Erected Mid-January
- Ecoliner Docking And Simulation Is Expected To Begin Mid-January At The Pomona Transit Center

Foothill Transit Quick Charge Electric Bus

- A Disruptive Solution To Fleet Vehicle Operators
  - Ability To Use Battery-electric Vehicles As A One-to-one Replacement Of A Conventionally Driven Vehicle
  - Lower On-board Energy Requirements Given Opportunity Charging Capability Resulting In Lower Individual Vehicle Weight And Investment Cost
  - Reduced Maintenance Costs Resulting From Absence Of Mechanical Parts In Battery Electric Drive System