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3rd Annual DOE/U.N. Hybrid Conference and Workshop



Advanced Vehicle Technologies in Fleet Operations

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Discussion Topics

- Background
- City of Los Angeles Clean Fuels Policy
- Alternative Fuel Vehicles (AFVs) in Fleet Operations
- Hybrid Technology
- Hydrogen Fuel Cell Vehicles
- Plans for the Future



Background

- Population 3.8 million in 465 sq mile area – government of over 35,000 employees:
 - 4 Airports
(LAX, Ontario, Van Nuys, Palmdale)
 - Los Angeles Harbor
(Largest volume of cargo and cruise traffic in US)
 - Sanitation Agency
(720,000 residential customers)
 - LA Department of Water and Power
(7,000 MW Dependable Capacity; 660,000 AF water annually)
- Approximately 15,000 vehicles in City fleet – of which over 1,000 are alternatively fueled





City of Los Angeles Clean Fuels Policy

- Supports alternative fuel applications by supporting programs and regulations that balance environmental benefits against operational concerns such as safety, efficiency, and cost effectiveness
- Promotes: the use and purchase of vehicles which utilize clean fuels and/or electric propulsion; the development of alternative fuel infrastructure; and supports the implementation of federal and state vehicle emission standards
- Pledges leadership in the area of clean fuel vehicle technology including the exploration of new technologies such as fuel cells to accomplish the goal of improving ambient air quality in the region

AFVs in Fleet Operations

- Buses
 - Propane (170 30 ft. buses)
 - Liquefied Natural Gas (LNG)
(55 Airport buses)
 - Compressed Natural Gas (CNG)
(53 shuttles)
 - Electric (30 shuttles)
 - Hybrid (propane/electric)
(8 shuttles)
- Heavy-Duty Trucks, such as aerial platform trucks, delivery vehicles, utility trucks mostly using LNG



AFVs in Fleet Operations

- Refuse Collection Vehicles
 - CNG (only 2)
 - Dual-Fuel LNG with diesel pilot ignition (200+ vehicles)
 - Ultra Low Sulfur Diesel with particulate filter traps (remaining 500+)
- Street Sweepers
 - CNG (7 currently)



AFVs in Fleet Operations.

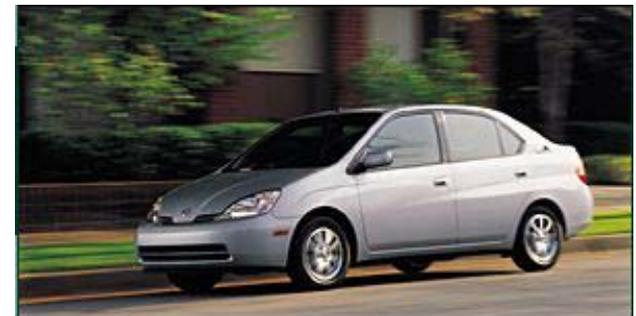
- Light-duty
 - Electric (over 300)
 - Hybrid (gasoline/electric) (over 250)
 - CNG (over 250)
 - Bi-fuels (gasoline/CNG)(over 60)
 - Neighborhood EVs (Nissan Hypermini) (13 in operation)
- *The City of Los Angeles currently operates the second largest hybrid passenger car fleet in the United States*





Hybrid Technology

- Uses a small conventionally-fueled power unit (spark ignition or compression ignition engine), an energy storage system (batteries), and an vehicle propulsion system (electric motor/generator with regenerative braking) to maximize efficiency
- The smaller engine combined with energy storage systems provides significantly improved fuel economy compared to conventional vehicles: approximately 50 mpg
- Benefits include cost savings from improved gas mileage, reduced air pollutant emissions, including NO_x, SO_x, CO, PM, and CO₂, and less reliance on fossil fuels leading to greater domestic energy security
- Good transitional technology between internal combustion and electric vehicles





Fuel Cell Vehicles

- In December 2002, the City took delivery of the nation's first hydrogen-powered fuel cell car certified for commercial sale, the Honda FCX
- Is the first of five to be put into service by the City for every day use
- The city will lease the vehicles for two years and Honda will provide fueling services
- The 2003 Honda FCX uses a hydrogen-powered Ballard Proton Exchange Membrane (PEM) fuel cell to produce electricity that powers the electric motor, which propels the vehicle.



Honda FCX

- 2003 Honda FCX Specifications

- Driving Range: Approximately 170 miles
- Electric Motor Type: AC synchronous
- Maximum Drive Torque: 201lb-ft (272Nm)
- Maximum Power Output: 80hp (60kW)
- Fuel Cell Power Output: 78kW
- Power Storage: Honda Ultra Capacitor
- Fuel Type: Compressed gaseous hydrogen
- Storage Method: High-pressure hydrogen storage tank (5,000 psi)
- Fuel Capacity: 3.75 kilograms @ 5000 psi (1 Kg of hydrogen contains the approximate energy equivalent of 1 gallon of gasoline)
- Refueling Time: Approximately 3 to 5 minutes



City's Plan for the Future



- Continue to acquire AFVs for use in City fleet operations whenever feasible (target is 15% of new vehicle purchases each year)
- Continue to replace City's "pool" vehicles with hybrid gasoline/electric cars and other clean technologies
- Completely replace the RCV fleet with dual fuel LNG/diesel trucks by 2008
- Expand the CNG fueled Street Sweeper fleet
- Incorporate fuel cell vehicles as the technology becomes more accessible



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