Attachment A

King County's Electric Vehicle Report

This report outlines King County's activities in the past several years to invest in plug-in electric and battery electric vehicles and develop a "green fleet" standard for municipal vehicle fleets. At the time of publication in September 2008, this report is associated with an announcement of the county's continued participation in a national demonstration project regarding plug-in electric vehicles, as well as its participation as a pilot fleet for the Evergreen Fleet Standard.

This report is also being transmitted to the King County Council in response to King County Council Motion 12744, "concerning the county's efforts to combat global warming and seeking ways for King County to accommodate the use of plug-in hybrid electric vehicles and battery electric vehicles," and King County Council Ordinance 15988, "relating to the promotion of energy efficiency and clean-vehicle technology in King County's fleet." This motion and ordinance were promulgated by the King County Council following on the success of the county's "Clean Vehicles NOW!" conference in September 2007.

This report was produced by the King County Executive Office and the King County Department of Transportation (KCDOT), as part of the King County Executive Action Group on Climate Change. It is consistent with the King County Climate Change Plan and Energy Plan.

This report is an important example of King County's long history of work and leadership on issues relating to climate change mitigation and clean energy. The report provides an overview of our efforts, current developments, emerging issues and proposed future actions for King County regarding investment in electric vehicles. The report also highlights King County's efforts to create a foundation for the evolution of this technology by:

- providing the public with incentives to use electric vehicles;
- investing in these vehicles and related infrastructure to transform the market;
- collecting vehicle performance and customer data to better inform future investments;
- identifying issues and best practices for electrical charging infrastructure; and
- engaging the community in our efforts.

The term "electric vehicle" generally describes all-electric battery-powered vehicles, referred to as battery electric vehicles (BEVs); and plug-in hybrid-electric vehicles (PHEVs), which are powered by a combination of battery power and conventional hybrid electric technology. BEVs are entirely dependent on recharging facilities for their power. PHEVs run heavily on battery power when recharged from charging stations, but are not dependent on recharging to achieve an extended driving range.

After a brief background section, the report is organized around the five following issues, as directed by King County Council Motion 12744 and Ordinance 15988:

I King County should encourage citizens to use PHEVs and BEVs, and should specifically address ways for drivers to recharge their PHEV and BEV batteries when parked at Metro Transit park-and-ride facilities;

II King County should work with state and local governments to incorporate PHEV and BEV incentives into their commute trip reduction and transportation demand management programs;

III King County should take a leadership role in promoting a regional demonstration project to encourage PHEV and BEV use, and work with utility providers to achieve the most efficient use of the power system and help assure and accelerate the optimal integration and acceptance of these new technologies;

IV King County should create a stakeholder advisory group to study the impacts of PHEVs and BEVs on the energy grid and look for ways to partner with our energy suppliers to perform these studies, advise King County on its participation in the regional demonstration project, and recommend incentives to encourage commuter use of PHEVs and BEVs; and

V King County shall lead a process for development and adoption of regional green fleet standards and the possible establishment of a regional clean-vehicle certification program by King County and the other local governments participating in the Evergreen Fleets Initiative.

Background

In March 2006, King County Executive Ron Sims published four Executive Orders on Global Warming Preparedness and Renewable Energy (PUT 7-5 through PUT 7-8), which placed a clear priority on development of strategies to reduce greenhouse gas emissions through energy conservation and efficiency in King County operations and the use of clean fuels in King County vehicles. This priority was reinforced by Council Motion 12362.

In February 2007, Executive Sims published the county's inaugural Climate Plan, intended to set a comprehensive vision for King County government on how to reduce greenhouse gas emissions and prepare for climate change impacts to the region. Among other priorities to reduce operational and regional greenhouse gas emissions, the plan highlighted two strategic focus areas:

- Energy conservation, efficiency, clean energy and clean fuels
- Climate-friendly transportation

In September 2007, the King County Climate Team and Department of Transportation hosted the "Clean Vehicles NOW!" conference. This conference emphasized the importance of investing in clean vehicle fleets and raised awareness about the clean technologies and fuels available today. This event also heightened awareness of the urgent need for government agencies and leaders to promote the widespread adoption of clean-vehicles into public and private fleets. As part of the event, the Department of Transportation and the Climate Team organized a dialogue with other municipalities to create a green fleet standard and explore emerging technologies. Among the

technologies that have come up for discussion as a result of this dialogue has been electric vehicle technology. At the 2007 conference, King County had on display its first converted Prius PHEV.

Because PHEVs and BEVs represent a form of alternative vehicle technology that currently has limited market accessibility, King County has joined forces with other agencies within the region and the Department of Energy's Idaho National Lab to help accelerate the adoption of this clean-vehicle option by participating in the collection of real-world, real-time data. A full discussion of this demonstration project appears in Section III.

Market Update

Electric Vehicle Technology

According to Hybridcars.com, the first electric vehicle was built in 1839. In recent years some major auto manufacturers, including Ford, GM, Honda and Toyota, have made a limited number of electric vehicles available to consumers. For the most part, however, BEVs and PHEVs have been produced by electric vehicle associations and small start-up companies that have retrofitted regular internal combustion engines and hybrid vehicles as BEVs and PHEVs.

Plug-in Hybrid Electric Vehicle (PHEV) Technology
PHEV technology has the potential to move transportation away from the internal combustion engine and dependence on fossil fuels, and reduce the leading source of greenhouse gas emissions in the region. PHEVs have many advantages, including the following:

- PHEVs have the potential to cut harmful vehicle-exhaust emissions by dramatically reducing the amount of fossil fuel used. According to the American Council for an Energy-Efficient Economy, a PHEV with a 20-mile range has the potential to reduce fuel consumption by 33 percent, and with a 60-mile range could reduce fuel consumption by as much as 66 percent.
- Plug-in hybrid electric vehicles use larger batteries than regular hybrid vehicles and can be recharged using a regular 120-volt household outlet. As a result, the capital outlay required to develop the infrastructure for the widespread use of these vehicles is relatively modest.
- Close to 70 percent of commuter trips are 40 miles or less. With PHEVs offering from 20 miles to as much as 60 miles of travel in all-electric range, it would be possible to go for extended periods of time without refueling at a gas station. The PHEVs that King County is testing have a range of 40 miles and a maximum speed of 35 mph in all-electric mode—ideal for many work-related transportation needs.
- PHEVs represent a viable transitional technology that can lay the groundwork for more advanced clean-vehicle technology in the future. Plug-in vehicle technology

can be combined with other alternative fuels to produce partial zero-emission vehicles or zero-emission vehicles.
- Most major manufacturers such as GM, Ford and Toyota have plans to roll out PHEVs by 2010 or shortly thereafter.

The Puget Sound region is well suited to spearhead the use of electricity as a clean alternative to fossil fuels for transportation because much of the electricity produced in the region is from low-carbon sources, primarily hydropower. King County and other municipal entities in the region, in partnership with our local utilities, have an ideal opportunity to take a leadership role in the early adoption of PHEVs as an alternative form of transportation. According to the Washington State Department of Ecology, shifting from oil to electricity will dramatically cut oil use for regional transportation.

King County's leadership in clean technology demonstration projects will help with this market transformation. Through our support of this technology, the county will underscore its commitment to the reduction of greenhouse gas through clean-vehicle technology.

Battery Electric Vehicles Technology (BEVs)
Battery electric vehicles (BEVs) are now commercially available in a wide range of applications that include neighborhood electric vehicles, four-passenger sedans, and utility trucks. The capabilities of the various vehicles range from 25 mph with a 35-mile range, to 50 mph with the ability to travel 100 miles and carry a payload of two metric tons. Today, according to the Electric Drive Transportation Association (EDTA), "electric drive technology is used in passenger vehicles, buses, heavy machinery, tractors, trucks, non-road and recreational applications." Most of these vehicles can be recharged using a regular household outlet.

Potential Challenges

Despite the advantages of PHEV technology and the advances that have taken place in this field, there are still some substantial new technology adoption hurdles to overcome. These include the following:

- PHEVs are not yet commercially available, and to introduce the technology into its fleet the county must make after-market conversions.
- PHEV technology costs more. According to HybridCars.com, the cost of a PHEV conversion kit ranges from $10,000 to $12,000. In the case of the demonstration project with Idaho National Laboratories (INL), the total cost of the conversion is $13,115 and is broken down as follows:

1. Hymotion Conversion Kit	$9,499.00
2. Installation	500.00
3. Data Logger (V2Green)	2,000.00
4. Taxes	1,115.00

- Electricity providers want to encourage recharging of PHEVs from the electrical grid at off-peak hours.
- Additional research and development is needed to develop battery technology that can deliver enough power efficiently and economically.
- There is a backlog of demand for the electric retrofit batteries that runs from six months to a year. King County's retrofit kits were delayed by five months.

King County's Involvement with Alternative Technology Vehicles

King County's commitment to environmental sustainability is evident in its longstanding engagement with clean vehicle technology and alternative fuels. As early as 1991, King County's Fleet Administration Division converted 25 vehicles to operate on compressed natural gas (CNG). By 1995, the county had a fleet of 271 CNG police vehicles which was then the largest fleet of its kind in North America.

Metro Transit also has a long history of innovation in energy technologies and has developed one of the most sophisticated bus transit fleets in the country with low-floor hybrid electric buses, ultra-low sulfur clean diesel, and other innovations. Electric trolleys entered the system prior to Metro Transit, in the 1940's, but Metro Transit expanded the system and continues to do so. The trolley network carries approximately 21 percent of Metro Transit bus riders and emits no greenhouse gases. In 1990, Metro introduced the Breda articulated electric trolley, dual propulsion (diesel and electric), for operation in the bus tunnel, an innovation that was unique in the transit world. The Breda was replaced by the New Flyer articulated hybrid bus. King County pioneered the application of hybrid technology to mass transportation with the order of 237 hybrid buses in 2001, which include engines that are dramatically lower in emissions and include a unique 'hush mode' for operation in the bus tunnel. Metro Transit continues to look for innovations in bus technology to reduce energy use.

In that same year the county began purchasing hybrid cars. Today, there are 157 hybrid vehicles and 166 E-85-capable (85 percent ethanol) flex fuel vehicles (FFVs) in the fleet.

King County has maintained leadership in the hybrid vehicle arena through our formation of the Northwest Hybrid Heavy-duty Truck Consortium. This regional consortium consists of 14 cities and counties within the Puget Sound region. King County Fleet Administration Division secured $400,000 in government grants from the Environmental Protection Agency and CMAQ to help offset the incremental cost of 10 pre-production hybrid trucks. The initiative was designed to help accelerate the market for hybrid truck technology by demonstrating a demand for the product. King County now has two hybrid trucks operating within its fleet and an additional truck on order.

Plug-in Hybrid Electric (PHEV) Technology

Consistent with the county's commitment to advanced clean vehicle technology, the county participated in Austin Energy's National Plug-in Partners' campaign by pledging to purchase 430 PHEVs (the largest pledge in the Pacific Northwest) when the technology becomes available and it is financially feasible to do so. With the emergence of PHEV

technology, the county has begun introducing PHEVs into its fleet by converting existing hybrid vehicles.

The county took delivery of its first converted PHEV in September 2007. King County is now engaged in a PHEV pilot project with INL and other local organizations which will be discussed in Section IV.

Battery Electric Vehicle (BEV) Technology
King County currently has 66 electric carts used by Wastewater Treatment Division and two electric vehicles in Metro Transit. The Department of Transportation is investigating the possibility of acquiring light- and medium-duty vehicles as older gasoline vehicles come due for replacement.

Accelerating Integration and Acceptance of the New Technology

Because user acceptance of new and alternative vehicle technology is essential to the large-scale integration of new vehicles into the fleet, we have actively engaged users at all levels of the organization in the process of "greening the fleet." A notable step towards this goal was the formation of the Vehicle Utilization Committee, which incorporates users from all the stakeholder groups within the county. Additionally, in response to the high incremental cost of acquiring advanced PHEVs and BEVs, we have proposed a policy for funding the incremental cost of these vehicles, which will go into effect for the purchase of 2009 replacement vehicles. The purpose is to provide a financial strategy for all King County departments to "green" their fleets while moderating the up-front higher costs of acquiring these vehicles.

I. Encourage citizens to use PHEVs and BEVs at Metro Transit park-and-ride facilities.

Current Developments

To facilitate and encourage the purchase and use of PHEVs and BEVs, KCDOT has examined the possibility of expanding the number of electric vehicle recharging stations at its Metro Transit park-and-ride lots. The key issues KCDOT has examined include the following: the near-term market outlook for BEVs and PHEVs; current and projected demand for recharging stations at Metro Transit park-and-ride lots; the types of recharging stations that should be provided; associated costs; and how best to manage the use of recharging stations.

Near-Term Market Outlook for Electric Vehicles

During the past years, the percentage growth in electric passenger vehicles within King County as estimated by the Department of Licensing (See Appendix A: Electric Passenger Vehicle Data: 2003-2008) has been significant but the numbers are still very small. Currently, there are 254 electric passenger vehicles licensed in King County out of a total of 1,265,385 passenger vehicles. Electric vehicles represent less than 2/100ths of 1 percent of all licensed vehicles, or one electric passenger vehicle for every 4,981 licensed passenger cars within the county.

Because of the recent dramatic increase in conventional fuel costs and the current intense focus of the automobile industry on providing viable electric vehicle options for consumers, including various plug-in vehicle options, it is likely that the number of plug-in electric vehicles purchased and operated within King County will increase significantly over the next two to five years. The year 2010 could be a pivotal year for plug-in electric vehicles. That is the target year for introduction of the Chevrolet "VOLT," which is expected to be one of the first mass-produced, modestly priced, plug-in electric vehicles. If sales of this or similar vehicles are successful, including entirely battery-powered electric vehicles, the demand for recharging stations could escalate significantly. Alternatively, if the introduction of accessible plug-in electric vehicles lags behind projected schedules or the technology does not continue to evolve, the growth in plug-in electric vehicles may not occur as quickly as anticipated.

King County Park-and-Ride Recharging Facilities

King County Metro Transit already provides some basic vehicle recharging capacity (120 volt/15 amp electric outlets adjacent to parking stalls) at principal county parking lots: 14 outlets at the Issaquah Highlands and 3 at Eastgate park-and-ride.

Additional charging stations are planned for park-and-rides currently under construction including 12 outlets at the Redmond parking garage, 5 at Burien Transit Center park-and-ride and 5 with the expansion of the Brickyard park-and-ride and are expected to be available mid to late 2009.

Existing recharging outlets have experienced very limited use to date, with very isolated uses observed at the Issaquah Highlands and Eastgate park-and-ride lots. In an effort to be supportive of future technical advancements, Metro Transit added recharging capabilities to park-and-ride structures during the initial construction process. This effort is more effective than retrofitting later and provides the capacity that could be needed if the demand develops.

Future Outlook

Our understanding of future demand for, and interest in, recharging electric vehicles at park-and-ride lots is evolving. Trends in this area include the following:

- Expanded vehicle mileage range could eliminate the need to recharge vehicles when parked.
- We expect that most plug-in electric and hybrid-electric vehicles will be recharged at their owners' residences. This behavior would model optimum cost and efficiency curves, as evening recharging is most convenient and reliable and utilizes least-cost electricity, which is available when the demands on the grid are typically lowest.
- Most electric vehicles purchased within the next year and beyond are likely to be charged overnight, and are less likely to need daytime recharging. This will be particularly true when their use is limited to neighborhood trips and/or trips to park-and-ride lots involving daily driving distances that are comfortably within the new vehicles' expected between-charge operating ranges. Most of the potential demand for electric vehicle recharging capacity at park-and-ride lots is likely to be for "topping off" battery charge.
- Some people driving BEVs to park-and-ride lots to reach transit service may be critically dependent on recharging facilities at the lots. This would be the case if the between-charge range is less than the round-trip distance between the owner's home and the park-and-ride lot. This problem can be expected to lessen over time as batteries with longer ranges become available.
- 2010 could be a pivotal year for plug-in electric vehicles with the expected introduction of the first mass-produced, reasonably priced, plug-in electric vehicle.

Types of Charging Stations

Virtually all of the new purely electric and hybrid-electric vehicles entering the marketplace within the next several years will be equipped with recharge connectors that can be connected to standard 120 volt/15 amp plug-in receptacles for slow overnight recharging at owners' residences. In the case of longer-range pure electric vehicles,

most will likely be equipped with high-speed, high voltage receptacles for charging at specialized high voltage stations. (See Appendix B: Electric Vehicle Charging Station Technical Information.)

Park-and-Ride Recharging Station Costs

Construction Costs

Providing new or additional recharging outlets within existing park-and-ride facilities would be significantly more expensive than providing recharging outlets with new facilities or facilities being expanded or upgraded. The rough estimated cost to install retrofit in order to provide additional recharging outlets at existing park-and-ride structures is $10,000 per outlet for the first two new outlets; for more than two outlets the costs would drop to approximately $2,000 per outlet. These estimates include engineering, permitting, hardware costs, weather-proofing and service work. Installation of recharging stations at surface parking lots would be much more costly due to trenching and other required work. It is estimated that the cost of providing recharging outlets when other utilities are being installed at newly constructed park-and-ride facilities or during service upgrades would be no more than a third of the cost of installing additional outlets in existing facilities.

Electrical Consumption Costs

It is estimated that it would take roughly 10 kwh of electricity to recharge a typical electric vehicle. At current rates, the estimated cost of the electricity to King County and/or the user, if the cost is passed on, is roughly 72 cents per day. This would aggregate to roughly $14 a month and $170 per year based on continuous daily use.

Proposed Future Actions

Based upon the preceding information, Metro Transit is preparing to launch the following pilot program. The program would promote the use of existing charging stations available at Metro Transit park-and-ride structured garages. This program would be offered principally for the benefit of individuals who purchase and use BEVs, and use transit. These individuals are more likely to be dependent on vehicle recharging stations at park-and-ride lots and elsewhere to have adequate vehicle range.

Park-and-Ride Plug-In Pilot Project

The initial pilot program would run for one to three years and would encourage the purchase and use of electric vehicles and transit by offering electric recharging facilities at park-and-ride lots. The program would entail the following:

1. The county would conduct an outreach effort to announce a countywide pilot program to encourage the purchase and use of all-electric vehicles, plug-in hybrid electric vehicles, and hybrid-electric vehicles. The main focus of the pilot would be to provide electric recharging at designated parking stalls at specific park-and-ride lots on a trial basis, with priority given to providing recharging facilities for all-electric battery-powered vehicles, which depend solely on electric power and frequent recharging.

2. Starting with the existing 17 outlets and the 12 additional scheduled to come on-line with the completion of the Redmond Park-and-Ride lot in March 2009, the county would launch a registration program to park in designated electric vehicle parking stalls with recharging outlets. Use of these parking stalls would be limited to electric-vehicle owners enrolled in the pilot program. The reserved stalls would have signs stating they are for use by electric vehicles only.
3. The county would provide a customer-friendly and efficient program for vehicle owners to enroll in our pilot program and use designated recharging parking stalls. Priority would be given to individuals using BEVs, which are more range-limited than PHEVs and entirely dependent on recharging for their power and operating range. The enrollment program cycle would operate either monthly or annually. Enrollment could be either through a web-based system or by phone, and would be used to collect user data.
4. The county would install appropriate signage to indicate the location of the reserved stalls.
5. The county would report on the results of the pilot program to the public, including several metrics:

    - Frequency of reservations of the recharging parking stalls;
    - Frequency of use of these parking stalls;
    - Financial performance of the pilot program;
    - Operation lessons learned from the pilot program; and
    - Time-of-use electricity metering in cooperation with partner utilities.

6. The county would evaluate the pilot program at regular intervals. Renewal or extension of the pilot program would follow evaluation of the program's performance.

If the pilot program proves successful and the demand for recharging facilities at park-and-ride lots increases, the county could develop a long-term program to expand the availability of recharging facilities at park-and-ride lots. To do this, a viable financial model will be required that would do the following:

- Develop a comprehensive program to accommodate expanded electric vehicle recharging at park-and-ride facilities.
- Develop a capital program to install additional electric recharging outlets as required by demand for the program. This would include both the retrofitting of existing surface park-and-ride lots and the inclusion of more outlets at all new facilities constructed in the future.

Best practices from around the country and in other nations would be studied as the county develops this long-term financial model. A variety of public agencies and private vendors are currently engaged in the industry and would be consulted as appropriate.

VanShare Pilot Project
Several transit programs provide county-owned vans for commuting, including the following:

- VanPool Program, with approximately 1000 vehicles that are parked overnight at participants' residences, have an average daily round trip commute of 58 miles. During the day the vehicles are parked at the drivers' place of employment.
- VanShare Program, which involves approximately 180 vans that are stationed overnight at strategically located parking facilities, (primarily at ferry docks or Sounder stations where the majority of connections occur) have an average daily round trip commute of 12 miles.).

Of the two van programs, VanPool is best suited to using a hybrid vehicle due to the long daily commute. VanShare, however, which has a short daily trip and requires vans to be parked overnight at a variety of parking facilities provides a unique opportunity to employ an all electric vehicle. If electric vans were acquired and deployed for the VanShare Program, need for recharging facilities would be at parking lots at the Washington State Ferry docks, Sounder stations, King Street Center and some park and ride lots. The potential use of recharging facilities by VanShare vans would most likely be limited to small demonstration projects over the next few years. The vans would recharge during the nighttime and weekend hours. These facilities might require some specialized metering capability to take advantage of the lower power costs that are generally available during nighttime hours.

Initial consultations suggest that the earliest availability of a potentially suitable six-passenger all-electric van could be early in 2009. Testing this vehicle in a VanShare application will be incumbent upon the Washington State Legislature increasing the allowed GVW for this type of NEV from 3000 to 4100 lbs. At this time, Metro Transit does not expect to replace its existing fleet of gasoline-powered vans with plug-in electric vehicles due to the present high cost of procuring vans that are electrically powered, but Metro Transit will continue to evaluate the possible use of these vehicles in the VanShare Program and continue explore grant opportunities.

II. PHEV and BEV Commuter Incentives

Commute Trip Reduction Program Incentives

The Revised Code of Washington (RCW 70.94.521) authorizes the Washington State Department of Transportation to implement the Commute Trip Reduction (CTR) program. Under this program, employers that have worksites within a county's urban growth area, and have at least 100 employees arriving to work between the hours of 6 a.m. and 9 a.m., must have an employee commute trip reduction program. The employer programs provide information and resources to employees to help reduce the proportion of employees that drive in single-occupant vehicles to work. The employers affected by the Commute Trip Reduction law survey their employees every two years to track performance toward meeting trip reduction targets.

The Washington State CTR Program does not have policy guidance concerning any PHEV and BEV incentives. However, as a result of King County's work in this arena, the CTR board agreed to address the issue of how PHEVs and BEVs should be addressed by the state Commute Trip Reduction law in the board's 2009 work plan.

The CTR law's legislative findings identify improving air quality and reducing reliance on imported oil as key reasons to pursue a reduction in single-occupant vehicle commute trips. Use of PHEVs and BEVs by commuters to get to park-and-ride facilities aligns with these policy goals. In 2009, the CTR board will consider how to allocate additional credit within the program if an employer can document employees' use of PHEVs or BEVs in their daily commutes, whether to park-and-ride facilities or for entire commutes.

Local jurisdictions within King County would likely look to the state for guidance on the issue of how to provide credit within the Commute Trip Reduction program for use of PHEVs and BEVs.

Park-and-Ride Incentives

The provision of recharging stations at park-and-ride lots is a significant benefit to PHEV and BEV users who use transit. An additional potential incentive would be the provision of reserved parking for individual PHEV or BEV users. And, to encourage those who may not yet be transit riders, transit will offer a one month free bus pass or equivalent to electric car owners to begin using transit. As park-and-ride facilities approach capacity and fuel costs increase, these incentives may be important to speed consumer interest and use of electric vehicles. See Section I for more detail on King County's plans in this area.

III. Department of Energy and Idaho National Lab PHEV Pilot Project

King County is partnering with the City of Seattle, Port of Seattle, Puget Sound Clean Air Agency and Idaho National Laboratories (INL) to implement a PHEV demonstration project. During August and September of 2008, King County is converting four existing Toyota Priuses to PHEVs at a cost of just over $13,000 each. These plug-in conversions are being undertaken as part of an advanced vehicle testing project with matching funds from INL.

Duration of Project

INL has proposed that the project run for one year, and has indicated an interest in extending this period if participating agencies are also willing to do so. The King County Department of Transportation believes that continuation of this collaboration could be beneficial to the county.

Data Collection

On-Board Data Collection
INL has chosen a local company, V2Green, to provide data-relay services for the project. The company has equipment that can provide real-time data to the research laboratory and to the participating agencies. The V2Green system is also capable of monitoring and regulating the charging and discharging of PHEVs while the vehicles are plugged into the electrical grid. This demonstration project can test vehicle performance while piloting a system that has the potential to monitor and regulate demand on the electrical grid.

Off-Board Data Collection
In addition to gathering information from the data loggers via cellular modem, INL is requiring that the agencies participating in this project provide off-board data on a monthly basis. The data that they will collect each month include amount of fuel used and maintenance records.

Recharging Stations/Electrical Outlets
The program requires that each vehicle have a dedicated ground fault interrupter (GFI) 20 amp, 120-volt outlet. There are currently two outlets available at the Goat Hill Parking Garage. Additional outlets will be installed to accommodate the daily duty cycles of the PHEVs. The vehicles will be plugged in primarily at night and would cause no perceptible demand on the power grid even if all 14 were to be plugged in during peak hours.

Criteria for Assigning Demonstration Project Vehicles

The four Priuses from the King County vehicle fleet that will be converted for the INL project will be assigned based on the following criteria:

1. **Function.** In all cases, the vehicles will be used to carry out administrative or light-duty courier functions. This is consistent with the manner in which hybrid vehicles in the fleet are now being used.

2. **Potential number of people who will be operating each vehicle.** To safeguard the integrity of the data collected, vehicles should be operated by a single driver or a small group of drivers who work closely together.

3. **Duty cycle of the vehicle.**
    a. PHEVs have a range of approximately 40 miles and are better suited for short commutes and city driving than long highway trips.
    b. This project requires that the test vehicles be driven at least 20 miles per day.
    c. The load-carrying capacity of a converted Prius must be taken into consideration.
    d. Because the program is primarily for data collection, more rather than less usage is desirable.

4. **Demonstration value.** This program can serve as a demonstration project for PHEVs, providing visible leadership to the employees and citizens of King County in the use of fuel efficient transportation.

5. **Whether the vehicle operator will have access to suitable electrical outlets for recharging.**

Vehicle Assignment

Based on the criteria outlined above, the PHEVs will be assigned to the Department of Natural Resources and Parks, the Department of Development and Environmental Services and the Department of Transportation.

IV. Stakeholder Advisory Group

A stakeholder advisory group has been formed to support and advise the county's decisions related to the INL plug-in pilot project. Members of the stakeholder advisory group include the following agencies:

- City of Seattle
- Seattle City Light
- King County Department of Transportation
- Port of Seattle
- Puget Sound Clean Air Agency

In addition, we have invited electricity purveyors in our region to join our dialogue. These include Puget Sound Energy, Snohomish Public Utility District, and Tacoma Power. We have a shared goal of reducing greenhouse gases and are coordinating many of the same programs. We believe this committee offers a tremendous opportunity over the next year for us to share information and chart the course for future actions.

V. Regional Green Fleet Standard

At the Clean Vehicles NOW! conference convened by King County in September 2007, 21 cities and municipalities in the Puget Sound region formed the Evergreen Fleets Initiative (originally known as the Puget Sound Regional Green Fleet Initiative). This initiative is designed to develop a uniform green fleet standard by:

- Establishing specific targets, goals, and strategies regarding the purchase of clean-vehicle technologies and the reduction of fossil fuels.
- Adopting policies that promote best practices in fleet design and operation.
- Sharing information on the total type and quantity of fuel consumed and vehicle miles traveled on an annual basis.

This initiative was designed to help reduce harmful exhaust emissions in the region by collaborating to develop a green fleet standard for government fleets. These cities and municipalities, in collaboration with the Puget Sound Clean Air Agency (PSCAA) and Puget Sound Clean Cities Coalition (PSCCC), launched the Evergreen Fleets Initiative and formed an advisory committee to develop strategies for the implementation of this initiative. The committee was tasked with identifying the attributes that define a "green fleet" and recommending policies and criteria that can be used to standardize these attributes. The goal is to help fleets adopt more environmentally friendly practices. The members of the committee represent the following municipalities and governmental agencies:

- Bainbridge Island
- Bellevue
- Bothell
- Bremerton
- Washington State Department of Community, Trade and Economic Development
- Department of Ecology
- Federal Way
- Fife
- Issaquah
- Kent
- King County
- Kirkland
- Lakewood
- Marysville
- Mercer Island
- North Bend
- Olympia

- Pierce County
- Puget Sound Clean Air Agency
- Puget Sound Clean Cities Coalition
- Renton
- Snohomish
- Snohomish County
- Thurston County
- University Place
- Washington State Department of Transportation

Over the past six months, this advisory committee has developed standards that represent a regional approach for public fleets to reduce greenhouse gas emissions. By achieving these standards, public fleets are poised to lead the region in advancing clean, renewable and cost-effective technologies. The committee agreed to share its collective knowledge and collaborate on the implementation of this new voluntary standard.

The components of the Evergreen Standards Program include best practices in the following areas:

1. Policy, communication and training
2. Vehicle and equipment purchasing
3. Vehicle, equipment and fuel use
4. Vehicle and equipment maintenance.

The program proposed by the committee invites voluntary participation and is conceptually similar to the Leadership in Energy and Environmental Design (LEED) standard for green buildings. It offers fleets the option of achieving one of three levels of environmental performance to become certified as an *Evergreen* fleet.

The recommended actions in the committee's first report represent a first step in developing the Evergreen Fleet Initiative. As the lead agencies designated to oversee the administration and certification of this program, the Puget Sound Clean Air Agency and the Puget Sound Clean Cities Coalition will review the committee's recommendations and develop a corresponding reporting and certification system. The system will include tools to assist fleets in evaluating their pollutant emissions, developing reduction strategies, and, ultimately, reducing air pollution in the region by meeting or exceeding the performance standard outlined in the Evergreen Fleet document. The official launch of the program is expected to take place in early 2009.

In preparation for the program launch, King County is continuing its leadership on the Evergreen Standards by beginning implementation of this program as an early adopter in September of this year. This pilot program will provide "real life" feedback to the lead agencies to help refine the program for the 2009 roll out.

Appendix A: Electric Passenger Vehicle Data

Electric Passenger Vehicle Data: 2003 - 2008

Washington Department of Licensing
Passenger Cars by Calendar Year *
Data as of August 25, 2008

Passenger Cars

	CY2008	CY2007	CY2006	CY2005	CY2004	CY2003
King County	1,265,385	1,280,197	1,253,362	1,223,682	1,227,244	1,196,502
Washington State	4,271,213	4,191,928	4,102,572	4,020,302	3,996,551	3,868,308

Electric Passenger Cars

	CY2008	CY2007	CY2006	CY2005	CY2004	CY2003
King County	254	208	147	114	72	19
Washington State	688	566	442	396	247	79

* Please note
1. Data are estimations only.
2. Data source is Vehicle Transactions database.
3. Data for 2008 contains all passenger cars with valid registration as of August 25, 2008.

Appendix B: Electric Vehicle Charging Station Technical Information

King County Installations:

King County Metro Transit parking garage installations exist at Eastgate and Issaquah Highlands. The installations at these facilities have consisted of signs and standard NEMA 5-15R or 5-20R receptacles (similar to the receptacles in our homes).

Auto Manufacturer Installations:

A market competition is ongoing between standards for recharging connectors for electric vehicles. GM and Toyota have lined up behind inductive connectors, similar to the one shown here. (An updated, smaller version has since been promoted as the standard. GM's EV1 uses this type of charger).

Ford and Honda have settled on conductive connectors, such as the one shown at right (Avcon).

Toyota has provided yet another conductive connector for its plug-in hybrid Prius, which is currently under development.

Most of these connectors can provide a fast charge to the hybrid-electric vehicle batteries. However, there is no set standard for these charging systems. This has created a challenge for setting up charging stations at Metro Transit park-and-ride lots.

A statement by the US Department of Energy regarding the PHEV reported that:

> The U.S. Department of Energy (DOE), National Energy Technology Laboratory (NETL), on behalf of the Office of Energy Efficiency and Renewable Energy (EERE) Office of Vehicle Technologies (OVT) Program, is seeking applications for cost-shared development and demonstration of plug-in hybrid electric vehicles (PHEVs).

The US DOE further reported that the desired vehicle would be capable of charging by using the standard 110 volt outlet found in homes and buildings across the U.S.