Attachment A

A CLEAN AND GREEN FLEET: AN ACTION PLAN FOR THE CITY OF SEATTLE

APRIL 2003

OFFICE OF SUSTAINABILITY AND ENVIRONMENT
FLEETS AND FACILITIES DEPARTMENT

Contacts:
Office of Sustainability and Environment: Kim Drury (206) 684-3214
Fleets and Facilities Department: Dave Kerrigan (206) 684-0142

A CLEAN AND GREEN FLEET: AN ACTION PLAN FOR THE CITY OF SEATTLE

1. INTRODUCTION

When the City adopted its Environmental Management Program in 1999, one of the key policy commitments was to:

> ". . . *achieve an overall reduction in air emissions produced by City vehicles and to reduce the amount of fossil fuels purchased and used for vehicles*."

Since that time, the City has made steady progress in "greening" the fleet, introducing more fuel efficient cars, converting to cleaner fuels and retrofitting the most polluting trucks with state-of-the-art emission control devices. The City of Seattle is now recognized locally and nationally for its leadership in testing, implementing and supporting more environmentally responsible fleet management policies and actions.

Yet, the need to continually improve the fleet and exert City leadership is even more urgent today:

- A US EPA study released in 2002 places Seattle and King County in the top five percentile in the nation for concentrations of some of the most hazardous air toxics. Cancer risks in the region top 700 in a million risk levels from these air toxics that are mostly attributable to diesel emissions.
- Monitoring by the Puget Sound Clean Air Agency show that our region is close to violating the annual federal standard for the finest particulate (PM2.5) as well as the eight-hour standard for ozone, the major component of smog. These air pollutants are directly related to increased incidents of allergies, asthma, emphysema and other lung problems. A national study completed in 2002 documented more deaths and emergency room visits when the air is heavily polluted.
- In 2002, following the world's warmest year ever recorded, the City's Office of Sustainability and Environment completed an inventory of Seattle's greenhouse gas emissions which found that, in our community, more than half of the emissions that cause global warming come from cars, trucks, buses and other transportation modes like boats and planes.

To ensure continuous environmental improvement by the City in managing its fleet, Mayor Nickels highlighted a number of green fleet actions in the Environmental Action Agenda which he released on Earth Day 2002, which was endorsed by the City Council via Resolution 30461. This document has been prepared as an integral part of the Mayor's Environmental Action Agenda and presents strategies and plans for reducing emissions and fleet fuel use to meet a goal of improving environmental quality. Producing this Plan has been a collaborative process of all the City's large departments lead by the City's Office of Sustainability and Environment (OSE) and the Fleets and Facilities Department. (F&FD) In addition, staff from the Puget Sound Clean Air Agency provided technical review.

2. WHY A CLEAN AND GREEN FLEET PLAN?

Among all City operations, managing and maintaining a fleet of more than 3,000 vehicles – from electric scooters to patrol cars to heavy duty diesel trucks - involves some of the City's most environmentally consequential choices. And, considering the number of vehicles purchased and the millions of gallons of fuel used, the fleet represents one of the City's biggest opportunities to meet its goal of environmentally responsible and sustainable operations. Further, by greening our fleet, the City leads by example, helping the community and the industry toward cleaner and greener transportation choices.

The most obvious and substantial environmental impacts of the fleet for Seattle are, of course, tailpipe emissions and fuel use. However, an environmentally superior fleet encompasses a number of other factors, only some of which fleet operations can control. For example, the City's ability to influence vehicle manufacturing is limited, even though the process involves huge amounts of materials extraction, use of natural resources and is responsible for significant air and water pollution. The elements that the City's fleet operations can control or influence to achieve a cleaner and greener fleet include the following:

- Fuel use, type and amount
- Fleet size
- Vehicle types, e.g., fuel efficiency, size and availability of alternatives such as bicycles and Segway™ Scooters.
- How vehicles are maintained, e.g. avoiding oil leaks, ensuring proper tire inflation, etc.
- Use of recycled oil, anti-freeze and, as appropriate, tires
- Use, storage and disposal of hazardous materials used in vehicle maintenance
- Fueling procedures - preventing pollution from incidental fuel spills
- Which maintenance materials are used, e.g., alternatives to hydraulic fuels, or recycled anti-freeze
- Removing mercury switches when vehicles are surplused

In each of these areas, the City's fleet management has taken a number of meaningful and positive actions. However, given that, apart from the manufacturing process, the primary environmental impacts associated with fleet operations are fuel use and emissions, they are primary focus of the remainder of this report.

3. BACKGROUND

The Fleets and Facilities Department (F&FD) is responsible for purchasing, maintaining and disposing of fleet vehicles for all City departments (with the only major exceptions being that City Light purchases all of its own vehicles and SPU purchases its own heavy equipment.)

The City's fleet consists of about 3250 vehicles, approximately 2875 of which are "on-road" vehicles, i.e., cars, trucks, SUVs, etc. About 375 vehicles are "off-road", e.g. construction equipment.

Each year F&FD replaces 300 – 400 vehicles with new vehicles, based on the business needs of each department. The vehicles are leased to departments by F&FD.

The Haller Lake and Charles Street garages are the two primary fueling stations and maintenance shops for City vehicles.

2002 Vehicle Inventory TYPE	NUMBER
Off-road diesel equipment	375
Heavy Duty Trucks	423
Diesel	395
Gasoline	28
Light Duty	**2452**
Compacts	791
Hybrids	33
CNG dedicated	45
CNG dual fuel	34
Gasoline	679
Full & midsize sedans	383
CNG dual fuel	6
CNG dedicated	19
Gasoline	358
Trucks, SUVs, Vans	1278
Electric	1
Diesel	132
CNG dedicated	12
CNG dual fuel	38
Propane	1
Gasoline	1094
TOTAL	**3250**

4. WHAT ARE WE TRYING TO ACHIEVE?

The goals of this Plan are to **reduce fleet fuel use** and **reduce vehicle fleet emissions**. The City's long-term intent is to have a fleet that is 100% clean and green, which means using clean fuels and vehicles that are the most fuel efficient, low emission vehicles available that meet the various business needs of the City. The following are proposed to measure the City's performance toward meeting these goals:

- Measure: Total annual City fuel use
  Target: By the end of 2005, compared to 1999, reduce annual fuel use by 5% (from 2.4 million gallons to 2.3 million gallons)

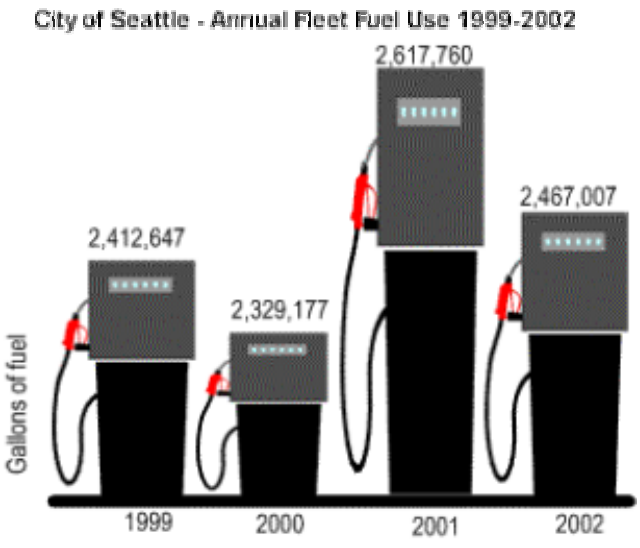
- Measure: Percentage of diesel vehicles using ultra-low sulfur diesel *and* retrofitted with emission control technology
  Target: 100 percent of eligible[1] vehicles (about 400) by 2004

- Measure: Percentage of new light-duty vehicles purchased each year that are clean and green[2]
  Target: 50%[3]

- Measure: Percentage of diesel fleet using B20 (80% ultra low sulfur diesel, 20% biodiesel)
  Target: 100% by the end of 2003

These measures have been selected for two reasons. One, trends in each of these areas serve as excellent indicators of whether the City is improving its environmental performance over time. And, two, data are available by which to measure performance.

- A fuel reduction goal of five percent by 2005 is actually more aggressive than it may appear. For example, about 32 percent of total fuel use is by police and fire vehicles, where there are few opportunities to gain fuel efficiency. And, although the City is making great strides in reducing diesel emissions, there are few options for increasing fuel efficiency in the heavy duty fleet outside of reduced engine idling. Thus, nearly all the fuel savings will need to be achieved by the non-police, light duty fleet meaning that, for those vehicles, the 5% target actually translates into approximately 8% by 2005. To help communicate the fuel reduction target more effectively, it may be useful to set targets for each department.



[1] As explained later, emission control technology doesn't presently exist for light duty diesel trucks or off-road vehicles like backhoes
[2] Clean, green vehicles are either alternative fueled vehicles or vehicles that have EPA fuel efficiency ratings of 45 mpg or greater.
[3] For the purposes of establishing this target, all light duty vehicles are included except police cars and light duty diesel trucks because there are no viable "clean and green" alternatives presently available.

5. WHAT ARE THE STRATEGIES FOR ACHIEVING OUR GOALS?

There are essentially two strategies available to the City to reduce fuel use and emissions:

A. Cleaner operating vehicles, *i.e., cleaner fuels and cleaner engine operations*
B. Increased efficiency – more efficient vehicles and more efficient use, *i.e., burning less fuel*

A. Cleaner Operating Vehicles

The problem: Internal combustion engines are responsible for a variety of harmful pollutants, some of which are regulated (known as "criteria pollutants") and some of which are not.

Of those pollutants regulated by the Federal Clean Air Act[4], ground level **ozone** –aka smog - and **particulates** - PM10 and PM2.5 - are of greatest concern when they reach elevated levels in the Puget Sound region. Public health concerns include eye irritation, reduced lung capacity and, for people with allergies and lung diseases like asthma and emphysema, a worsening of those conditions. Particulates and ozone also degrade the environment by reducing visibility and damaging trees, particularly in the areas which receive the greatest concentrations due to prevailing winds, i.e. the areas southeast of Seattle, including Mt. Rainier National Park. Although the Seattle/King County region has recently come close to violating the annual standards for ozone and particulates, the region has remained in compliance with the Federal Clean Air Act since the 1970's[5].

Two of the major vehicle emissions of greatest concern are not regulated. **Carbon dioxide (CO2**) is the most significant source of greenhouse gas contributing to global climate change – for every gallon of gas burned, approximately 20 pounds of CO2 are produced. Also not regulated are air toxics. The Puget Sound Air Toxics Evaluation completed in 2002 shows that at least 70 percent of Seattle's air toxics risk can be attributed to diesel exhaust; the report confirms U.S. Environmental Protection Agency's National-Scale Air Toxics Assessment (NATA), which shows the Puget Sound region in the top five percent in the nation for air toxics. The data indicate the cancer risk from outdoor air toxics are as high as about 700 in a million – equivalent to second hand smoke.

Although new federal standards to reduce clean up diesel emissions are now in place, they don't go into effect until 2006 for fuel stock and 2007 for engine improvements. Even then, absent other actions, it will be many years before a significant drop in toxic diesel emissions is realized because the on-road life of diesel equipment can be as long as 15 to 20 years. (A number of City Light trucks still in service date from the late 1970's)

Measures to achieve cleaner operating vehicles:

- **Ultra low sulfur diesel**. In 2001, the City was among the first fleets in the Pacific Northwest to switch to a cleaner fuel – ultra low sulfur diesel - for its entire fleet of 527 diesel vehicles. This measure alone cuts toxic emissions for each vehicle by approximately **ten percent**. In addition, the City's purchase of cleaner diesel has accelerated its availability in the region for other fleets – thereby achieving emissions reductions beyond those directly attributable to the City fleet. *Recommended action: Maintain current level of effort*

[4] Carbon monoxide (CO), ozone (O3), nitrogen oxides (NOx), particulates (fine and course particles) sulfur oxides (Sox) and lead are all criteria pollutants, but only the first four are associated with vehicles.

[5] The regional consequences to becoming a non-attainment area are not insignificant. Losing the Clean Air Status means costly new regulatory requirements for businesses that need emissions permits and burdensome federal processes and reporting to demonstrate movement back to attainment. Over the long term, federal highway funding would be lost as it was in Atlanta.

- **Diesel truck retrofits.** The City is retrofitting approximately 400[6] of its most heavily used diesel trucks, a project started in 2001 and scheduled to be completed by the end of 2004. Retrofitting diesel vehicles with emission control devices (oxidation catalysts or particulate filters) and operating them on ultra-low sulfur diesel fuel will reduce carbon monoxide, hydrocarbon and particulate emissions by **50 to 90 percent,** depending on the retrofit device used. (Particulate traps achieve the greatest emissions reduction but work only on engines that get heavy use and reach high temperatures; oxidation catalysts reduce emissions by about 50 percent and are used on equipment that gets less intense use.) Retrofit devices also significantly reduce smoke and odor from diesel engines. In addition, all new heavy duty diesel equipment purchased by the City includes state of the art emission control devices.

  Although emissions from heavy duty City trucks are being substantially reduced, there are two remaining categories of diesel vehicles in the City fleet which are not included in the emissions reduction target: the 132 light duty trucks and off-road construction equipment (e.g., backhoes, compactors, etc.) As of now, there is no emissions control off-the-shelf technology available for these types of equipment. However, F&FD is working with the Puget Sound Clean Air Agency to test emission reduction equipment for off-road vehicles so, depending on the outcome of those tests, emission improvements in off-road equipment may be an option in the future.

  Recommended action: Complete retrofit of targeted trucks, scheduled to be completed by the end of 2004; following off-road vehicle pilot program, evaluate advisability of comprehensive retrofit program for off-road vehicles

- **Alternative fueled vehicles.** Alternative fuel vehicles (AFVs) operate on fuels other than petroleum-based gasoline and diesel.

  - It is important to note that the Energy Policy Act of 1992 (EPAct) mandates the purchase of alternative fuel vehicles by federal, state and fuel provider (utility) fleets. For Seattle City Light, the requirement is that 90 percent of its light duty vehicles be alternative fuel vehicles.

  The majority of AFV vehicles in the City fleet run on **compressed natural gas** (CNG.) CNG vehicles run considerably cleaner than gasoline cars: they have lower carbon monoxide, particulate matter and carbon dioxide emissions, produce significantly lower evaporative emissions during fueling and operating and emit relatively few toxic contaminants. While City Light still purchases some "dual fuel" cars, i.e., capable of using either gasoline or CNG, for the most part "dedicated" CNG vehicles are preferred now because they perform better and don't allow the user to revert to using the more polluting gasoline. Although the City has made a substantial investment in promoting CNG, both in vehicle purchases and by providing a fueling station, its use of CNG has never exceeded one-half of one percent of overall fuel use. Police resist CNG patrol cars because the fuel tank takes too much needed space in the trunk. One of the barriers to a greater use of CNG cars in the motor pool is because refueling isn't as convenient as for gasoline cars.

  Recommended action: Expand current efforts. At least 50% of new fleet compact cars purchased by the City each year will either be hybrids or dedicated CNG vehicles. Conduct an analysis of the life-cycle benefits and costs of making the City fleet 100% "Clean and Green" and establish a time line for meeting that goal.

[6] The total number of heavy duty trucks in 2002 was 423; those not being retrofitted are either being retired from the fleet or get such minor use as to not warrant the cost of retrofitting, which averages about $5000.

The newest alternative fuel is **bio-diesel**, produced from renewable resources like soybeans or waste vegetable oil**.** Blended with diesel fuel, the fuel significantly lowers emissions of carbon monoxide, hydrocarbons, particulate matter and toxic contaminants compared to petroleum diesel fuel – particularly important in those diesel vehicles for which there are presently no emission control devices available, e.g., light duty diesel trucks and off-road equipment. Life-cycle reductions in CO2 are also significant, and, because it is biodegradable and non-toxic, bio-diesel poses minimal concerns related to soil and water contamination. Bio-diesel has the added advantage of not requiring any vehicle equipment changes. Bio-diesel was first tested in 20 heavy duty City trucks in 2001-02 but the fuel quality wasn't reliable. The pilot program was resumed in late 2002 with a new fuel supplier and results to date are positive. The Puget Sound Clean Air Agency terms a blend of 20 percent pure bio-diesel/80 percent ultra-low sulfur diesel in trucks outfitted with emission control devices the "gold standard" for reducing diesel emissions. Although the cost of bio-diesel is currently about fifteen percent higher than ULSD, growing demand and increased production are likely to reduce the price differential in the relatively near term.

Recommended action: Convert diesel fleet to B20 by the end of 2003 to reduce CO2 emissions, toxics and particulates; pursue financial assistance through City Light's greenhouse gas emission mitigation program.

- **Electric vehicles** have zero emissions. However, major car manufacturers have in general, suspended R&D in electric cars because they are not considered to be economically feasible (due to technological challenges associated with batteries.) The City has one electric light duty truck in the fleet. There are some applications where small electric vehicles are viable: at Seattle Center, electric scooters are replacing gasoline powered models.

  Recommended action: Maintain use of off-road electric vehicles as appropriate. Evaluate opportunities for other appropriate applications. Make no further investment in <u>full size</u> electric vehicles.

- **Segways™** are two-wheeled personal mobility vehicles that are battery powered (recharged by plugging into a standard socket) and reach speeds up to 12 miles per hour. In mid 2002, the City purchased ten Segways™ at $6700 each to research the costs and benefits of using them to replace vehicles in jobs like reading water meters. The results of that research, completed in March 2003, show overall cost savings to the city averaging $8000 per year (mostly in productivity savings.) For meter routes that involve mostly driving, F&FD would realize a net savings of approximately $5,187 per year in reduced vehicle, fuel and maintenance costs.

  Recommended action: Expand current efforts: Evaluate the addition of Segways™ to the motor pool as alternative to driving; evaluate benefits and costs of additional applications.

- **Maintenance.** Proper vehicle maintenance is essential to ensure the cleanest possible emissions. Emissions from well maintained vehicles are 20 to 50 percent less than engines that are not properly maintained. Currently, City fleet maintenance practices exceed state requirements; on at least an annual basis, all vehicles undergo computerized emissions or opacity tests (as appropriate.)

  Recommended action: Continue current level of effort.

- **Cleaner Gasoline.** Today's regular gasoline is much cleaner than in past decades but still contains significant amounts of sulfur. Low sulfur gasoline is becoming more widely available and by 2006, most refineries will be mandated by federal rules to remove sulfur during the production of gasoline. Reducing sulfur content has the important effect of less degradation of catalytic converters and fewer sulfur compounds in the exhaust.

  Recommendation: Evaluate benefits and costs of specifying low sulfur content in the City's purchase contract for gasoline due to be issued in late 2003.

B. Increased efficiency – more efficient vehicles and more efficient use

The Problem. Nationally and locally gasoline and diesel fuel consumption is steadily increasing due to more people driving more miles in vehicles that have an average fuel economy seven percent below that of 1987. The City's fleet is no exception to the trend: average fuel use in the past three years is up by about 2.5 percent compared to 1999.

Increased fuel consumption means increased demand for new oil production, adding to environmental concerns even beyond air pollution and global warming, including, for example, oil spills on land and water and increased pressure to drill in environmentally sensitive areas.

Measures to increase efficiency. The goal is to reduce the use of fleet fuel without compromising employees' ability to do their jobs effectively and efficiently.

- **Increased average fuel economy.** The greatest opportunity to increase the fleet's average fuel economy is the use of **hybrid electric vehicles** which combine a highly efficient gas engine with an advanced electric motor. On average, hybrids are **60 percent** more fuel efficient than a comparable car used in the fleet today: the Toyota Prius gets 48 mpg and the Dodge Neon, 28 mpg. Since hybrids first became available in 2000, employees have embraced them and the City has added 33 of them to the fleet. The hybrids are about 25 percent more expensive to purchase than a comparable standard vehicle but par with the cost of a dedicated CNG car; Prius also offer the additional benefit of a 70,000 mile warranty, thereby significantly increasing their resale value. Recent research concluded that in terms of total energy use and greenhouse gas emissions, diesel hybrids will out perform hydrogen fuel-cell vehicles until 2020.[7]

  Achieving increased fuel economy remains as a top priority for the City fleet but is more difficult in vehicle classes other than compacts:

  - Only one police car is manufactured in the US, the Crown Victoria, which gets 20 mpg. There are 238 police cars in the fleet and each get driven about 25,000 miles each year.
  - The City's fleet includes 1278 vans, SUVs and light duty trucks. Although F&FD seeks out the most fuel efficient vehicle available for purchase, opportunities to increase the overall fuel efficiency with these type vehicles are limited. Of the hundreds of light truck models sold today, only a handful (lightweight compact pickups and utility vehicles with

[7] Massachusetts Institute of Technology Laboratory for Energy and the Environment. March 11, 2003. www.sciencedaily.com/releases/2003/03/030311074526.htm

4-cyl. engines) are currently rated at or above 26 mpg; the current federal standard for model years 1996-04, is 20.7 mpg.

Recommended action: Expand current efforts. At least 50% of new fleet compact cars purchased by the City each year will either be hybrids or dedicated CNG vehicles. . Conduct an analysis of the life-cycle benefits and costs of making the City fleet 100% "Clean and Green" and establish a time line for meeting that goal.

- **Alternatives to driving: transit, bikes, walking or teleconferencing.** Using a fleet vehicle isn't always necessary. For example, SPU documented that the fastest trip between its Operations Center on Airport Way and the Dexter Horton Building is taking a bus. SPD has reduced the need for fewer patrol cars by having bicycle and horse patrols which also offer the advantage of being higher profile than patrol cars. Bicycles are available any employee to check out at Charles Street and the SeaPark Garage. Conference calls can take the place of some meetings. Some of these measures are already underway in the City but more remains to be done. In 2001, SPU launched an employee education campaign called *Take the High Road* encouraging the use of buses or teleconferencing to cut down on fleet fuel use.
  .
- **Reduce vehicle idling.** Vehicle idling gets *zero* miles per gallon; unnecessary idling wastes fuel and pollutes. Running an engine at low speed (idling) also causes twice the wear on internal parts compared to driving at regular speeds. The break-even point for shutting off and re-starting gasoline engines or leaving it to idle is just 30 seconds - from the point of view of both emissions and fuel consumption. Properly heated and computer controlled, fuel injected diesel engines need little time after cold start up to begin operation. Newer trucks come equipped with idle time shut-downs. Older trucks can require a few minutes of idling to cool down, as manufacturers recommend. Many diesel equipment operators in the City have misconceptions about proper idling time, in general erring on the side of too much idling. In 2002, SPU launched an anti-idling campaign for its employees and Parks followed suit in January 2003.

  - Although substantial fuel savings can be achieved by reducing vehicle idling, it's important to note that not all idling is necessarily "unnecessary": many City vehicles have equipment that requires the engine to be running, e.g., emergency lights on public safety vehicles.

- **Maintenance.** Well maintained engines and properly inflated tires can significantly increase fuel efficiency for both cars and trucks. As noted earlier, Fleets and Facilities Department performs a thorough maintenance check on all City vehicles at least once a year. However, annual maintenance checks are not adequate to ensure that tires are properly inflated. According to a U.S. Department of Transportation study completed in 2001[8], 32 percent of light trucks (including sport utility vehicles, vans and pickup trucks) are driven with one or more substantially under-inflated tires. Studies show that one tire under-inflated by two pounds per square inch (psi) will increase fuel consumption by one percent.

  Recommended action: Launch an employee education program in 2003 that focuses on reduced idling, alternatives to driving and proper tire inflation.

- **Right vehicle/right job.** Matching duty requirements of staff to the smallest possible vehicle for the task is an effective fuel saving strategy. For example, in early 2002, with support from the Mayor, Fleets and Facilities adopted a policy substantially limiting the availability of new SUVs. In those cases where it is determined that an SUV is necessary

[8] National Highway Traffic Safety Administration (NHTSA); Website at: www.nhtsa.dot.gov/people/ncsa.

and appropriate, a more efficient model may be an option. For example, a Toyota RAV4 (4WD) gets 24 mpg compared to a Chevrolet Suburban's 15 mpg. The use of SUVs by departments has declined in recent years.

Recommended action: Expand current level of effort; with interdepartmental team, create guidelines for departments.

- **Eliminate excess vehicles.** In early 2002, Fleets and Facilities cut the total fleet by 200 vehicles, returning the overall fleet size to that of 1998. Eliminating excess vehicles discourages non-critical trips and encourages more efficient use of the remaining vehicles. Substantial cost savings are achieved by not having to purchase, maintain, depreciate and park vehicles. In those situations where the demand for fleet vehicles exceeds the available supply, contracting with Flex Car may be a viable alternative.

  Recommended action: Continue to evaluate opportunities to downsize the fleet; evaluate the benefits and costs of contracting with Flex Car as a "back-up" fleet available to City employees.

Not yet underway, but on the horizon.

- **Fuel efficient tires.** Vehicle tires show a wide variation in fuel efficiency based on their composition and design. Research conducted by the California Energy Commission suggests that low rolling resistance tires could improve the fuel economy of passenger vehicles by approximately three percent and even more for diesel trucks with heavy loads. A three percent increase in efficiency would cut fleet fuel use by about 60,000 gallons. Tires manufactured and marketed specifically for fuel efficiency aren't widely available yet and further performance, safety and consumer research is currently underway in California. However, if the fuel efficiency potential proves to be real, the City can add the tires as another strategy.

- **Hydrogen fuel cell cars.** Experts agree - the car of the future is a fuel cell car - powered by hydrogen, the most abundant element in the universe, and pollution and noise free. Experts also agree that even with aggressive research, " . . . the hydrogen fuel-cell vehicle will not be better than the diesel hybrid in terms of total energy use and greenhouse gas emissions by 2020[9]." The hydrogen fuel-cell vehicle has low emissions and energy use on the road, but converting natural gas or gasoline into hydrogen requires substantial energy use and emits greenhouse gases.

[9] MIT, March 11, 2003.

6. ACTION PLAN

STRATEGY	PROGRAM	RECOMMENDED ACTION	COST IMPACTS	ENVIRONMENTAL IMPACT	LEAD
CLEANER OPERATING VEHICLES	Ultra low sulfur diesel	Maintain current level; diesel fleet is already 100% ulsd	No new cost impacts	Toxics & particulates reduced by 10% per vehicle	F&FD
	Diesel truck retrofits w/ emission control devices	Maintain current level to convert all eligible vehicles by 12/04	$5,000/vehicle cost already budgeted	Toxics & particulates reduced by 60%-90% per vehicle	F&FD
	Alternative Fueled Vehicle-Bio-diesel	Expand: by the end of 2003, all diesel fuel will be B20	~$40,000 per year, using current biodiesel prices; may be eligible for City Light mitigation dollars	• 1266 tons of CO2 reduced/year • ~15% reduction of toxics and particulates in vehicles and equipment not retrofitted w/emission control devices	OSE and F&FD
	Alternative Fueled Vehicle-CNG	Expand: 50% of each year's new light duty vehicles will be either CNG or hybrid	~$5,000 incremental first cost/vehicle; annual fuel cost for CNG varies but ~ 25% less than Dodge Neon	• .68 lbs/mile of CO2 compared to .91 lbs/mile for Dodge Neon • 12% fewer smog forming pollutants/mile than Dodge Neon	F&FD
	Alternative fueled vehicles – Segways™	Expand: Adopt Segways as standard equipment for water meter routes; evaluate other applications such as meter coin collections, public safety, etc.	~$6,000/unit; B:C ratio of 2.19 for water meter "driving" routes; annual savings to F&FD of $5187. Benefits and costs will vary, depending on the application. Annual recharge cost ~$3.00	• Zero pollutants • Zero CO2 • Reduced fuel use • Reduced CO2 emissions	F&FD & participating departments
	Maintenance	Maintain current levels (minimum of complete annual tune-up and maintenance check)	No new costs	Particulates and smog forming pollutants from well tuned vehicles are 20% to 60% less than out-of -tune vehicles	F&FD

ACTION PLAN, cont.

STRATEGY	PROGRAM	RECOMMENDED ACTION	COST IMPACTS	ENVIRONMENTAL IMPACT	LEAD
INCREASED EFFICIENCY – VEHICLES AND USE	Hybrids	Expand: 50% of each year's new light duty vehicles will be either CNG or hybrid. Conduct life cycle cost analysis of timing, benefits and costs of achieving City's intention to have a 100% clean, green fleet.	~$5000 incremental first cost/vehicle compared to Neon. Annual fuel cost ~ 42% less than Neon. Slower depreciation than standard compact. ACEEE's Environmental Damage Index[10] rates the Prius at $1.01/mile and the Dodge Neon at $1.73/mile.	• 48 mpg (avg city and hwy) • 60% more fuel efficient than a Dodge Neon • .53 lbs/mile of CO2 compared to .91 lbs/mile for Dodge Neon • 12% fewer smog forming pollutants/mile than Escort	F&FD
	Reduce vehicle idling; ensure proper tire inflation rates; promote alternatives to driving	Expand: launch citywide employee education program	Minimal costs: develop messages and materials; staff time for project management, coordination	Difficult to project the amount of fuel savings.	OSE w/F&FD, SPU and Parks
	Right vehicle/right job	Increase: develop guidelines/specifications for depts. and F&FD	Minimal direct costs: Interdepartmental team could develop	Case-by –case: - Excursion 4WD: 13 mpg - Cherokee 4WD: 18 mpg - Suburu wagon AWD: 24 mpg - Ford focus wagon: 30 mpg	F&FD, OSE and depts.
	Eliminate excess vehicles	Re-evaluate fleet size every other year. Evaluate benefits and costs of contracting with FlexCar.	Cost savings due to fewer vehicles purchased, maintained, parked		F&FD, Finance, OSE
	Maintenance	Maintain			

[10] American Council for an Energy Efficient Economy (ACEEE) Green Book: Environmental Guide to Cars & Trucks. The EDX represents a vehicle's overall environmental impact express as the environmental cost to society from each mile the vehicle travels (in cents per mile) accounting for both health costs and global warming.