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Implementation Approach for Plug-in Electric Vehicles at Joint Base Lewis McChord: Task 4

Stephen Schey
Jim Francfort

December 2014

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Stephen Schey
Jim Francfort[2]

[1]Stephen Schey, Project Manager, Infrastructure Planning and Analysis, Intertek Testing Services, North America, Phoenix, AZ
[2]Jim Francfort, Vehicle Systems Principal Investigator, Idaho National Laboratory operated by Battelle Energy Alliance, Idaho Falls, ID

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Idaho National Laboratory
Idaho Falls, Idaho 83415

http://avt.inl.gov

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ABSTRACT

Battelle Energy Alliance, LLC, managing and operating contractor for the U.S. Department of Energy's Idaho National Laboratory, is the lead laboratory for the U.S. Department of Energy's advanced vehicle testing. Battelle Energy Alliance, LLC contracted with Intertek Testing Services, North America (Intertek) to conduct several U.S. Department of Defense-based studies to identify potential U.S. Department of Defense transportation systems that are strong candidates for introduction or expansion of plug-in electric vehicles (PEVs). This study focused on Joint Base Lewis McChord (JBLM), which is located in Washington State.

Task 1 consisted of a survey of the non-tactical fleet of vehicles at JBLM to begin the review of vehicle mission assignments and the types of vehicles in service. In Task 2, daily operational characteristics of select vehicles were identified and vehicle movements were recorded in data loggers in order to characterize the vehicles' missions. In Task 3, the results of the data analysis and observations were provided. Individual observations of the selected vehicles provided the basis for recommendations related to PEV adoption (i.e., whether a battery electric vehicle or plug-in hybrid electric vehicle [collectively referred to as PEVs] can fulfill the mission requirements0, as well as the basis for recommendations related to placement of PEV charging infrastructure.

This report focuses on an implementation plan for the near-term adoption of PEVs into the JBLM fleet.

Intertek acknowledges the support of Idaho National Laboratory and JBLM fleet managers and personnel for participation in this study.

Intertek is pleased to provide this report and is encouraged by the enthusiasm and support from JBLM personnel.

EXECUTIVE SUMMARY

Federal agencies are mandated[a] to purchase alternative fuel vehicles, increase consumption of alternative fuels, and reduce petroleum consumption. Available plug-in electric vehicles (PEVs) provide an attractive option in the selection of alternative fuel vehicles. PEVs, which consist of both battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs), have significant advantages over internal combustion engine (ICE) vehicles in terms of energy efficiency, reduced petroleum consumption, and reduced production of greenhouse gas (GHG) emissions, and they provide performance benefits with quieter, smoother operation. This study intended to evaluate the extent to which Joint Base Lewis McChord (JBLM) could convert part or all of their fleet of vehicles from petroleum-fueled vehicles to PEVs.

More fuel-efficient ICE vehicles, including hybrid electric vehicles, exist that may provide improvements for the current fleet; however, PEVs are the focus of this study.

BEVs provide the greatest benefit when it comes to fuel and emissions savings because all motive power is provided by the energy stored in the onboard battery pack. These vehicles use no petroleum and emit no pollutants at their point of use. PHEVs provide similar savings when their battery provides all or the majority of motive power (depending on the PHEV design); however, they also have the ability to extend their operating range with an onboard ICE. Because a PHEV can meet all transportation range needs, adoption of a PHEV will be dependent on its ability to meet other transportation needs such as cargo or passenger capability. Operation of PHEVs in charge-depleting mode, where all or a majority of the motive power is provided by the battery, can be increased with opportunity charging at available charging stations. However, it should be noted that not all PHEVs have a mode where the battery provides all motive power at all speeds. Previous work on this study focused on the non-tactical fleet of vehicles at JBLM to identify a subset of 60 vehicles for data logging in an effort to identify vehicles that may be replaced with PEVs, with emphasis on BEVs that provide maximum benefit. This report provides an approach for the near-term adoption of PEVs at JBLM.

The geographic size of JBLM creates significant travel demands on its vehicle fleet and provides opportunities for conversion of some vehicles to PEVs. JBLM identified 1,595 vehicles in its fleet; four JBLM fleet managers selected 60 vehicles as representative of their fleets for participation in the study. The results of the data logging and analysis for these 60 vehicles and the extrapolation to the entire fleet were previously reported in the Task 3 report.

The Task 3 report observed that a mix of BEVs and PHEVs are capable of performing most of the required missions using BEVs for the short trips and PHEVs for the longer trips. It also observed that the replacement of vehicles in the current fleet could result in significant reductions in the emission of GHGs and in petroleum use, as well as reductions in fleet operating costs. The other

[a] Energy Policy act of 1992, Energy Policy Act of 2005, Executive Order 13423, and Energy Independence and Security Act of 2007.

Task 3 report identified potential PEV charging locations should PEV replacement occur.

This report presents a replacement approach for the adoption of PEVs at JBLM. This approach provides a gradual introduction of PEVs into JBLM operation in these four groups and into the balance of the non-tactical fleet. The gradual approach provides a transitional period to allow greater experience in the operation, maintenance, and support of PEVs in their daily missions. The vehicles introduced by this approach provide for 30% of the fleet as PEVs in 2022, assuming the size of the fleet remains as it was in 2013. The projected PEV adoption rate for sedans, non-sedans, and total fleet is presented in Figure ES-1.

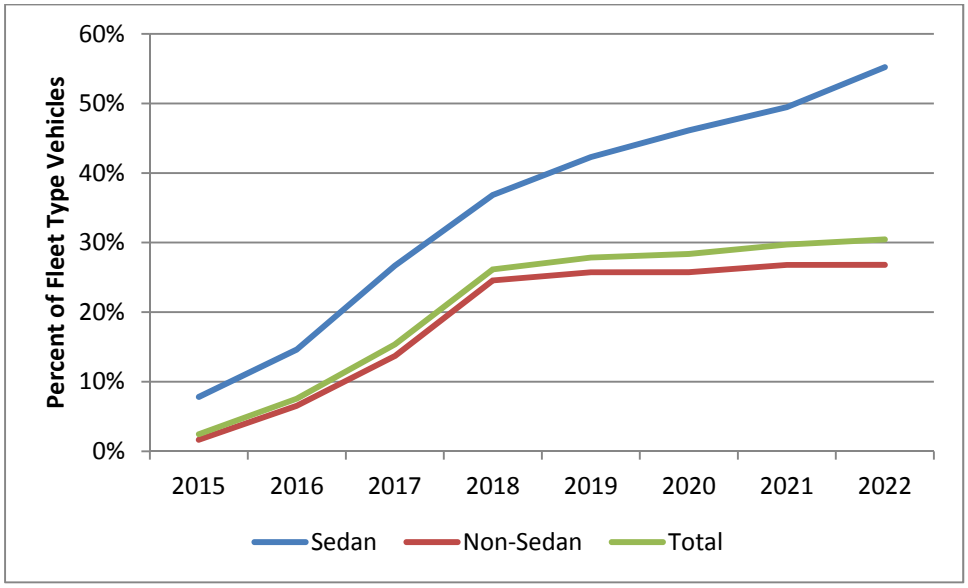

Figure ES-1. Projected PEV adoption rate at JBLM.

JBLM will decide whether to adopt PEVs as provided by the General Services Administration (GSA) only, which now consists only of sedan type vehicles, or to justify the adoption of non-GSA-listed vehicles. While the greater emphasis and initial adoption is for GSA-listed vehicles, both approaches are presented in this report.

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ACRONYMS

AC	alternating current
BEV	battery electric vehicle
CD	charge depleting
CS	charge sustaining
DC	direct current
EPA	U.S. Environmental Protection Agency
EVSE	electric vehicle supply equipment
GHG	greenhouse gas emissions
GSA	General Services Administration
ICE	internal combustion engine
Intertek	Intertek Testing Services, North America
JBLM	Joint Base Lewis McChord
OEM	original equipment manufacturer
PEV	plug-in electric vehicle (includes BEVs and PHEVs, but not hybrid electric vehicles)
PHEV	plug-in hybrid electric vehicle
SUV	sports utility vehicle

Implementation Approach for Plug-in Electric Vehicles at Joint Base Lewis McChord: Task 4

1. INTRODUCTION

The U.S. Department of Energy and the U.S. Department of Defense signed a memorandum of understanding on July 22, 2010, for strengthening the coordination of efforts to enhance national energy security and to demonstrate federal government leadership in transitioning the United States to a low-carbon economy. The memorandum of understanding included efforts in the areas of energy efficiency, fossil fuels, alternative fuels, efficient transportation technologies and fueling infrastructure, grid security, smart grid, and energy storage.

In support of the memorandum of understanding, the Idaho National Laboratory, with funding provided by the U.S. Department of Energy's Vehicle Technologies Office and Federal Energy Management Program, directed Intertek Testing Services, North America (Intertek) to conduct several U.S. Department of Defense-based studies to identify potential transportation systems that are strong candidates for introduction or expansion of plug-in electric vehicles (PEVs). Intertek previously has conducted similar fleet, city, state, and countrywide studies using their Micro-Climate® assessment process, which consists of the following four main tasks:

- Task 1, Conduct a fleet and infrastructure assessment
- Task 2, Identify target electrification vehicles
- Task 3, Perform detailed assessment of target electrification vehicles and charging infrastructure
- Task 4, Provide an implementation approach for adoption of electric vehicles.

Assessment of the potential for replacing Joint Base Lewis McChord (JBLM; in Tacoma, Washington) fleet vehicles with PEVs starts with an assessment of the fleet vehicles' missions and vehicle characteristics. This assessment was conducted through a written survey completed by fleet managers and through field interviews of fleet drivers, as well as through instrumentation of vehicles. The Task 1 report, titled, *Assessment of Data and Survey Results for Joint Base Lewis McChord*, dated June 2013, provided a summary and assessment of General Services Administration (GSA) data and survey results.

PEVs generally are classified into two vehicle types: battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs). A BEV contains an onboard battery that provides all motive power. PHEVs also have an onboard battery that provides some motive power, but there is also another motive power source (such as a gasoline engine). PHEVs have, in general, two modes: (1) charge-depleting (CD) mode where the battery provides all or most (depending on the PHEV design) of the motive power and the battery is being depleted, and (2) charge-sustaining (CS) mode where the non-battery power source provides the majority of the motive power, while being supplemented by the battery power. The battery state of charge is maintained within a designed range. A BEV can be considered to operate solely in CD mode. Collectively, BEVs and PHEVs are referred to as PEVs.

The Task 1 report documented the identification of fleet vehicles that appeared to be good candidates for replacement by PEVs. The Task 2 report, titled, *Identification of Joint Base Lewis McChord Vehicles for Installation of Data Loggers*, dated June 2013, identified the 60 vehicles within the candidate groups for further monitoring and analysis through addition of vehicle data loggers. The data loggers were installed and data collected on the selected vehicles. The Task 3 report, titled, *Detailed Assessment of Target Electrification Vehicles at Joint Base Lewis McChord*, dated August 2014, provided a summary and details of the data collection for the monitored vehicles and extrapolated that to the entire non-tactical fleet of vehicles at JBLM. The other Task 3 report, titled, *Detailed Assessment of Charging Infrastructure*

for Plug-in Electric Vehicles at Joint Base Lewis McChord, dated August 2014, provided the related charging infrastructure assessment. This report provides an implementation approach for adoption of PEVs at JBLM in the next few years.

2. NON-TACTICAL VEHICLES

2.1 Fleet Vehicle Survey

JBLM reported 1,566 vehicles in its non-tactical fleet, not counting specialty vehicles, low-speed vehicles and non-powered vehicles (e.g., trailers). Four group fleet managers were involved in the monitoring of vehicles. Table 1 provides a summary of the vehicle types by class and group. Note that the inventory list does not always allow specific differentiation between cargo or passenger vans because the same body frame may be used for each. Consequently, some assumptions are made on type.

Table 1. JBLM non-tactical fleet summary.

Fleet	Sedan Compact/ Sub Com	Sedan Midsize/ Large	SUV	Mini -van	Cargo Van	Pass Van	Pickup or LD Truck	MD or HD Truck	Bus	Total
6th MP	3	8	2	2	–	1	4	–	–	20
DCA	8	2	–	1	8	8	19	5	1	52
Public Work	5	1	10	3	22	52	121	33	–	247
Motor Transport	26	96	115	98	110	202	280	73	56	1,056
Other	12	18	44	25	10	25	51	3	1	189
Total	54	125	171	129	150	288	475	114	58	1,564

Figure 1 shows vehicle-type distribution for all vehicles for comparison.

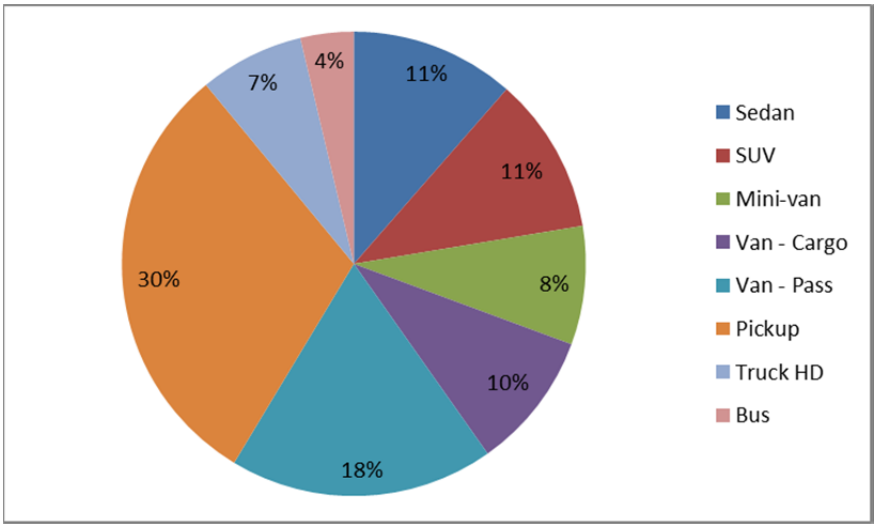

Figure 1. Vehicle-type distribution for all non-tactical vehicles.

JBLM identified 60 vehicles for further study, as described in the Task 2 report. This subset of vehicles contained eight sedans, seven minivans, four sports utility vehicles (SUVs), 20 pickup trucks, seven cargo vans, 11 passenger vans, and three heavy-duty trucks. (Note that one vehicle monitored was identified as assigned to two different fleet groups; therefore, the total in the table is greater than 60.) Table 2 categorizes the monitored vehicles. This distribution is approximately representative of the entire non-tactical fleet.

Table 2. JBLM monitored vehicles by group.

Fleet	Sedan Compact/ Sub Com	Sedan Midsize/ Large	SUV	Mini -van	Cargo Van	Pass Van	Pickup or LD Truck	MD or HD Truck	Bus	Total
6th MP	–	–	1	1	–	–	1	–	–	3
DCA	–	–	–	–	1	1	1	1	–	4
Public Work	–	–	–	2	–	3	9	–	–	14
Motor Transport	4	4	3	5	6	7	9	2	–	40
Total	4	4	4	8	7	11	20	3	–	61

Fleet vehicles are used for a variety of purposes by several different divisions on base. Section 2.2 provides detail on these purposes or missions. The category of the mission can be helpful in the identification of PEVs as potential replacements.

The initial survey also identified the fuel used by the fleet vehicles. In particular, cars and light trucks are powered predominantly by gasoline. These vehicle types make up the majority of the fleet and are the most likely candidates for replacement by electric vehicles, because, to date, auto manufacturers have focused on providing electric vehicles of this size. Diesel-powered vehicles also make up a sizeable fraction of the fleet; diesel is the predominant fuel used in larger vehicles. In particular, medium trucks are likely candidates for replacement by electric vehicles because manufacturers plan to provide more vehicles of this size in the coming years. Figure 2 illustrates the fuel types in use at JBLM.

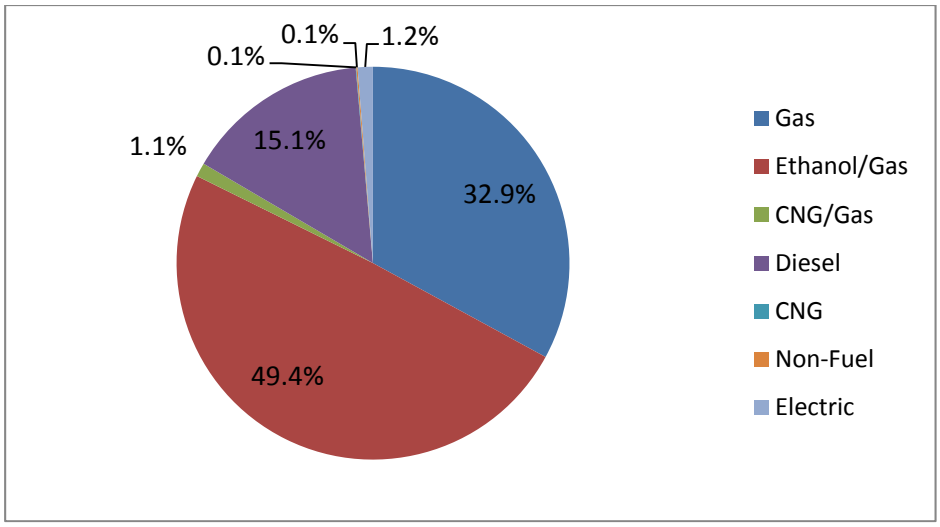

Figure 2. Fuel-type distribution for all vehicles.

2.2 Vehicle Missions

The vehicle mission is an important characteristic in the fleet study. Intertek has established the following seven mission/vehicle categories for analysis (examples are depicted in Figure 3):

1. **Pool vehicles**: A pool vehicle is any automobile (other than the low-speed vehicles identified below) manufactured primarily for use in passenger transportation, with not more than 10 passengers.
2. **Enforcement vehicles**: Vehicles specifically approved in an agency's appropriation act for use in apprehension, surveillance, police, or other law enforcement work. This category also includes site security vehicles, parking enforcement, and general use, but the vehicles are capable of requirements to support enforcement activities.

3. **Support vehicles**: Vehicles assigned to a specific work function or group to support the mission of that group. Vehicles are generally passenger vehicles or light-duty pickup trucks and may contain after-market modifications to support the mission.
2. **Transport vehicles**: Light, medium, or heavy-duty trucks used to transport an operator and tools or equipment of a non-specific design or nature. The vehicle's possible uses include repair, maintenance, and delivery.
3. **Specialty vehicles**: Vehicles designed to accommodate a specific purpose or mission (such as ambulances, mobile cranes, and handicap controls).
4. **Shuttles/buses**: Vehicles designed to carry more than 12 passengers and further outlined in 49 CFR 532.2.
5. **Low-speed vehicles:** Vehicles that are legally limited to roads with posted speed limits up to 35 or 45 mph (depending on state law) and that have a limited load-carrying capability.

Figure 3. Vehicle missions.

Vehicle mission assignments can be useful in identifying the type of potential replacement PEVs (Section 3).

2.3 General Services Administration Vehicle Replacement Requirements

Table 3 presents the replacement requirements for fleet vehicles. Note that both the age and mileage requirements need to be met in order for the vehicle to qualify for replacement, except where noted as "or."

Table 3. GSA vehicle replacement requirements.

GSA Vehicle Replacement Requirements[2]			
	Fuel Type	Years	Miles
Passenger vehicles	Gasoline or Alternative Fuel Vehicle	3 4 5 Any age	36,000 24,000 Any mileage 75,000
	Hybrid	5	Any mileage
	Low-Speed BEV	6	Any mileage
Light trucks 4 x 2	Non-diesel	7 or	65,000
	Diesel	8 or	150,000
	Hybrid	7	Any mileage
Light trucks 4 x 4	Non-diesel	7 or	60,000
	Diesel	8 or	150,000
	Hybrid	7	Any mileage
Medium trucks	Non-diesel	10 or	100,000
	Diesel	10 or	150,000
Heavy Trucks	Non-diesel	12 or	100,000
	Diesel	12 or	250,000

2.4 Plug-In Electric Vehicle Availability

The adoption of PHEVs and BEVs is a primary goal of GSA and supports many directives in this area. As GSA increases its certification of PHEVs and BEVs, agencies can plan for vehicle replacement through GSA for passenger vehicles and trucks. GSA provides a summary of light and medium-duty passenger vehicles available for lease or purchase through the GSA portal,[3] although not all BEVs and PHEVs currently on the market are 'certified' to be GSA replacements. Vehicles not on the GSA list of 'certified' vehicles require an agency to self-certify a functional need or alternative measures for exemptions. Tables 4 and 5 summarize the vehicles that may be suitable replacements and are certified replacements through GSA. Note that the "CD/CS" column provides the U.S. Environmental Protection Agency (EPA) fuel economy values for the CD and CS modes of the PHEVs, while the city and highway fuel economy values are provided for BEVs. The fuel economy of the PHEV CD mode and BEVs are provided in units of miles-per-gallon-of-gasoline-equivalent (MPGe). This metric allows for electricity consumption to be compared with fuel consumption during CS mode (or against conventional vehicles). The Nissan Leaf and Mitsubishi i-MiEV are not included in the alternative fuel guide for 2014, but they have appeared in previous guides. For JBLM, the replacement is dependent on vehicle configuration characteristics and its ability to meet the vehicle's mission.

Original equipment manufacturers (OEM) provide information related to a vehicle's range in CD mode and EPA provides test results. However, actual results may vary depending on several factors other than travel that may also deplete a vehicle's battery. Such factors include changes in the battery's capacity over time, area topography, weather conditions (e.g., cabin cooling/heating), payload, etc. This report will

[2] http://www.gsa.gov/graphics/fas/VehicleReplacementStandardsJune2011Redux.pdf [accessed January 10, 2014]

[3] http://www.gsa.gov/portal/content/104211 [accessed August 1, 2014]

identify a BEV's "safe range" as 70 miles (this is typically less than the advertised range of most BEV OEMs) and a PHEV's safe range in CD mode as 40 miles.

Tables 4 through 9 provide summaries of PHEVs and BEVs either currently available or near commercialization in both passenger cars and pickup trucks, but do not appear on the GSA 'certified' vehicle list. These vehicles may qualify for use by the agency through demonstrating a functional need.

Table 4. GSA-certified PHEVs for 2014.

Make/Model	GSA Class	Type	CD/CS	GSA Incremental Price
Chevrolet Volt	Sedan, Subcompact	PHEV	98 MPGe/37 mpg	$17,087.18
Ford C-MAX Energi	Sedan, Subcompact	PHEV	88 MPGe/38 mpg	$14,899.52
Ford Fusion Energi	Sedan, Compact	PHEV	88 MPGe/38 mpg	$19,289.99

Table 5. GSA-certified BEVs for 2014.

Make/Model	GSA Class	Type	City/Highway	GSA Incremental Price
Ford Focus Electric	Sedan, Subcompact	BEV	110/99 MPGe	$16,573.09

Note that EPA differs from GSA in vehicle class designation. EPA identifies the Volt as a compact, the C-MAX Energi as a midsize, the Fusion Energi as a midsize, and the Focus as a compact.[4]

Table 6. OEM PHEV cars and availability.

Make	EPA Class	Model	Model Year/Estimated Year for Commercialization
Chevrolet	Compact	Volt	2011
Ford	Midsize	C-MAX Energi	2013
Ford	Midsize	Fusion Energi	2013
Toyota	Midsize	Prius PHEV	2012
Honda	Midsize	Accord PHEV	2014
BMW	Subcompact	i3 REx	2014
BMW	Subcompact	i8	2014
Audi	Compact	A3 eTron PHEV	2015 (estimate)
Volvo	SUV	V60 Plug-in	2016 (estimate)

Table 7. OEM BEV cars and availability.

Make	EPA Class	Model	Model Year/Estimated Year for Commercialization
Nissan	Midsize	Leaf	2011
Ford	Compact	Focus Electric	2012
Tesla	Large	Model S	2012
Fiat	Mini	500e	2013
Honda	Small Station Wagon	Fit EV	2013
BMW	Subcompact	i3	2014

[4] http://www.fueleconomy.gov/feg/Find.do?action=sbs&id=34130 [accessed August 1, 2014].

Make	EPA Class	Model	Model Year/Estimated Year for Commercialization
Chevrolet	Subcompact	Spark EV	2014
smart	Two Seater	ED	2014
Kia	Small Station Wagon	Soul EV	2014
Volkswagen	Compact	Golf e-Golf	2015
Mercedes-Benz	Midsize	B-Class ED	2015 (estimate)
Volvo	Compact	C30 Electric	2016 (estimate)

Table 8. OEM PHEV trucks, vans, and availability.

Make	EPA Class	Model	Model Year/Estimated Year for Commercialization
Via	Standard Pickup Truck	VTRUX VR300	2013
Via	Special Purpose Vehicle	VTRUX Cargo Van	2013
Via	Vans, Cargo Type	VTRUX Pass Van	2013
Mitsubishi	Small SUV	Outlander PHEV	2015 (estimate)
Land Rover	Standard SUV	C30 Electric	2016 (estimate)

Table 9. OEM BEV trucks, vans, and availability.

Make	EPA Class	Model	Model Year/Estimated Year for Commercialization
Toyota	SUV	RAV4 EV	2013 (California only - nationwide release date unknown)
Tesla	Standard SUV	Model X	2015 (estimate)
Land Rover	Standard SUV	C30 Electric	2016 (estimate)

As further indication of the expanding market for PEVs, companies are offering after-market vehicle upgrades involving the addition of plug-in capabilities to OEM vehicles. For example, Echo Automotive headquartered in Scottsdale, Arizona offers a "…low-cost, bolt-on, plug-in hybrid system that can quickly be installed on new or existing fleet vehicles to increase fuel efficiency and decrease operating costs – all without affecting the OEM power train or requiring costly infrastructure."[5] EVAOS conducts upgrades of Ford F-series pickup trucks to PHEV models and has delivered vehicles to the U.S. Air Force[6]. Options such as these conversions might be of benefit for vehicles in the JBLM fleet for which no replacement PEV is currently available.

2.5 Plug-In Electric Vehicle Charging

Refueling electric vehicles presents some challenges and some opportunities not encountered when refueling petroleum-fueled vehicles. Recharging the battery of a PHEV follows the same methodology as that for BEVs. The Task 3 infrastructure report provides detailed information on recharging PEVs.

[5] http://www.echoautomotive.com/index.php?option=com_content&view=article&id=8 [accessed July 14, 2014].

[6] http://www.evaos.com [accessed November 20, 2014].

Most PEV manufacturers supply an alternating current (AC) Level 1 cordset with the vehicle, which provides sufficient capabilities for some drivers, but more typically provides an emergency backup capability because of the long recharge times. AC recharging capabilities found in the public arena more typically are AC Level 2.

Because the battery of a BEV is typically much larger than that of a PHEV, recharge times are longer. BEVs that see daily mileage near the limits of the advertised range do better when recharged using AC Level 2 electric vehicle supply equipment (EVSE) or direct current (DC) fast charging (DCFC), because AC Level 1 recharge times are usually extensive. PHEVs, on the other hand, generally can use AC Level 1 EVSE for overnight charging to ensure a fully charged battery at the start of daily use. AC Level 2 EVSE units provide greater range in the shortest amount of time when intermediate or opportunity charging. DCFC provides the fastest recharge capability for those vehicles equipped with DCFC inlets; however, currently there are no PHEVs with DCFC capability available and no announced plans for one to be introduced. It is important to note that the Task 3 reports show that the PEVs studied do not need to rely on DCFC to complete their missions.

3. VEHICLE MISSION REPLACEMENT GUIDANCE

3.1 Background and Methods

Section 2.2 identified the mission categories for analysis. The Task 3 report provided specific information for the monitored fleet based on vehicle mission. When suitable PEV types are available to replace the ICE vehicles in the current fleet, the specific mission of the vehicle to be replaced can be a guide in determining whether a BEV or PHEV should be selected. As previously noted, the greater fuel cost savings and GHG reductions occur with BEVs than PHEVs, which suggests a greater emphasis on BEVs. For JBLM, the missions monitored included pool, support, and transport.

Aside from specific mission functions, the distance a PEV can travel in CD mode between charge opportunities is the most important factor in considering vehicle replacement. The two most significant considerations in vehicle analysis include the vehicle daily travel and vehicle outings.

3.2 Pool Mission Guidance

Thirty-five of the vehicles monitored at JBLM provided a pool mission. These vehicles included sedans of all sizes, SUVs, minivans, pickup trucks, passenger and cargo vans, and one heavy-duty truck. The overall summary for these vehicles is shown in Table 10. These vehicles traveled 29,255 miles, logged 1,537 hours, and idled for 416 hours.

Table 10. JBLM pool vehicle travel summary.

Pool Vehicles Travel Summary				
	Per Day Average/Peak	Per Outing Average/Peak	Per Trip Average/Peak	Total
Travel Distance (Miles)	27.9/571.2	10.1/1,566.9	3.8/202.5	29,255
Travel Time (Minutes)	87.9/777.0	32.0/1,897.0	12.0/257.0	92,244
Idle Time (Minutes)	23.8/NA	8.7/NA	3.2/NA	25,011

Figure 4 shows the daily travel and outing travel for the group of pool vehicles.

The highest daily travel distances of 571 miles and other infrequent trips above 100 miles do not display well on the above graphs because, individually, they contribute less than 1%. The BEV safe range is considered to be 70 miles (blue and green bars in Figure 4) (i.e., while BEV range can vary based on several factors, most BEVs provide at least 70 miles of vehicle range on a single battery charge). However, collectively, the daily travel greater than 70 miles provides 9% of all daily travel. The single

outings above 70 miles also do not display well on the above scale because each contribute less than 1% of outings, but collectively provide 3%.

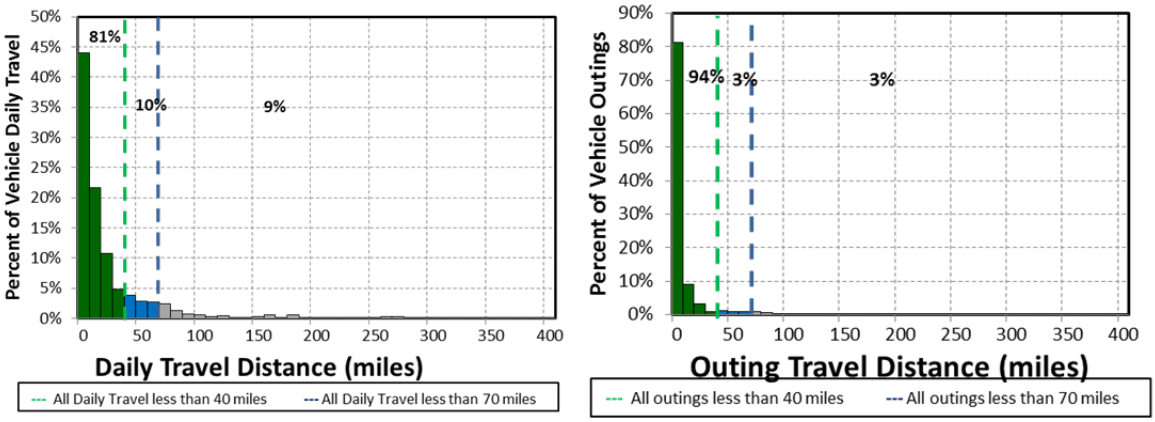

Figure 4. JBLM pool vehicle daily and outing travel.

When driven, the average travel distance per day for pool vehicles is 27.9 miles. On 91% of the vehicle travel days, the daily travel was less than the 70 miles considered to be within the BEV safe range. Meanwhile, 81% of vehicle travel days were less than the 40 miles considered to be within the CD range of a PHEV (green bars of Figure 4).

The average outing distance driven by pool vehicles was 10.1 miles, with 97% of the outing travel less than the 70 miles considered to be within the BEV safe range (blue and green bars in Figure 4). Meanwhile, 97% of vehicle outings were less than 40 miles considered to be within the CD range of a PHEV (green bars of Figure 4).

In general, if a suitable PEV body style meets vehicle requirements, 91% of the pool fleet could be BEVs and 9% PHEVs to allow for daily travel greater than the range of the BEV. The fleet manager would likely desire a more conservative approach to allow for flexibility, but this shows the high capability of BEVs to meet this pool mission at JBLM.

3.3 Support Mission Guidance

Nineteen of the vehicles monitored at JBLM provided a support mission. These vehicles included medium and large sedans, SUVs, minivans, pickup trucks, and passenger and cargo vans. The overall summary for these vehicles is shown in Table 11. These vehicles traveled 29,257 miles, logged 2,324 hours, and idled for 476 hours.

Table 11. JBLM support vehicle travel summary.

Support Vehicles Travel Summary				
	Per Day Average/Peak	Per Outing Average/Peak	Per Trip Average/Peak	Total
Travel Distance (Miles)	42.2/598.5	12.8/1,236.1	5.2/245.6	29,257
Travel Time (Minutes)	201.2/1,502.0	60.8/1,440.0	24.9/512.0	139,463
Idle Time (Minutes)	41.2/NA	12.5/NA	5.1/NA	28,582

Figure 5 shows the daily travel and outing travel for the group of support vehicles.

The outing graph does not show the highest outings of 1,236 and 608.8 miles for clarity of scale. The scale of the graph also does not show the single outings above 70 miles, which individually provide 0% of the outings but collectively, account for 2%.

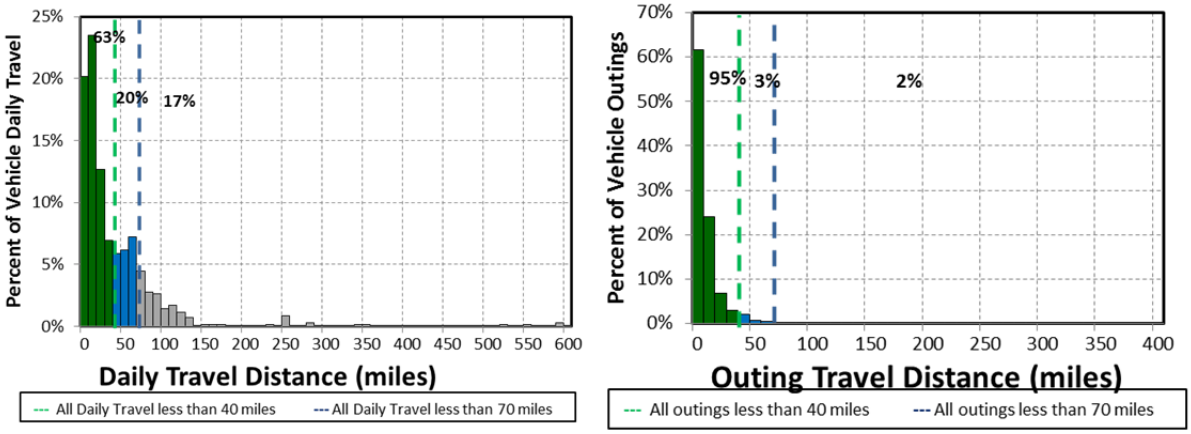

Figure 5. JBLM support vehicle daily and outage distance.

When driven, the average travel distance per day for support vehicles was 42.2 miles. On 83% of the vehicle travel days, the daily travel was less than the 70 miles considered to be within the BEV safe range (blue and green bars in Figure 5). Meanwhile, 63% of vehicle travel days were less than the 40 miles considered to be within the CD range of a PHEV (green bars of Figure 5).

The average outing distance driven by support vehicles was 12.8 miles, with 98% of the outing travel less than the 70 miles considered to be within the BEV safe range (blue and green bars in Figure 5). Meanwhile, 95% of vehicle outings were less than 40 miles considered to be within the CD range of a PHEV (green bars of Figure 5).

In general, if a suitable PEV body style meets the vehicle requirements, 83% of a support fleet could be BEVs and 17% PHEVs to allow for daily travel greater than the range of the BEV. The fleet manager would likely desire a more conservative approach to allow for flexibility, but this shows the high capability of BEVs to meet this support mission at JBLM.

3.4 Transport Mission Guidance

Six of the vehicles monitored at JBLM provided a transport mission. Four vehicles failed to report sufficient data for analysis as noted in the Task 3 report. This is most likely due to infrequent use because there were few data points logged. These vehicles included pickup trucks, cargo vans, and heavy-duty trucks. The overall summary for these vehicles is shown in Table 12. These vehicles traveled 1,783 miles, logged 14.5 hours, and idled for 73 hours.

Table 12. JBLM transport vehicle travel summary.

Transport Vehicles Travel Summary				
	Per Day Average/Peak	Per Outing Average/Peak	Per Trip Average/Peak	Total
Travel Distance (Miles)	55.7/393.8	24.5/393.8	6.8/142.5	1,783
Travel Time (Minutes)	245.9/669.0	108.0/673.0	30.0/218.0	7,870
Idle Time (Minutes)	138.4/NA	60.7/NA	16.9/NA	4,430

Figure 6 shows the daily travel and outing travel for the group of transport vehicles.

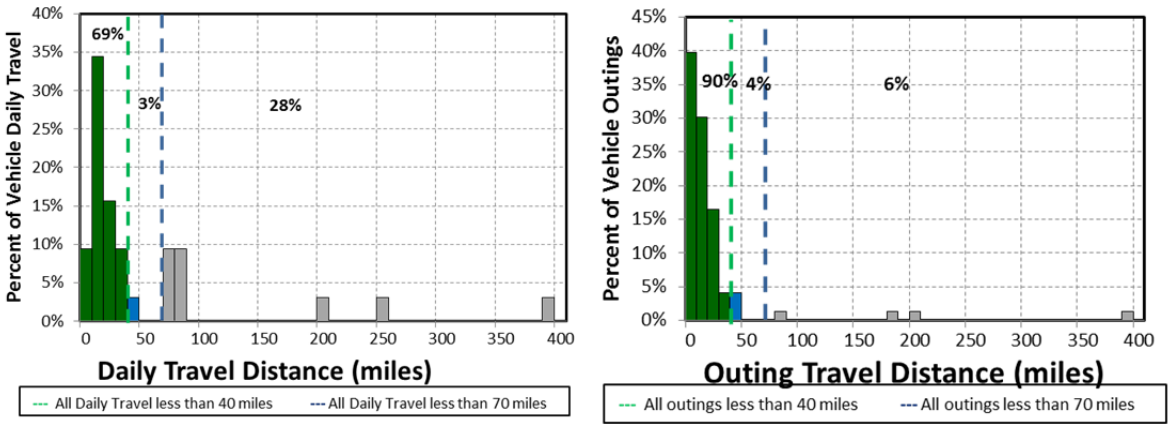

Figure 6. JBLM transport vehicle daily and outing travel.

The average travel distance per day when driven for transport vehicles was 55.7 miles. On 72% of the vehicle travel days, the daily travel was less than the 70 miles considered to be within the BEV safe range (blue and green bars in Figure 6). Meanwhile, 69% of vehicle travel days were less than the 40 miles considered to be within the CD range of a PHEV (green bars of Figure 6).

The average outing distance driven by support vehicles is 24.5 miles, with 94% of the outing travel less than the 70 miles considered to be within the BEV safe range (blue and green bars in Figure 6). Meanwhile, 90% of vehicle outings were less than the 40 miles considered to be within the CD range of a PHEV (green bars of Figure 6).

In general, if a suitable PEV body style meets the vehicle requirements, 72% of a transport fleet could be BEVs and 28% PHEV to allow for daily travel greater than the range of the BEV. The fleet manager would likely desire a more conservative approach to allow for flexibility, but this shows the high capability of BEVs to meet this transport mission at JBLM.

3.5 Enforcement Mission Guidance

Enforcement vehicles typically are light-duty motor vehicles specifically approved in an agency's appropriation act for use in apprehension, surveillance, police, or other law enforcement work. Enforcement missions can vary by agency, location, and jurisdiction; however, they typically utilize sedans, minivans, vans, or small pickup trucks and typically do not carry specific cargo or equipment with the exception of K-9 units. Although no enforcement vehicles were monitored at JBLM, they generally involve relatively short travel distances and daily travel and tend to have high idle times. Many PEVs can provide suitable replacements for these vehicles, although, at times, the finite range of a BEV may not meet enforcement mission requirements. PHEVs can typically complete most enforcement missions, whereas BEVs can support routine travel functions such as parking enforcement.

4. JOINT BASE LEWIS McCHORD REPLACEMENT APPROACH

Sixty vehicles, belonging to four different fleet managers, were included in the study at JBLM. The specific requirements of each fleet manager necessitated that these data be analyzed for each individual fleet. The results were then extrapolated to the entire non-tactical fleet at JBLM.

Tables 4 and 5 identified that at the time of this report, GSA had certified four vehicles for replacement as PEVs: three PHEVs and one PEV. Consequently, the group of potential replacements involves only sedans – a rather small subset of fleet vehicles and only 11% of the vehicles at JBLM.

Tables 6 through 9 identified other vehicles that currently are or soon to be available but not listed by GSA. These vehicles provide potential replacements for all non-tactical fleet vehicles, except heavy-duty

trucks, buses, and specialty vehicles. While the PEV market has introduced and delivered several specialty vehicles on heavy-duty truck frames (e.g., bucket trucks) and electric buses to several customers, their charging needs are typically also specialized and not included in this report. If all of these PEVs are included for replacement consideration, the potential includes 89% of the vehicles at JBLM.

After-market vehicle modifications are also available for converting ICE vehicles to PHEVs and may be considered by JBLM for vehicles types not currently available.

Appendices A through D provide the details of each monitored vehicle as reported in the Task 3 report. The replacement approach for each of the groups and the balance of the JBLM vehicles are presented in Appendices E through I.

There are four approaches identified for each group:

- Monitored vehicles
  - GSA-listed PEVs only
  - All potential PEV types
- Full fleet
  - GSA-listed PEVs only
  - All potential PEV types.

The extensive analysis conducted for monitored vehicles (Task 3) results in high confidence that the suggested vehicle can meet mission requirements. The suggested vehicles for the full fleet rely on the extrapolation of those monitored vehicles and the guidance identified in Section 3.

The overall plan is presented in this section and is followed by the effects to each of the fleet groups.

4.1 Joint Base Lewis McChord Summary Replacement Approach

Table 13 identified the types of vehicles by fleet group at JBLM at the time of the analysis. Supporting the incorporation of PEVs into this fleet is the objective of this task. At the time of the vehicle analysis, six PEVs were included in the fleet inventory at JBLM, not counting the low-speed vehicles. This group includes one Nissan Leaf and five Chevrolet Volts. Four of these vehicles were included in the Motor Transport Branch fleet. In general, fleet managers at JBLM have little experience managing PEVs and a considered approach for incorporation of these vehicles is suggested.

Table 13. Projected fleet vehicle replacements at JBLM.

Year	Sedan	SUV	Minivan	Cargo Van	Pass. Van	Pickup	Total
2015	48	66	91	93	109	274	681
2016	27	27	18	19	52	51	194
2017	36	48	11	5	64	47	211
2018	28	25	7	22	62	90	234
2019	13	5	2	1	1	7	29
2020	8	–	–	–	–	–	8
2021	7	–	–	10	–	6	23
2022	12	–	–	–	–	–	12
Total	179	171	129	150	288	475	1,392

The full fleet inventory was analyzed in 2013 and replacement vehicles are projected for 2015 and the following years. While some of these vehicles may have been replaced in 2014, there are sufficient vehicles available to substitute for specific vehicles if necessary.

Table 14 provides the full fleet replacement projections based on GSA replacement criteria. Many of the JBLM vehicles have exceeded the minimal replacement criteria and this is expected to continue in the coming years in these projections. Note that heavy-duty trucks, specialty vehicles, and buses are excluded from this list.

The projected approach to PEV introduction is to replace selected ICE vehicles with PEVs as they would normally be replaced. The replacement approach presents a structured and gradual introduction of PEVs into the JBLM fleet. This approach is based on an increasing percentage of PEVs as replacements are considered over the next 8 years. While there are few PEVs currently in the JBLM fleet, this approach allows for growth in experience in managing, supporting, and maintaining the PEV fleet.

The projected introduction of PEVs into the fleet presented in Table 14 is based on an initial focus on sedans because they are the easiest to incorporate into the various missions and because these are the only types currently listed on the GSA schedule. Some of the remaining vehicle types are included to gain initial experience with the vehicle types, although they are not listed on the GSA schedule. GSA may list some of these vehicles in the next few years.

Table 14. Projected approach for the introduction of PEVs into the JBLM fleet.

Year	Sedan	SUV	Minivan	Cargo Van	Pass. Van	Pickup	Total	Percent of all Replacements
2015	17	2	6	3	1	8	37	5%
2016	12	9	9	8	13	20	71	37%
2017	21	15	10	4	30	28	108	51%
2018	18	16	6	18	33	59	150	64%
2019	10	4	2	1	1	6	24	83%
2020	7	–	–	–	–	–	7	88%
2021	6	–	–	8	–	5	19	83%
2022	8	–	–	–	–	–	8	67%
Total	99	46	33	42	78	126	424	

The vehicles introduced by this schedule would result in 30% of the fleet being PEVs in the year 2022 ,assuming the size of the fleet remains as it was in 2013 (Figure 7).

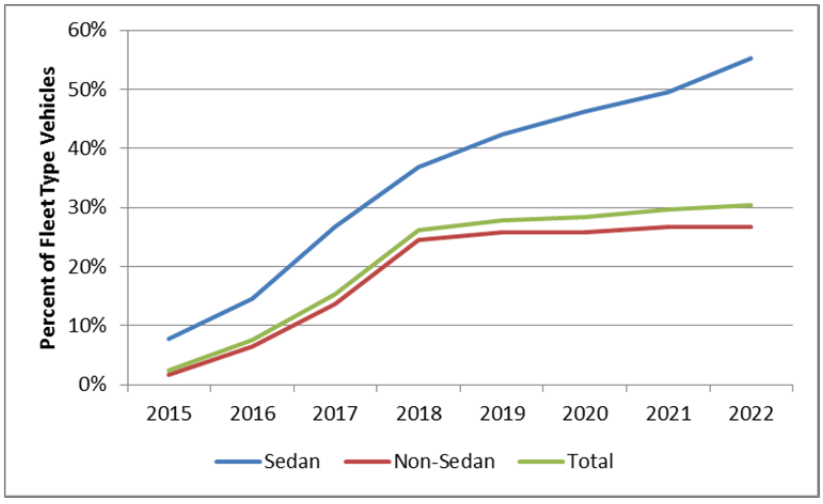

Figure 7. Projected PEVs in JBLM fleet.

When considering the replacement of vehicles with PEVs, JBLM fleet managers may note the vehicle mission guidance of Section 3. It would be most desirable to select a BEV if the body type and capabilities meet the vehicle's mission in order to gain the most benefit in fuel cost and GHG emission reduction. In most cases, the greatest component of a particular fleet can be BEVs. The analysis in Task 3 shows the average vehicle travels less than 3,600 miles per year. This is an average of 300 miles per month or 75 miles per week. This also reflects the opportunity to increase the percentage of BEVs over PHEVs in each fleet.

4.1.1 Replacement Approach for Sedans

Table 15 presents a planned approach for the replacement of sedans with PEVs; this is the sedan portion of Table 14. With this approach, at the end of the 8-year period, 55% of fleet sedans will be PEVs, with 53% BEVs and 47% PHEVs.

Table 15. Planned approach for the introduction of PEV sedans at JBLM.

Year	ICE	PHEV	BEV	Total PEVs	Vehicles Replaced	Percentage PEV/Year	Cumulative Percent PEV
2015	31	8	9	17	48	35%	9%
2016	15	6	6	12	27	44%	16%
2017	15	11	10	21	36	58%	28%
2018	10	7	11	18	28	64%	38%
2019	3	5	5	10	13	77%	44%
2020	1	3	4	7	8	88%	47%
2021	1	4	2	6	7	86%	51%
2022	4	3	5	8	12	67%	55%
Total	80	47	52	99	179		

Assuming the total fleet inventory remains at 179 sedans, this replacement approach results in the fleet composition shown in Figure 8 for the years 2015 through 2022.

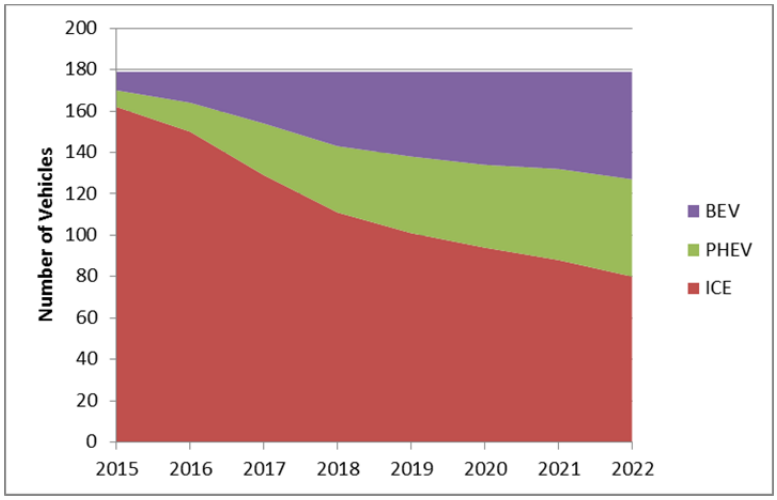

Figure 8. JBLM-recommended fleet sedan types 2015 through 2022.

See Table J-1 in Appendix J for a list of suggested replacement PEV sedans.

4.1.2 Replacement Approach for Non-Sedan Vehicles

As noted above, the non-sedan portion of the JBLM fleet is presented separately because there are no current GSA-listed vehicles as potential replacements. These are included in the suggested replacement approach to allow JBLM to gain initial experience with the vehicle types. GSA may list some of these vehicles in the next few years. The non-sedan portion of Table 14 is shown in Table 16.

Table 16. Planned approach for the introduction of non-sedan PEVs at JBLM.

Year	SUV	Minivan	Cargo Van	Pass. Van	Pickup	Total	Percentage PEV/Year
2015	2	6	3	1	8	20	3%
2016	9	9	8	13	20	59	35%
2017	15	10	4	30	28	87	50%
2018	16	6	18	33	59	132	64%
2019	4	2	1	1	6	14	88%
2020	–	–	–	–	–	0	0%
2021	–	–	8	–	5	13	81%
2022	–	–	–	–	–	0	0%
Total	46	33	42	78	126	325	
Percent	27%	26%	28%	27%	27%	27%	

With this approach, at the end of the 8-year period and assuming 1,213 vehicles remain in the total fleet, 27% of the non-sedan fleets will be PEVs, with approximately 27% of each type a PEV.

4.2 Analysis Results – 6th MP Group

The 6th MP Group fleet contains 20 vehicles; three of those vehicles were monitored in this study. The vehicles monitored included a minivan, an SUV, and a pickup truck. The details of each vehicle monitored are included in Appendix A. Appendix E provides the detailed evaluation for the approach summarized in the following sections.

Table 17 identifies the projected year the current vehicle will be replaced based on GSA requirements and extrapolated vehicle mileage. This table factors into the full table provided in Table 14.

Table 17. 6th MP Group vehicles replacements at JBLM.

Year	Sedan Compact/ Sub Com	Sedan Midsize	Sedan Large	Mini-van	SUV	Cargo Van	Pass. Van	Pickup or LD Truck	Total
2015	1	–	–	2	1	–	1	1	6
2016	2	–	2	–	–	–	–	–	4
2017	–	1	1	–	1	–	–	–	3
2018	–	–	2	–	–	–	–	3	5
2019	–	1	–	–	–	–	–	–	1
2020	–	–	–	–	–	–	–	–	0
2021	–	1	–	–	–	–	–	–	1
2022	–	–	–	–	–	–	–	–	0
Total	3	3	5	2	2	0	1	4	20

4.2.1 Replacement Approach for 6th MP Group Sedans

Table 18 presents a planned approach for the replacement of sedans with PEVs that flows into the totals shown in Table 15. The percentage of vehicles replaced each year by PEVs is also shown.

Table 18. Planned approach for the introduction of PEV sedans in the 6th MP Group.

Year	ICE	PHEV	BEV	Total PEVs	Percentage PEV/Year
2015	–	–	1	1	100%
2016	3	–	1	1	25%
2017	1	1	–	1	50%
2018	1	–	1	1	50%
2019	–	–	1	1	100%
2020	–	–	–	–	–
2021	–	–	1	1	100%
2022	–	–	–	–	–
Total	5	1	5	6	
Percent	45%	9%	45%	55%	

The final complement of sedans includes 55% PEVs, with a PEV component of 67% BEVs and 33% PHEVs. See Appendix E for the list of vehicles recommended for replacement in this approach.

4.2.2 Replacement Approach for 6th MP Group Non-Sedan Vehicles

Table 19 presents a planned approach for the replacement of non-sedans with PEVs that flows into the totals shown in Table 16. The percentage of non-sedan vehicles replaced each year by PEVs is also shown.

Table 19. Planned approach for the introduction of non-sedan PEVs in the 6th MP Group.

Year	SUV	Minivan	Cargo Van	Pass. Van	Pickup	Total	Percentage PEV/Year
2015	–	1	–	–	–	1	20%
2016	–	–	–	–	–	–	–
2017	1	–	–	–	–	1	100%
2018	–	–	–	–	2	2	67%
2019	–	–	–	–	–	–	–
2020	–	–	–	–	–	–	–
2021	–	–	–	–	–	–	–
2022	–	–	–	–	–	–	–
Total	1	1	–	–	2	4	
Percent	50%	50%	–	0%	50%	44%	

In this approach, the final complement of non-sedans includes 44% PEVs. The proportion of each vehicle type is shown in Table 19. See Appendix E for the list of vehicles recommended for replacement in this approach.

4.3 Analysis Results – Directorate of Community Activities Support Group

The Directorate of Community Activities (DCA) support group fleet contains 52 vehicles; four of those vehicles were monitored in this study. This section provides a replacement strategy for this group.

The details of each vehicle monitored are included in Appendix B. Appendix F provides the detailed evaluation for the approach summarized in the following sections.

The projected year the current vehicle will be replaced based on GSA requirements and extrapolated vehicle mileage is shown in Table 20. Note the heavy-duty trucks and bus are not included. This table is the DCA Support Group portion of Table 14.

Table 20. Projected DCA Support Group vehicle replacements at JBLM.

Year	Sedan Compact/ Sub Com	Sedan Midsize	Sedan Large	Mini-van	SUV	Cargo Van	Pass. Van	Pickup or LD Truck	Total
2015	–	–	–	–	–	3	1	3	7
2016	–	–	–	–	–	2	5	10	17
2017	–	–	–	–	–	–	1	4	5
2018	–	1	–	-	–	3	1	1	6
2019	–	–	–	1	–	–	–	1	2
2020	–	–	–	–	–	–	–	–	0
2021	1	1	–	–	–	–	–	–	2
2022	7	–	–	–	–	–	–	–	7
Total	8	2	0	1	0	8	8	19	46

4.3.1 Replacement Approach for the Directorate of Community Activities Support Group Sedans

Table 21 presents a planned approach for the replacement of sedans with PEVs that flows into the totals shown in Table 15. The percentage of vehicles replaced each year by PEVs is also shown. Note that of the 10 sedans in the DCA Support Group, none are projected for replacement until 2018.

Table 21. Planned approach for the introduction of PEV sedans in the DCA Support Group.

Year	ICE	PHEV	BEV	Total PEVs	Percentage PEV/Year
2015	–	–	–	–	–
2016	–	–	–	–	–
2017	–	–	–	–	–
2018	–	–	1	1	100%
2019	–	–	–	–	–
2020	–	–	–	–	–
2021	1	1	–	1	50%
2022	4	1	2	3	43%
Total	5	2	3	5	
Percent	50%	20%	30%	50%	

The final complement of sedans includes 50% PEVs, with a PEV component of 60% BEVs and 40% PHEVs. See Appendix F for the list of vehicles recommended for replacement in this approach.

4.3.2 Replacement Approach for the Directorate of Community Activities Support Group Non-Sedan Vehicles

Table 22 presents a planned approach for the replacement of non-sedans with PEVs that flows into the totals shown in Table 16. The percentage of non-sedan vehicles replaced each year by PEVs is also shown.

Table 22. Planned approach for the introduction of non-sedan PEVs in the DCA Support Group.

Year	SUV	Minivan	Cargo Van	Pass. Van	Pickup	Total	Percentage PEV/Year
2015	–	–	–	–	1	1	14%
2016	–	–	1	1	1	3	18%
2017	–	–	–	1	2	3	60%
2018	–	–	2	1	–	3	60%
2019	–	1	–	–	1	2	100%
2020	–	–	–	–	–	0	–
2021	–	–	–	–	–	0	–
2022	–	–	–	–	–	0	–
Total	–	1	3	3	5	12	
Percent	0%	100%	38%	38%	26%	33%	

In this approach, the final complement of non-sedans includes 33% PEVs. The proportion of each vehicle type is also shown. See Appendix F for the list of vehicles recommended for replacement in this approach.

4.4 Analysis Results – Public Works

The Public Works fleet contains 250 vehicles; 14 of these vehicles were monitored in this study. This section provides a replacement strategy for this group. The details of each vehicle monitored are included in Appendix C. Appendix G provides the detailed evaluation for the approach summarized in the following sections.

Table 23 identifies the projected year the current vehicle will be replaced based on GSA requirements and extrapolated vehicle mileage. Note the heavy-duty trucks and specialty vehicles are not included. This table is a subset of Table 14.

Table 23. Projected Public Works vehicle replacements at JBLM.

Year	Sedan Compact/ Subcompact	Sedan Midsize	Sedan Large	Mini-van	SUV	Cargo Van	Pass. Van	Pickup or LD Truck	Total
2015	–	–	–	1	4	7	9	49	70
2016	–	–	–	–	–	–	4	9	13
2017	–	–	–	2	1	2	4	20	29
2018	2	–	1	–	2	3	35	37	80
2019	2	–	–	–	3	–	–	1	6
2020	–	–	–	–	–	–	–	–	–
2021	1	–	–	–	–	10	–	5	16
2022	–	–	–	–	–	–	–	–	–
Total	5	0	1	3	10	22	52	121	214

4.4.1 Replacement Approach for Public Works Sedans

Table 24 presents a planned approach for the replacement of sedans with PEVs that flows into the totals shown in Table 15. The percentage of vehicles replaced each year by PEVs is also shown.

Table 24. Planned approach for introduction of PEV sedans in Public Works.

Year	ICE	PHEV	BEV	Total PEVs	Percentage PEV/Year
2015	–	–	–	–	–
2016	–	–	–	–	–
2017	–	–	–	–	–
2018	2	–	1	1	33%
2019	1	–	1	1	50%
2020	–	–	–	–	–
2021	–	–	1	1	100%
–	–	–	–	–	–
Total	3	–	3	3	
Percent	50%	0%	50%	50%	

The final complement of sedans includes 50% PEVs, with the PEV proportion being all BEVs. See Appendix G for the list of vehicles recommended for replacement in this approach.

4.4.2 Replacement Approach for Public Works Non-Sedan Vehicles

Table 25 presents a planned approach for the replacement of non-sedans with PEVs that flows into the totals shown in Table 16. The percentage of non-sedan vehicles replaced each year by PEVs is also shown.

Table 25. Planned approach for the introduction of non-sedan PEVs in Public Works.

Year	SUV	Minivan	Cargo Van	Pass. Van	Pickup	Total	Percentage PEV/Year
2015	1	–	1	–	2	4	6%
2016	–	–	–	1	2	3	23%
2017	1	2	1	3	6	13	45%
2018	1	–	2	12	20	35	45%
2019	1	–	–	–	1	2	50%
2020	–	–	–	–	–	–	–
2021	–	–	8	–	4	12	80%
2022	–	–	–	–	–	–	–
Total	4	2	12	16	35	69	
Percent	40%	67%	55%	31%	29%	33%	

In this approach, the final complement of non-sedans includes 33% PEVs. The proportion of each vehicle type is also shown in Table 25. See Appendix G for the list of vehicles recommended for replacement in this approach.

4.5 Analysis Results – Motor Transport Branch

The Motor Transport Branch fleet contains 1,060 vehicles; 40 of those vehicles were monitored in this study. This section provides a replacement strategy for this fleet. The details of each vehicle monitored are included in Appendix D. Appendix H provides the detailed evaluation for the approach summarized in the following sections.

Table 26 identifies the projected year the current vehicle will be replaced based on GSA requirements and extrapolated vehicle mileage. Without the heavy-duty trucks, specialty vehicles, and low-speed vehicles, 927 vehicles are included. This table factors into the full table provided in Table 14.

Table 26. Projected Motor Transport Branch vehicle replacements at JBLM.

Year	Sedan Compact/ Subcompact	Sedan Midsize	Sedan Large	Mini-van	SUV	Cargo Van	Pass. Van	Pickup or LD Truck	Total
2015	3	11	31	71	39	75	87	190	507
2016	3	4	7	14	22	15	38	27	130
2017	4	4	12	7	38	3	51	21	140
2018	6	3	8	6	14	16	26	39	118
2019	6	3	1	–	2	1	–	2	15
2020	–	8	–	–	–	–	–	–	8
2021	1	2	–	–	–	–	–	1	4
2022	3	1	1	–	–	–	–	–	5
Total	26	36	60	98	115	110	202	280	927

4.5.1 Replacement Approach for Motor Transport Branch Sedans

Table 27 presents a planned approach for the replacement of sedans with PEVs that flows into the totals shown in Table 15. The percentage of vehicles replaced each year by PEVs is also shown.

Table 27. Planned approach for the introduction of PEV sedans for the Motor Transport Branch.

Year	ICE	PHEV	BEV	Total PEVs	Percentage PEV/Year
2015	30	7	8	15	33%
2016	7	4	3	7	50%
2017	8	6	6	12	60%
2018	6	5	6	11	65%
2019	2	5	3	8	80%
2020	1	3	4	7	88%
2021	–	3	–	3	100%
2022	–	2	3	5	100%
Total	54	35	33	68	
Percent	44%	29%	27%	56%	

The final complement of sedans includes 56% PEVs, with the PEV proportion being 51% BEVs and 49% PHEVs. See Appendix H for the list of vehicles recommended for replacement in this approach.

4.5.2 Replacement Approach for Motor Transport Non-Sedan Vehicles

Table 28 presents a planned approach for the replacement of non-sedans with PEVs that flows into the totals shown in Table 16. The percentage of non-sedan vehicles replaced each year by PEVs is also shown.

In this approach, the final complement of non-sedans includes 25% PEVs. The proportion of each vehicle type is also shown in Table . See Appendix H for the list of vehicles recommended for replacement in this approach.

Table 28. Planned approach for the introduction of non-sedan PEVs for the Motor Transport Branch.

Year	SUV	Minivan	Cargo Van	Pass. Van	Pickup	Total	Percentage PEV/Year
2015	1	3	2	1	3	10	2%
2016	7	7	6	10	15	45	39%
2017	10	6	3	24	18	61	51%
2018	9	5	14	20	30	78	77%
2019	2	–	1	–	2	5	100%
2020	–	–	–	–	–	–	–
2021	–	–	–	–	1	1	100%
2022	–	–	–	–	–	–	–
Total	29	21	26	55	69	200	
Percent	25%	21%	24%	27%	25%	25%	

4.6 Balance of Joint Base Lewis McChord Fleet

The balance of the JBLM fleet consists of vehicles assigned to several agencies. None of these vehicles was monitored as part of the study. Table 29 provides the balance of vehicles at JBLM using information provided by JBLM and sorted by vehicle type. This table is a subset of Table 14.

Table 29. JBLM balance of fleet vehicles.

Year	Sedan Compact/ Subcompact	Sedan Midsize	Sedan Large	Mini-van	SUV	Cargo Van	Pass. Van	Pickup or LD Truck	Total
2015	1	1	–	17	22	8	11	31	91
2016	2	1	6	4	5	2	5	5	30
2017	4	1	9	2	8	–	8	2	34
2018	5	–	–	1	9	–	–	10	25
2019	–	–	–	1	-	–	1	3	5
2020	–	–	–	–	–	–	–	–	–
2021	–	–	–	–	–	–	–	–	–
2022	–	–	–	–	–	–	–	–	–
Total	12	3	15	25	44	10	25	51	185

4.6.1 Replacement Approach for Balance of Fleet Sedans

Table 30 presents a planned approach for the replacement of sedans with PEVs that flows into the totals shown in Table 15. The percentage of vehicles replaced each year by PEVs is also shown. Appendix I provides the detailed evaluation for the approach summarized in the following sections.

The final complement of sedans includes 57% PEVs, with the PEV proportion being 47% BEVs and 53% PHEVs. See Appendix I for the list of vehicles recommended for replacement in this approach.

Table 30. Planned approach for the introduction of PEV sedans in the balance of the JBLM fleet.

Year	ICE	PHEV	BEV	Total PEVs	Percentage PEV/Year
2015	1	1		1	50%
2016	5	2	2	4	44%
2017	6	4	4	8	57%
2018	1	2	2	4	80%
2019					
2020					
2021					
2022					
Total	13	9	8	17	
Percent	43%	30%	27%	57%	

4.6.2 Replacement Approach for Balance of Fleet Non-Sedan Vehicles

Table 31presents a planned approach for the replacement of non-sedans with PEVs that flows into the totals shown in Table 16. The percentage of non-sedan vehicles replaced each year by PEVs is also shown.

Table 31. Planned approach for the introduction of non-sedan PEVs in the balance of the JBLM fleet.

Year	SUV	Minivan	Cargo Van	Pass. Van	Pickup	Total	Percentage PEV/Year
2015	–	2	–	–	2	4	4%
2016	2	2	1	1	2	8	38%
2017	3	2	–	2	2	9	45%
2018	6	1	–	–	7	14	70%
2019	1	1	–	1	2	5	100%
2020	–	–	–	–	–	–	–
2021	–	–	–	–	–	–	–
2022	–	–	–	–	–	–	–
Total	12	8	1	4	15	40	
Percen	27%	32%	10%	16%	29%	26%	

In this approach, the final complement of non-sedans includes 26% PEVs. The proportion of each vehicle type is also shown in Table 31. See Appendix I for the list of vehicles recommended for replacement in this approach.

5. PLUG-IN ELECTRIC VEHICLE CHARGING INFRASTRUCTURE

Preparations for the adoption of PEVs also require the consideration of recharging stations. With the potential replacements identified in the previous section, the deployment of fleet EVSE can be provided.

The Task 3 infrastructure report provides a detailed review of EVSE types and installation considerations. A detailed review of potential charging locations was completed and, for all of the monitored fleets, charging at the vehicle's home base is all that is required. JBLM may find future value in locating additional charging stations for employee or visitor use for privately owned vehicles, but those locations are not identified here.

The Task 3 report identifies AC Level 1 EVSE is sufficient for charging PHEVs, whereas AC Level 2 EVSE is recommended for BEVs. As JBLM begins the planned introduction of PEVs into the fleets, it is recommended that the initial vehicles be provided with AC Level 2 EVSE in order to gain experience

with the charging systems and to provide the greatest charge return for all vehicles. In this manner, JBLM need not be concerned in the early years whether the vehicle is a PHEV or a BEV, but rather add infrastructure to accommodate AC Level 1 EVSE (that come standard with a PEV purchase) in later years. In addition, the Task 3 report identified that as experience is gained in the management of PEVs, there need not be an EVSE unit for every PEV. However, for these first vehicles, it is recommended that each be assigned its own EVSE unit at its home base.

Based on the replacement approach identified in Section 4, the charging infrastructure needs of sedans and non-sedan vehicles are discussed separately.

5.1 Plug-In Electric Vehicle Charging Infrastructure for Sedans

Table 32 provides the projected schedule for the introduction of EVSE to support the sedan replacement approach. As noted, AC Level 2 infrastructure is emphasized in the early adoption years over AC Level 1. In addition, the EVSE is introduced as dual units to reduce installation costs.

Table 32. EVSE infrastructure adoption for sedans.

	6th MP Group	DCA Support Group	Public Works	Motor Transport Branch	Balance of Fleet	Total
Year	AC L2/AC L1	AC L2/AC L1	AC L2/AC L1	AC L2/AC L1	ACL2/ACL1	ACL2/ACL1
2015	2/0	–	–	16/0	2/0	20/0
2016	–	–	–	6/0	4/0	10/0
2017	0/2	–	–	6/6	0/8	6/16
2018	–	2/0	2/0	4/8	2/2	10/10
2019	0/2	–	–	2/6	–	2/8
2020	–	–	–	0/8	–	0/8
2021	–	–	2/0	0/2	–	2/2
2022	–	2/2	–	0/4	–	2/6
Total	2/4	4/2	4/0	34/34	8/10	52/50

The Task 3 report detailed the potential for maximizing each group's conversion to PEVs and the potential savings in fuel costs and GHG emissions that result. The above table only considers the adoption approach identified in this report and results in fewer EVSE units than that reported in Task 3.

5.2 Plug-In Electric Vehicle Charging Infrastructure for Non-Sedan Fleet

Table 33 provides the schedule for the introduction of EVSE to support the non-sedan fleet replacement approach. Again, AC Level 2 infrastructure is emphasized in the early adoption years over AC Level 1. In addition, the EVSE is introduced as dual units to reduce installation costs. This report does not detail the selection of BEVs or PHEVs for the non-sedan fleet; however, the proportion identified in Task 3 is used for the final configurations for each fleet group.

The Task 3 report detailed the potential for maximizing each group's conversion to PEVs and the potential savings in fuel costs and GHG emissions that result. The above table only considers the adoption approach identified in this report and thus results in fewer EVSE units than that reported in Task 3. The Task 3 infrastructure report provides recommendations regarding placement of these EVSE units.

Table 33. EVSE infrastructure adoption for non-sedan fleets.

Year	6th MP Group AC L2/AC L1	DCA Support Group AC L2/AC L1	Public Works AC L2/AC L1	Motor Transport Branch AC L2/AC L1	Balance of fleet AC L2/AC L1	Total AC L2/AC L1
2015	2/0	2/0	4/0	10/0	4/0	22/0
2016	–	2/0	4/0	46/0	8/0	60/0
2017	–	0/4	6/6	20/40	2/8	28/58
2018	0/2	0/2	20/16	12/66	4/10	36/96
2019	–	0/2	0/2	2/4	0/4	2/12
2020	–	–	–	–	–	–
2021	–	–	4/8	–	–	4/8
2022	–	–	–	–	–	–
Total	2/2	4/8	38/32	90 / 110	18/22	152/174

Table 34 summarizes the fleet's charging needs.

Table 34. JBLM charging infrastructure approach.

Year	6th MP Group AC L2/AC L1	DCA Support Group AC L2/AC L1	Public Works AC L2/AC L1	Motor Transport Branch AC L2/AC L1	Balance of Fleet AC L2/AC L1	Total AC L2/AC L1
Sedan	2/4	4/2	4/0	34/34	8/10	52/50
Non-Sedan	2/2	4/8	38/32	90/110	18/22	152/174
Total	4/6	8/10	42/32	124/144	26/32	204/224

6. OBSERVATIONS

As a result of this intensive study, Intertek suggests JBLM is poised for the successful introduction of PEVs into daily operation and that BEVs can provide support for most of the vehicle missions, while providing savings in fuel costs and GHG emissions. In meeting the directives and mandates, the adoption approach outlined here should provide input to JBLM's overall strategy and presents an opportunity to gain experience in the operation, support, and maintenance of PEVs. It is suggested that JBLM may wish to move forward, in the near future, with the replacement of pool, support, and transport vehicles with PEVs as current budget considerations allow. Certainly, the vehicle types studied in this report may be candidates for immediate replacement.

Intertek appreciates presenting the results of this evaluation and working with JBLM personnel in this study.

Appendix A
6th MP Group Vehicle Data Sheets

Note: the replacement year identified in the following data sheets is the earliest year available for potential replacement based on the GSA requirements noted in Table 3. The final replacement approach may suggest later years based on vehicle use.

Table A-1 identifies a potential replacement approach for vehicles currently on the GSA list.

Table A-1. JBLM 6th MP Group vehicle replacement (GSA-listed vehicle).

GSA-Listed Vehicle Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	GSA Replacement Vehicle	Replacement Year
G61-0546L	GMC Terrain	2011	SUV	NA	NA
G61-0689A	Ford Ranger	2004	Pickup	NA	NA
G41-5433B	Dodge Caravan	2006	Minivan	NA	NA

Table A-2 identifies a potential replacement approach using all currently or soon-to-be available PEVs.

Table A-2. JBLM 6th MP Group vehicle replacement (all potential vehicles).

All Vehicle Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Replacement Year
G61-0546L	GMC Terrain	2011	SUV	Toyota Rav4 EV	2018
G61-0689A	Ford Ranger	2004	Pickup	Via VTRUX PU	2015
G41-5433B	Dodge Caravan	2006	Minivan	Nissan Leaf	2015

Vehicle

G61-0546L

	Make/Model/Year	GMC/Terrain/2011
	EPA Class Size	SUV
	Mission	Pool
	Contact	C. Simmons/6th MP Group
	Parking Location	Building 4291
	Fleet Vehicle ID	G61-0546L
	Fuel Type	Gas/Eth
	Potential Replacement PEV Make/Model	Toyota Rav4 EV
	Potential Annual Fuel Cost Savings	$1,469
	Potential Annual GHG Reduction	7,253 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2018
	Vehicle Age at Estimated Replacement	7 years
	Odometer at Estimated Replacement Date	45,592

Vehicle G61-0689A

	Make/Model/Year	Ford/Ranger/2004
	EPA Class Size	Standard Pickup Truck
	Mission	Pool
	Contact	C. Simmons/6th MP Group
	Parking Location	Building 4291
	Fleet Vehicle ID	G61-0689A
	Fuel Type	Gas
	Potential Replacement PEV Make/Model	Via VTRUX pickup
	Potential Annual Fuel Cost Savings	$354
	Potential Annual GHG Reduction	1,738 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	11 years
	Odometer at Estimated Replacement Date	27,838

Vehicle G41-5433B

	Make/Model/Year	Dodge/Grand Caravan/2006
	EPA Class Size	Minivan
	Mission	Pool
	Contact	C. Simmons/6th MP Group
	Parking Location	Building 4291
	Fleet Vehicle ID	G41-5433B
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Nissan Leaf
	Potential Annual Fuel Cost Savings	$1,436
	Potential Annual GHG Reduction	7,122 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	9 years
	Odometer at Estimated Replacement Date	61,106

Appendix B
DCA Support Group Vehicle Data Sheets

Note: the replacement year identified in the following data sheets is the earliest year available for potential replacement based on the GSA requirements noted in Table 3. The final replacement approach may suggest later years based on vehicle use.

Table B-1 identifies a potential replacement approach for vehicles currently on the GSA list.

Table B-1. JBLM DCA Support Group vehicle replacement (GSA-listed vehicle).

GSA-Listed Vehicle Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	GSA Replacement Vehicle	Replacement Year
G41-74299	Ford Ranger	2004	Pickup Truck	NA	NA
G71-0684A	Chev. C6500 Stake	2005	Pickup Truck HD	NA	NA
G43-1195H	Chevrolet 15 Pas Van	2011	Passenger Van	NA	NA
G42-0289G	Chevrolet G1300	2008	Cargo Van	NA	NA

Table B-2 identifies a potential replacement approach using all currently or soon-to-be available PEVs.

Table B-2. JBLM DCA Support Group vehicle replacement (all potential vehicles).

All Vehicle Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Replacement Year
G41-74299	Ford Ranger	2004	Pickup Truck	Via VTRUX PU	2015
G71-0684A	Chev. C6500 Stake	2005	Pickup Truck HD	Via VTRUX PU	2015
G43-1195H	Chevrolet 15 Pass Van	2011	Passenger Van	Via VTRUX Van	2015
G42-0289G	Chevrolet G1300	2008	Cargo Van	Nissan eNV200	2016

Vehicle G41-74299

	Make/Model/Year	Ford/Ranger/2004
	EPA Class Size	Standard Pickup Truck
	Mission	Support
	Contact	D. Pettengill/DCA Support
	Parking Location	Building 8050
	Fleet Vehicle ID	G41-74299
	Fuel Type	Gas
	Potential Replacement PEV Make/Model	Via VTRUX PU
	Potential Annual Fuel Cost Savings	$474
	Potential Annual GHG Reduction	2,326 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	11
	Odometer at Estimated Replacement Date	26,654

Vehicle G71-0684A

	Make/Model/Year	Chevrolet/C6500 Stake/2005
	EPA Class Size	Stake Truck
	Mission	Pool
	Contact	D. Pettengill/DCA Support
	Parking Location	Building 2057
	Fleet Vehicle ID	G71-0684A
	Fuel Type	Diesel
	Potential Replacement PEV Make/Model	Via VTRUX PU
	Potential Annual Fuel Cost Savings	$393
	Potential Annual GHG Reduction	1,948 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	10
	Odometer at Estimated Replacement Date	13,801

Vehicle G43-1195H

	Make/Model/Year	Chevrolet/15 Pass Van/2011
	EPA Class Size	Passenger Van
	Mission	Support
	Contact	D. Pettengill/DCA Support
	Parking Location	Building 8050
	Fleet Vehicle ID	G43-1195H
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Via VTRUX Pass Van
	Potential Annual Fuel Cost Savings	$2,925
	Potential Annual GHG Reduction	14,501 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	4
	Odometer at Estimated Replacement Date	65,000

Vehicle G42-0289G

	Make/Model/Year	Chevrolet/G1300/2008
	EPA Class Size	Cargo Van
	Mission	Pool
	Contact	D. Pettengill/DCA Support
	Parking Location	Building 2057
	Fleet Vehicle ID	G42-0289G
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Nissan eNV200
	Potential Annual Fuel Cost Savings	$505
	Potential Annual GHG Reduction	2,508 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	12,855

Appendix C
Public Works Vehicle Data Sheets

Note: the replacement year identified in the following data sheets is the earliest year available for potential replacement based on the GSA requirements noted in Table 3. The final replacement approach may suggest later years based on vehicle use.

Table C-1 identifies a potential replacement approach for vehicles currently on the GSA list.

Table C-1. JBLM Public Works vehicle replacement (GSA-listed vehicle).

GSA-Listed Vehicle Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	GSA Replacement Vehicle	Replacement Year
G42-0658K	Ford F150	2010	Pickup Truck	NA	NA
G42-1054F	Ford F150	2008	Pickup Truck	NA	NA
G71-0133L	Ford E450	2011	Passenger van	NA	NA
G43-0944G	Chevrolet G3500	2008	Passenger van	NA	NA
G43-0822G	Ford F350	2008	Pickup Truck	NA	NA
G41-1100K	Dodge GR Caravan	2010	Minivan	NA	NA
G42-0619K	Chevrolet C1500	2010	Pickup Truck	NA	NA
G41-1180K	Dodge GR Caravan	2010	Minivan	NA	NA
G43-1892H	Chevrolet C2500HD	2009	Pickup Truck	NA	NA
G43-1961H	Chevrolet C3500	2009	Pickup Truck	NA	NA
G42-0505A	Chevrolet G1300	2004	Passenger van	NA	NA
G43-1155L	Ford F350	2011	Pickup Truck	NA	NA
G41-1605L	Dodge Dakota	2011	Pickup Truck	NA	NA
G42-0610K	Chevrolet C1500	2010	Pickup Truck	NA	NA

Table C-2 identifies a potential replacement approach using all currently or soon-to-be available PEVs.

Table C-2. JBLM Public Works vehicle replacement (all potential vehicles).

GSA-Listed Vehicle Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicles	Replacement Year
G42-0505A	Chevrolet G1300	2004	Passenger van	Via VTRUX PU	2015
G42-1054F	Ford F150	2008	Pickup Truck	Toyota Rav4 EV	2016
G43-0822G	FordF350	2008	Pickup Truck	Toyota Rav4 EV	2016
G43-0944G	Chevrolet G3500	2008	Passenger van	Via VTRUX Van	2017
G43-1892H	Chevrolet C2500HD	2009	Pickup Truck	Nissan eNV200	2017
G43-1961H	Chevrolet C3500	2009	Pickup Truck	Toyota Rav4 EV	2017
G41-1100K	Dodge GR Caravan	2010	Minivan	Mitsu. Outlander	2018
G41-1180K	Dodge GR Caravan	2010	Minivan	Nissan Leaf	2018
G42-0619K	CheroletC1500	2010	Pickup Truck	Toyota Rav4 EV	2018
G42-0658K	Ford F150	2010	Pickup Truck	Via VTRUX PU	2018
G43-1155L	Ford F350	2011	Pickup Truck	Via VTRUX PU	2018
G41-1605L	Dodge Dakota	2011	Pickup Truck	Toyota Rav4 EV	2019

GSA-Listed Vehicle Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicles	Replacement Year
G42-0610K	Chevrolet C1500	2010	Pickup Truck	Nissan eNV200	2019
G71-0133L	Ford E450	2011	Passenger van	Via VTRUX Van	2021

Vehicle G42-0658K

	Make/Model/Year	Ford/F150/2010
	EPA Class Size	Standard Pickup Truck
	Mission	Pool Vehicle
	Contact	J. Ross/Public Works
	Parking Location	Building 2044/Adkison/N 3rd St
	Fleet Vehicle ID	G42-0658K
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Via VTRUX PU
	Potential Annual Fuel Cost Savings	$864
	Potential Annual GHG Reduction	4,273 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2018
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	30,782

Vehicle G42-1054F

	Make/Model/Year	Ford/F150/2008
	EPA Class Size	Standard Pickup Truck
	Mission	Pool
	Contact	J. Ross/Public Works
	Parking Location	Building 2044/Adkison/N 3rd St
	Fleet Vehicle ID	G42-1054F
	Fuel Type	Gas
	Potential Replacement PEV Make/Model	Nissan Rav4 EV or BEV Pickup
	Potential Annual Fuel Cost Savings	$746
	Potential Annual GHG Reduction	3,692 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	25,040

Vehicle G71-0133L

	Make/Model/Year	Ford/E450/2011
	EPA Class Size	Vans, Passenger Type
	Mission	Pool
	Contact	J. Ross/Public Works
	Parking Location	Building 2063/N. 4th St
	Fleet Vehicle ID	G71-0133L
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Via VTRUX Pass Van
	Potential Annual Fuel Cost Savings	$1,229
	Potential Annual GHG Reduction	6,093 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2021
	Vehicle Age at Estimated Replacement	10
	Odometer at Estimated Replacement Date	38,989

Vehicle G43-0944G

	Make/Model/Year	Chevrolet/G3500 Express /2008
	EPA Class Size	Passenger Van
	Mission	Pool
	Contact	J. Ross/Public Works
	Parking Location	Building 2044/Utah Ave
	Fleet Vehicle ID	G43-0944G
	Fuel Type	Diesel
	Potential Replacement PEV Make/Model	Via VTRUX Pass Van
	Potential Annual Fuel Cost Savings	$524
	Potential Annual GHG Reduction	2,599 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2017
	Vehicle Age at Estimated Replacement	9
	Odometer at Estimated Replacement Date	13,953

Vehicle G43-0822G

	Make/Model/Year	Ford/F350/2008
	EPA Class Size	Pickup Trucks
	Mission	Support
	Contact	J. Ross/Public Works
	Parking Location	Building 2044/Utah Ave
	Fleet Vehicle ID	G43-0822G
	Fuel Type	Gas
	Potential Replacement PEV Make/Model	Nissan Rav4 EV or BEV Pickup
	Potential Annual Fuel Cost Savings	$1,364
	Potential Annual GHG Reduction	6,752 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	39,273

Vehicle G41-1100K

	Make/Model/Year	Dodge/Grand Caravan/2010
	EPA Class Size	Minivan
	Mission	Pool
	Contact	J. Ross/Public Works
	Parking Location	Building 2012/Pendleton Ave
	Fleet Vehicle ID	G41-1100K
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Mitsubishi Outlander
	Potential Annual Fuel Cost Savings	$633
	Potential Annual GHG Reduction	3,127 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2018
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	21,772

Vehicle G42-0619K

	Make/Model/Year	Chevrolet/C1500/2010
	EPA Class Size	Standard Pickup Trucks
	Mission	Pool
	Contact	J. Ross/Public Works
	Parking Location	Building 555/Lincoln Blvd
	Fleet Vehicle ID	G42-0619K
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Nissan Rav4 EV or BEV Pickup
	Potential Annual Fuel Cost Savings	$437
	Potential Annual GHG Reduction	2,163
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2018
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	13,771

Vehicle G41-1180K

	Make/Model/Year	Dodge/Grand Caravan/2010
	EPA Class Size	Minivan
	Mission	Pool
	Contact	J. Ross/Public Works
	Parking Location	Building 540/A St SW
	Fleet Vehicle ID	G41-1180K
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Nissan Leaf
	Potential Annual Fuel Cost Savings	$523
	Potential Annual GHG Reduction	2,594
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2018
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	17,790

Vehicle G43-1892H

	Make/Model/Year	Chevrolet/C2500HD/2009
	EPA Class Size	Pickup Truck
	Mission	Support
	Contact	J. Ross/Public Works
	Parking Location	6th St SW
	Fleet Vehicle ID	G43-1892H
	Fuel Type	Gas
	Potential Replacement PEV Make/Model	Nissan eNV200 or BEV Pickup
	Potential Annual Fuel Cost Savings	$879
	Potential Annual GHG Reduction	4,357 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2017
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	23,838

Vehicle G43-1961H

	Make/Model/Year	Chevrolet/C3500/2009
	EPA Class Size	Pickup Truck
	Mission	Support
	Contact	J. Ross/Public Works
	Parking Location	6th St SW
	Fleet Vehicle ID	G43-1961H
	Fuel Type	Gas
	Potential Replacement PEV Make/Model	Toyota Rav4 EV or BEV Pickup
	Potential Annual Fuel Cost Savings	$1,173
	Potential Annual GHG Reduction	5,803 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2017
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	31,889

Vehicle G42-0505A

	Make/Model/Year	Chevrolet/G1500 Express /2004
	EPA Class Size	Passenger Van
	Mission	Support
	Contact	J. Ross/Public Works
	Parking Location	Building 555/2012 Lincoln Blvd
	Fleet Vehicle ID	G42-0505A
	Fuel Type	Gas
	Potential Replacement PEV Make/Model	Via VTRUX Pass Van
	Potential Annual Fuel Cost Savings	$1,343
	Potential Annual GHG Reduction	6,660 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	11
	Odometer at Estimated Replacement Date	35,442

Vehicle G43-1155L

	Make/Model/Year	Ford/F350/2011
	EPA Class Size	Pickup Truck
	Mission	Support
	Contact	J. Ross/Public Works
	Parking Location	Building 2044/Utah Ave
	Fleet Vehicle ID	G43-1155L
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Via VTRUX PU
	Potential Annual Fuel Cost Savings	$384
	Potential Annual GHG Reduction	2,729 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2018
	Vehicle Age at Estimated Replacement	7
	Odometer at Estimated Replacement Date	35,501

Vehicle G41-1605L

	Make/Model/Year	Dodge/Dakota/2011
	EPA Class Size	Standard Pickup Truck
	Mission	Support
	Contact	J. Ross/Public Works
	Parking Location	Building 2044
	Fleet Vehicle ID	G41-1605L
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Toyota Rav4 EV or BEV Pickup
	Potential Annual Fuel Cost Savings	$423
	Potential Annual GHG Reduction	2,095 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2019
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	12,814

Vehicle G42-0610K

	Make/Model/Year	Chevrolet/C1500/2010
	EPA Class Size	Standard Pickup Truck
	Mission	Pool
	Contact	J. Ross/Public Works
	Parking Location	Building 2044/Pendleton Ave
	Fleet Vehicle ID	G42-0610K
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Nissan eNV200
	Potential Annual Fuel Cost Savings	$706
	Potential Annual GHG Reduction	3,498 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2019
	Vehicle Age at Estimated Replacement	9
	Odometer at Estimated Replacement Date	25,827

Appendix D
Motor Transport Branch Vehicle Data Sheets

Note: the replacement year identified in the following data sheets is the earliest year available for potential replacement based on the GSA requirements noted in Table 3. The final replacement approach may suggest later years based on vehicle use.

Table D-1 identifies a potential replacement approach for vehicles currently on the GSA list.

Table D-1. JBLM Motor Transport Branch vehicle replacement (GSA-listed vehicle).

GSA-Listed Vehicle Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	GSA Replacement Vehicle	Replacement Year
G10-7664F	Dodge Avenger	2008	Compact Sedan	Ford Focus	2015
G11-2676G	Chevrolet Impala	2008	Large Sedan	Ford Focus	2015
G11-0678K	Chevrolet Impala	2010	Large Sedan	Ford Focus	2017
G11-0493L	Chevrolet Impala	2012	Large Sedan	Ford Fusion	2016
G10-2878L	Chevrolet Malibu	2011	Midsize Sedan	Ford Focus	2017
G11-2675G	Chevrolet Impala	2008	Large Sedan	Chevrolet Volt	2016
G12-0662H	Ford Fusion HEV	2010	Midsize Sedan	Ford Fusion	2015
G10-6379L	Dodge Avenger	2011	Midsize Sedan	Ford Focus	2017

Table D-2 identifies a potential replacement approach using all currently or soon-to-be available PEVs.

Table D-2. JBLM Motor Transport Branch vehicle replacement (all potential vehicles).

All Vehicle Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Replacement Year
G10-7664F	Dodge Avenger	2008	Compact Sedan	Ford Focus	2015
G11-2676G	Chevrolet Impala	2008	Large Sedan	Nissan Leaf	2015
G12-0662H	Ford Fusion HEV	2010	Midsize Sedan	Ford Fusion	2015
G41-1180G	Chevrolet Uplander	2008	Minivan	Mitsu. Outlander	2015
G41-1288A	Ford Sport Trac	2004	Pickup Truck	Toyota Rav4 EV	2015
G41-1373G	Dodge Dakota	2008	Pickup Truck	Mitsu. Outlander	2015
G41-1392G	Chevrolet Uplander	2008	Minivan	Mitsu. Outlander	2015
G41-65991	Dodge Dakota	2002	Pickup Truck	Via VTRUX PU	2015
G43-25839	Ford F350	2003	Pickup Truck	Toyota Rav4 EV	2015
G61-1155D	Ford Escape HYB	2006	SUV	Toyota Rav4 EV	2015
G11-0493L	Chevrolet Impala	2012	Large Sedan	Ford Fusion	2016
G11-2675G	Chevrolet Impala	2008	Large Sedan	Chevrolet Volt	2016
G41-1161G	Chevrolet Uplander	2008	Minivan	Toyota Rav4 EV	2016
G41-1367G	Dodge Dakota	2008	Pickup Truck	Toyota Rav4 EV	2016
G41-1376G	Dodge Dakota	2008	Pickup Truck	Nissan eNV200	2016
G41-1395G	Chevrolet Uplander	2008	Minivan	Toyota Rav4 EV	2016
G42-0698K	Chevrolet C1500	2011	Pickup Truck	Via VTRUX PU	2016
G42-0988F	Chevrolet Express 13	2007	Cargo Van	Nissan eNV200	2016
G42-3471A	Chevrolet G2300	2005	Cargo Van	Nissan eNV200	2016
G43-0792K	Chevrolet CG3300	2010	Passenger Van	Via VTRUX Van	2016

All Vehicle Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Replacement Year
G43-0860G	Chevrolet CG3300	2008	Passenger Van	Via VTRUX Van	2016
G43-3717A	Ford E350	2004	Cargo Van	Via VTRUX Van	2016
G43-4937A	Ford E350	2004	Cargo Van	Nissan eNV200	2016
G62-0979G	Dodge 1500	2008	Pickup Truck	Via VTRUX PU	2016
G62-4526H	Chevrolet Tahoe	2009	SUV	Mitsubishi Outlander	2016
G63-0271A	Ford F350	2004	Stake Truck	Via VTRUX PU	2016
G71-0674A	Fore F650 18'BO	2004	Delivery Van	Via VTRUX PU	2016
G82-0509A	Ford F650 STAKE	2004	Stake Truck	NA	2016
G10-2878L	Chevrolet Malibu	2011	Midsize Sedan	Nissan Leaf	2017
G10-6379L	Dodge Avenger	2011	Midsize Sedan	Nissan Leaf	2017
G11-0678K	Chevrolet Impala	2010	Large Sedan	Nissan Leaf	2017
G43-0801K	Chevrolet CG3300	2010	Passenger Van	Via VTRUX Van	2017
G43-0875K	Ford E350	2010	Cargo Van	Nissan eNV200	2017
G43-3881H	Ford E350	2009	Passenger Van	Via VTRUX Van	2017
G41-1100K	Dodge GR Caravan	2010	Minivan	Mitsubishi Outlander	2018
G43-0790K	Chevrolet CG3300	2010	Passenger Van	Via VTRUX Van	2018
G43-1389K	Chevrolet CG3300	2010	Passenger Van	Via VTRUX Van	2018
G62-1094L	Chevrolet Avalanche	2011	SUV	Nissan Leaf	2018
G71-0062G	Ford F750	2008	Stake Truck	NA	2018
G43-1191L	Chevrolet CG3300	2011	Passenger Van	Via VTRUX Van	2019

Vehicle G43-0875K

	Make/Model/Year	Ford/E350 /2010
	EPA Class Size	Cargo Van
	Mission	Pool
	Contact	J. Lamantia/Motor Transport
	Parking Location	Near J. Ramp/Levitow Blvd
	Fleet Vehicle ID	G43-0875K
	Fuel Type	Gas/Eth
	Potential Replacement PEV Make/Model	Nissan eNV200
	Potential Annual Fuel Cost Savings	$4,534
	Potential Annual GHG Reduction	22,519 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2017
	Vehicle Age at Estimated Replacement	7
	Odometer at Estimated Replacement Date	76,222

Vehicle G41-1288A

	Make/Model/Year	Ford/Sport Trac /2004
	EPA Class Size	Standard Pickup Truck
	Mission	Pool
	Contact	J. Lamantia/Motor Transport
	Parking Location	Building 100/Col. Joe Jackson Blvd
	Fleet Vehicle ID	G41-1288A
	Fuel Type	Gas/Eth
	Potential Replacement PEV Make/Model	Toyota Rav4 EV
	Potential Annual Fuel Cost Savings	$163
	Potential Annual GHG Reduction	807 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	11
	Odometer at Estimated Replacement Date	15,923

Vehicle G43-4937A

Make/Model/Year	Ford/E350 /2004
EPA Class Size	Cargo Van
Mission	Pool
Contact	J. Lamantia/Motor Transport
Parking Location	C. Ramp/7th St NE
Fleet Vehicle ID	G43-4937A
Fuel Type	Gas

Potential Replacement PEV Make/Model	Nissan eNV200
Potential Annual Fuel Cost Savings	$984
Potential Annual GHG Reduction	4,878
EVSE Type for Recharging	AC Level 2
Estimated Replacement Year	2016
Vehicle Age at Estimated Replacement	12
Odometer at Estimated Replacement Date	41,560

Vehicle G10-7664F

Make/Model/Year	Dodge/Avenger /2008
EPA Class Size	Compact Sedan
Mission	Pool
Contact	J. Lamantia/Motor Transport
Parking Location	Building 100/ Westcott Hills
Fleet Vehicle ID	G10-7664F
Fuel Type	Gas/Eth

Potential Replacement PEV Make/Model	Ford Focus
Potential Annual Fuel Cost Savings	$246
Potential Annual GHG Reduction	1,217 lb-CO_2e
EVSE Type for Recharging	AC Level 2
Estimated Replacement Year	2015
Vehicle Age at Estimated Replacement	7
Odometer at Estimated Replacement Date	15,190

Vehicle G41-65991

	Make/Model/Year	Dodge/Dakota/2002
	EPA Class Size	Standard Pickup Truck
	Mission	Pool
	Contact	J. Lamantia/ Transport
	Parking Location	Building 100/Barrack St or 2nd St
	Fleet Vehicle ID	G41-65991
	Fuel Type	Gas
	Potential Replacement PEV Make/Model	Via VTRUX PU
	Potential Annual Fuel Cost Savings	$287
	Potential Annual GHG Reduction	2,039 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	13
	Odometer at Estimated Replacement Date	33,202

Vehicle G11-2676G

	Make/Model/Year	Chevrolet / Impala / 2008
	EPA Class Size	Large Cars
	Mission	Pool
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building 9190/Sansone St
	Fleet Vehicle ID	G11-2676G
	Fuel Type	Gas/E85
	Potential Replacement PEV Make/Model	Nissan Leaf
	Potential Annual Fuel Cost Savings	$986
	Potential Annual GHG Reduction	6,625
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	7
	Odometer at Estimated Replacement Date	48,773

Vehicle G43-3717A

Make/Model/Year	Ford/E350 Econoline/2004
EPA Class Size	Cargo Van
Mission	Pool
Contact	C. Sallinger/Motor Transport
Parking Location	Building 2027/N 8th St
Fleet Vehicle ID	G43-3717A
Fuel Type	Diesel

Potential Replacement PEV Make/Model	Via VTRUX Van
Potential Annual Fuel Cost Savings	$1,909
Potential Annual GHG Reduction	9,455 lb-CO_2e
EVSE Type for Recharging	AC Level 1
Estimated Replacement Year	2016
Vehicle Age at Estimated Replacement	12
Odometer at Estimated Replacement Date	60,126

Vehicle G11-0678K

Make/Model/Year	Chevrolet/Impala/2010
EPA Class Size	Large Sedan
Mission	Support
Contact	C. Sallinger/Motor Transport
Parking Location	Building 100/2nd St NW
Fleet Vehicle ID	G11-0678K
Fuel Type	Gas/ETH

Potential Replacement PEV Make/Model	Nissan Leaf
Potential Annual Fuel Cost Savings	$1,066
Potential Annual GHG Reduction	5,282 lb-CO_2e
EVSE Type for Recharging	AC Level 2
Estimated Replacement Year	2017
Vehicle Age at Estimated Replacement	7
Odometer at Estimated Replacement Date	27,606

Vehicle G62-4526H

	Make/Model/Year	Chevrolet/Tahoe/2009
	EPA Class Size	SUV
	Mission	Support
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building 2007/Pendleton Ave
	Fleet Vehicle ID	G62-4526H
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Mitsubishi Outlander
	Potential Annual Fuel Cost Savings	$2,378
	Potential Annual GHG Reduction	11,772 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	7
	Odometer at Estimated Replacement Date	71,006

Vehicle G42-0698K

	Make/Model/Year	Chevrolet/C1500/2011
	EPA Class Size	Standard Pickup Truck
	Mission	Support
	Contact	J. Lamantia/Motor Transport
	Parking Location	Near D. Ramp/2nd St NW
	Fleet Vehicle ID	G42-0698K
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Via VTRUX PU
	Potential Annual Fuel Cost Savings	$154
	Potential Annual GHG Reduction	762 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	5
	Odometer at Estimated Replacement Date	87,427

Vehicle G11-0493L

	Make/Model/Year	Chevrolet/Impala/2012
	EPA Class Size	Large Sedan
	Mission	Support
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building 2007/Pendleton Ave
	Fleet Vehicle ID	G11-0493L
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Ford Fusion
	Potential Annual Fuel Cost Savings	$699
	Potential Annual GHG Reduction	3,452 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	4
	Odometer at Estimated Replacement Date	46,378

Vehicle G71-0062G

	Make/Model/Year	Ford/F750/2008
	EPA Class Size	Stake Truck
	Mission	Transport
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building R9641
	Fleet Vehicle ID	G71-0062G
	Fuel Type	Diesel
	Potential Replacement PEV Make/Model	NA
	Potential Annual Fuel Cost Savings	
	Potential Annual GHG Reduction	
	EVSE Type for Recharging	
	Estimated Replacement Year	2018
	Vehicle Age at Estimated Replacement	10
	Odometer at Estimated Replacement Date	17,291

Vehicle G62-1094L

	Make/Model/Year	Chevrolet/Avalanche/2011
	EPA Class Size	SUV
	Mission	Support
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building 4074/Kaufman Ave
	Fleet Vehicle ID	G62-1094L
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Nissan Leaf
	Potential Annual Fuel Cost Savings	$1,485
	Potential Annual GHG Reduction	7,377 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2018
	Vehicle Age at Estimated Replacement	7
	Odometer at Estimated Replacement Date	40,755

Vehicle G41-1395G

	Make/Model/Year	Chevrolet/Uplander/2008
	EPA Class Size	Minivan
	Mission	Pool
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building R9641/Rainier Dr
	Fleet Vehicle ID	G41-1395G
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Toyota Rav4 EV
	Potential Annual Fuel Cost Savings	$725
	Potential Annual GHG Reduction	3,579 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	26,600

Vehicle G61-1155D

	Make/Model/Year	Ford/Escape Hybrid/2006
	EPA Class Size	SUV
	Mission	Pool
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building 4074/Kaufman Ave
	Fleet Vehicle ID	G61-1155D
	Fuel Type	Gas
	Potential Replacement PEV Make/Model	Toyota Rav4 EV
	Potential Annual Fuel Cost Savings	$713
	Potential Annual GHG Reduction	3,494 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	9
	Odometer at Estimated Replacement Date	41,664

Vehicle G10-2878L

	Make/Model/Year	Chevrolet/Malibu/2011
	EPA Class Size	Midsize Cars
	Mission	Pool
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building R1407/West Way
	Fleet Vehicle ID	G10-2878L
	Fuel Type	Gas/E85
	Potential Replacement PEV Make/Model	Nissan Leaf
	Potential Annual Fuel Cost Savings	$847
	Potential Annual GHG Reduction	4,186
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2017
	Vehicle Age at Estimated Replacement	6
	Odometer at Estimated Replacement Date	28,179

Vehicle G41-1100K

	Make/Model/Year	Dodge/Grand Caravan/2010
	EPA Class Size	Minivan
	Mission	Pool
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building 2012/1210
	Fleet Vehicle ID	G41-1100K
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Mitsubishi Outlander
	Potential Annual Fuel Cost Savings	$633
	Potential Annual GHG Reduction	3,127
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2018
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	21,772

Vehicle G62-0979G

	Make/Model/Year	Dodge/1500/2008
	EPA Class Size	Standard Pickup Truck
	Mission	Pool
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building 1210/Mann Ave
	Fleet Vehicle ID	G62-0979G
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Via VTRUX PU
	Potential Annual Fuel Cost Savings	$612
	Potential Annual GHG Reduction	3,028 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	42,498

Vehicle G71-0674A

	Make/Model/Year	Ford/F650 18'BO/2004
	EPA Class Size	Delivery Van
	Mission	Transport
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building R9641/Perry Ave
	Fleet Vehicle ID	G71-0674A
	Fuel Type	Diesel
	Potential Replacement PEV Make/Model	Via VTRUX PU
	Potential Annual Fuel Cost Savings	$875
	Potential Annual GHG Reduction	4,338 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	12
	Odometer at Estimated Replacement Date	50,098

Vehicle G41-1373G

	Make/Model/Year	Dodge/Dakota/2008
	EPA Class Size	Standard Pickup Truck
	Mission	Support
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building R9654/Perry Ave
	Fleet Vehicle ID	G41-1373G
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Mitsubishi Outlander
	Potential Annual Fuel Cost Savings	$645
	Potential Annual GHG Reduction	3,197 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	7
	Odometer at Estimated Replacement Date	65,000

Vehicle G41-1367G

	Make/Model/Year	Dodge/Dakota/2008
	EPA Class Size	Standard Pickup Truck
	Mission	Pool
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building R9641/Rainier Dr
	Fleet Vehicle ID	G41-1367G
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Toyota Rav4 EV or BEV Pickup
	Potential Annual Fuel Cost Savings	$1,031
	Potential Annual GHG Reduction	5,109 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	8
	Odometer at Estimated Replacement Date	33,802

Vehicle G43-0792K

	Make/Model/Year	Chevrolet/CG3500 Express/2010
	EPA Class Size	Passenger Van
	Mission	Pool
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building R9640/Perry Ave
	Fleet Vehicle ID	G43-0792K
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Via VTRUX Pass Van
	Potential Annual Fuel Cost Savings	$2,388
	Potential Annual GHG Reduction	11,837
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	6
	Odometer at Estimated Replacement Date	65,000

Vehicle G43-0801K

	Make/Model/Year	Chevrolet/Express CG3500/2010
	EPA Class Size	Passenger Van
	Mission	Pool
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building R9641
	Fleet Vehicle ID	G43-0801K
	Fuel Type	Gas/E85
	Potential Replacement PEV Make/Model	Via VTRUX Pass Van
	Potential Annual Fuel Cost Savings	$2,417
	Potential Annual GHG Reduction	11,985 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2017
	Vehicle Age at Estimated Replacement	7
	Odometer at Estimated Replacement Date	60,924

Vehicle G42-0988F

	Make/Model/Year	Chevrolet/Express 13/2007
	EPA Class Size	Cargo Van
	Mission	Support
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building 9040/Fitzsimmons
	Fleet Vehicle ID	G42-0988F
	Fuel Type	Gas
	Potential Replacement PEV Make/Model	Nissan eNV200
	Potential Annual Fuel Cost Savings	$2,503
	Potential Annual GHG Reduction	12,425 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	9
	Odometer at Estimated Replacement Date	59,460

Vehicle G43-0860G

Make/Model/Year	Chevrolet/CG3300/2008
EPA Class Size	Passenger Van
Mission	Pool
Contact	C. Sallinger/Motor Transport
Parking Location	Building R9641or 19th St N
Fleet Vehicle ID	G43-0860G
Fuel Type	Gas

Potential Replacement PEV Make/Model	Via VTRUX Pass Van
Potential Annual Fuel Cost Savings	$1,951
Potential Annual GHG Reduction	9,672 lb-CO_2e
EVSE Type for Recharging	AC Level 1
Estimated Replacement Year	2015
Vehicle Age at Estimated Replacement	8
Odometer at Estimated Replacement Date	68,427

Vehicle G43-1389K

Make/Model/Year	Chevrolet/CG3300/2010
EPA Class Size	Passenger Van
Mission	Pool
Contact	C. Sallinger/Motor Transport
Parking Location	Various
Fleet Vehicle ID	G43-1389K
Fuel Type	Gas/ETH

Potential Replacement PEV Make/Model	Via VTRUX Pass Van
Potential Annual Fuel Cost Savings	$750
Potential Annual GHG Reduction	3,718 lb-CO_2e
EVSE Type for Recharging	AC Level 1
Estimated Replacement Year	2018
Vehicle Age at Estimated Replacement	8
Odometer at Estimated Replacement Date	59,091

Vehicle G41-1180G

	Make/Model/Year	Chevrolet/Uplander/2008
	EPA Class Size	Minivan
	Mission	Support
	Contact	J. Lamantia/Motor Transport
	Parking Location	Building 9040/Fitzsimmons
	Fleet Vehicle ID	G41-1180G
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Mitsubishi Outlander
	Potential Annual Fuel Cost Savings	$1,988
	Potential Annual GHG Reduction	9,812 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2014
	Vehicle Age at Estimated Replacement	6
	Odometer at Estimated Replacement Date	65,000

Vehicle G11-2675G

	Make/Model/Year	Chevrolet/Impala/2008
	EPA Class Size	Large Cars
	Mission	Pool
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building 9040/9900
	Fleet Vehicle ID	G11-2675G
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Chevrolet Volt
	Potential Annual Fuel Cost Savings	$193
	Potential Annual GHG Reduction	954 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2014
	Vehicle Age at Estimated Replacement	6
	Odometer at Estimated Replacement Date	6,842

Vehicle G43-1191L

Make/Model/Year	Chevrolet/CG3300/2011
EPA Class Size	Passenger Van
Mission	Pool
Contact	C. Sallinger/Motor Transport
Parking Location	Building R9641/Yakima
Fleet Vehicle ID	G43-1191L
Fuel Type	Gas/ETH

Potential Replacement PEV Make/Model	Via VTRUX Pass Van
Potential Annual Fuel Cost Savings	$1,377
Potential Annual GHG Reduction	6,826 lb-CO_2e
EVSE Type for Recharging	AC Level 1
Estimated Replacement Year	2018
Vehicle Age at Estimated Replacement	7
Odometer at Estimated Replacement Date	46,615

Vehicle G12-0662H

Make/Model/Year	Ford/Fusion HEV/2010
EPA Class Size	Midsize Car
Mission	Pool
Contact	J. Lamantia/Motor Transport
Parking Location	Building R9641/3674
Fleet Vehicle ID	G12-0662H
Fuel Type	Gas

Potential Replacement PEV Make/Model	Ford Fusion
Potential Annual Fuel Cost Savings	$475
Potential Annual GHG Reduction	2,316 lb-CO_2e
EVSE Type for Recharging	AC Level 1
Estimated Replacement Year	2014
Vehicle Age at Estimated Replacement	4
Odometer at Estimated Replacement Date	32,100

Vehicle G63-0271A

	Make/Model/Year	Ford/F350 Stake/2004
	EPA Class Size	Stake Truck
	Mission	Transport
	Contact	C. Sallinger/Motor Transport
	Parking Location	Camp Murray/Yakima
	Fleet Vehicle ID	G63-0271A
	Fuel Type	Gas
	Potential Replacement PEV Make/Model	Via VTRUX PU
	Potential Annual Fuel Cost Savings	$665
	Potential Annual GHG Reduction	3,295 lb-CO2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2014
	Vehicle Age at Estimated Replacement	10
	Odometer at Estimated Replacement Date	53,564

Vehicle G41-1392G

	Make/Model/Year	Chevrolet/Uplander/2008
	EPA Class Size	Minivan
	Mission	Support
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building R9641/Building 3017
	Fleet Vehicle ID	G41-1392G
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Mitsubishi Outlander
	Potential Annual Fuel Cost Savings	$928
	Potential Annual GHG Reduction	4,583 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	7
	Odometer at Estimated Replacement Date	41,466

Vehicle G43-3881H

	Make/Model/Year	Ford/E350/2009
	EPA Class Size	Passenger Van
	Mission	Pool
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building R9641/Perry Ave
	Fleet Vehicle ID	G43-3881H
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Via VTRUX Pass Van
	Potential Annual Fuel Cost Savings	$801
	Potential Annual GHG Reduction	3,970 lb-CO_2e
	EVSE Type for Recharging	AC Level 1
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	7
	Odometer at Estimated Replacement Date	44,033

Vehicle G43-25839

	Make/Model/Year	Ford/F350/2003
	EPA Class Size	Pickup Truck
	Mission	Transport
	Contact	J. Lamantia/Motor Transport
	Parking Location	Building R9641
	Fleet Vehicle ID	G43-25839
	Fuel Type	Diesel
	Potential Replacement PEV Make/Model	Toyota Rav4 EV or BEV Pickup
	Potential Annual Fuel Cost Savings	$1,425
	Potential Annual GHG Reduction	7,071 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2014
	Vehicle Age at Estimated Replacement	11
	Odometer at Estimated Replacement Date	26,709

Vehicle G41-1376G

	Make/Model/Year	Dodge/Dakota/2008
	EPA Class Size	Standard Pickup Truck
	Mission	Support
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building R9640/Perry Ave
	Fleet Vehicle ID	G41-1376G
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Nissan eNV200
	Potential Annual Fuel Cost Savings	$790
	Potential Annual GHG Reduction	3,918 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	7
	Odometer at Estimated Replacement Date	17,089

Vehicle G41-1161G

	Make/Model/Year	Chevrolet/Uplander/2008
	EPA Class Size	Minivan
	Mission	Pool
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building 9040A/Fitzsimmons
	Fleet Vehicle ID	G41-1161G
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Toyota Rav4 EV
	Potential Annual Fuel Cost Savings	$341
	Potential Annual GHG Reduction	1,684 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2015
	Vehicle Age at Estimated Replacement	7
	Odometer at Estimated Replacement Date	10,654

Vehicle G43-0790K

	Make/Model/Year	Chevrolet/CG3300/2010
	EPA Class Size	Passenger Van
	Mission	Pool
	Contact	C Sallinger/Motor Transport
	Parking Location	Bldg R9641
	Fleet Vehicle ID	G43-0790K
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Via VTRUX Pass Van
	Potential Annual Fuel Cost Savings	$1,987
	Potential Annual GHG Reduction	9,851 lb-CO_2e
	EVSE Type for Recharging	AC L1
	Estimated Replacement Year	2017
	Vehicle Age at Estimated Replacement	7
	Odometer at Estimated Replacement Date	55,311

Vehicle G82-0509A

	Make/Model/Year	Ford/F350/2004
	EPA Class Size	Stake Truck
	Mission	Transport
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building R9641/Perry Ave
	Fleet Vehicle ID	G82-0509A
	Fuel Type	Diesel
	Potential Replacement PEV Make/Model	NA
	Potential Annual Fuel Cost Savings	
	Potential Annual GHG Reduction	
	EVSE Type for Recharging	
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	12
	Odometer at Estimated Replacement Date	6,832

Vehicle G10-6379L

	Make/Model/Year	Dodge/Avenger/2011
	EPA Class Size	Midsize Car
	Mission	Support
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building 9040/Gardner Loop RD
	Fleet Vehicle ID	G10-6379L
	Fuel Type	Gas/ETH
	Potential Replacement PEV Make/Model	Nissan Leaf
	Potential Annual Fuel Cost Savings	$1,319
	Potential Annual GHG Reduction	6,532 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2016
	Vehicle Age at Estimated Replacement	5
	Odometer at Estimated Replacement Date	32,230

Vehicle G42-3471A

	Make/Model/Year	Chevrolet/G2300/2005
	EPA Class Size	Cargo Van
	Mission	Transport
	Contact	C. Sallinger/Motor Transport
	Parking Location	Building 690
	Fleet Vehicle ID	G42-3471A
	Fuel Type	Gas
	Potential Replacement PEV Make/Model	Nissan eNV200
	Potential Annual Fuel Cost Savings	$827
	Potential Annual GHG Reduction	4,100 lb-CO_2e
	EVSE Type for Recharging	AC Level 2
	Estimated Replacement Year	2014
	Vehicle Age at Estimated Replacement	9
	Odometer at Estimated Replacement Date	29,235

Appendix E
6th MP Group Vehicle Replacement Approach

There are four replacement approaches identified for the 6th MP Group:

- Monitored vehicles
  - GSA-listed PEVs only
  - All potential PEV types
- Full fleet
  - GSA-Listed PEVs only for sedans
  - All potential PEV types for non-sedan vehicles.

The extensive analysis conducted for monitored vehicles (Task 3) results in high confidence that the suggested vehicle can meet mission requirements. The suggested vehicles for the full fleet rely on the extrapolation of those monitored vehicles and the guidance identified in Section 3.

E.1 Monitored Vehicle General Services Administration Replacement Approach

The vehicles monitored include a minivan, an SUV, and a pickup truck for which no GSA-listed replacements are currently available.

E.2 All Monitored Vehicle Replacement Approach

Table E-1 provides a replacement approach using currently or soon-to-be available PEVs. Although not currently listed by GSA, these or similar vehicles may be listed by the year identified or JBLM may choose to justify the replacement.

Table E-1. 6th MP Group all monitored vehicle replacement approach.

All Monitored Vehicle Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Replacement Year
G61-0689A	Ford Ranger	2004	Pickup	Via VTRUX PU	2015
G41-5433B	Dodge Caravan	2006	Minivan	Nissan Leaf	2015
G61-0546L	GMC Terrain	2011	SUV	Toyota Rav4 EV	2018

E.3 Sedan Fleet Replacement Approach

GSA currently lists only sedans for PEVs. It is assumed that additional sedans will be added to the list in the next few years. Table E-2 provides the list of sedans in the 6th MP Group fleet. The projected year of replacement is identified based on the GSA requirements and expected usage. The mileage is projected from the odometer reading in 2013 and annual mileage provided by JBLM. As noted above, none of these vehicles were monitored in this study. For illustration, the vehicles marked in green in this table reflect potential replacement vehicles that are included in Section 4.2.1.

Table E-2. 6th MP Group sedan fleet replacement approach.

Sedan Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Estimated Mileage	Replacement Year
G10-7541F	Pontiac G6	2008	Sedan – Compact	Focus	37,883	2015
G10-7540F	Pontiac G6	2008	Sedan – Compact	Focus	34,342	2016
G10-2841L	Dodge Avenger	2011	Sedan – Compact	Focus	43,911	2016
G11-0479L	Chevrolet Impala	2011	Sedan – Large	Leaf	45,262	2016
G11-0481L	Chevrolet Impala	2011	Sedan – Large	Focus	36,678	2016

Sedan Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Estimated Mileage	Replacement Year
G10-6362L	Chevrolet Malibu	2011	Sedan – Midsize	Volt	34,916	2017
G11-0478L	Chevrolet Impala	2011	Sedan – Large	Leaf	37,214	2017
G11-0480L	Chevrolet Impala	2011	Sedan – Large	Rav4 EV	41,249	2018
G11-0482L	Chevrolet Impala	2011	Sedan – Large	Rav4 EV	37,361	2018
G10-6361L	Chevrolet Malibu	2011	Sedan – Midsize	Leaf	30,586	2019
G10-2629K	Ford Fusion HEV	2011	Sedan – Midsize	Leaf	30,281	2021

E.4 Near-Term Non-Sedan Vehicle Replacement Approach

Another approach to the replacement strategy is to consider non-sedan vehicles that may be replaced in the next 2 years. Table E-3 identifies the non-sedan vehicles in the 6th MP Group fleet that are projected to be replaced in 2015. No vehicles are projected to be replaced in 2016. The projected year of replacement is identified based on the GSA requirements and expected usage. The mileage is projected from the odometer reading in 2013 and annual mileage provided by JBLM. As before, the potential replacement vehicle may not be GSA-listed but could be by the replacement year identified or JBLM may consider its justification for replacement. (Note that JBLM may have replaced several of these vehicles in 2014.) For illustration, the vehicles marked in orange were monitored; therefore, high confidence exists in the potential replacement. Either minivan would meet the suggested replacement included in Section 4.2.2.

Table E-3. 6th MP Group near-term vehicles replacement approach.

Near-Term Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Estimated Mileage	Replacement Year
G41-5433B	Dodge Gr Caravan	2006	Minivan	Rav4 EV	63,451	2015
G41-2128F	Chevrolet Uplander	2007	Minivan	Rav4 EV	38,644	2015
G61-0689A	Ford Ranger	2004	Pickup	VTRUX PU	29,006	2015
G62-3684B	Chevrolet Tahoe	2005	SUV	Outlander	109,869	2015
G71-3311	Ford E350	2004	Van - Pass	VTRUX Van	4,049	2015

Appendix F
DCA Support Group Vehicle Analysis

There are four replacement approaches identified for the DCA Support Group:

- Monitored vehicles
  - GSA-listed PEVs only
  - All potential PEV types
- Full fleet
  - GSA-listed PEVs only for sedans
  - All potential PEV types for non-sedan vehicles.

The extensive analysis conducted for monitored vehicles (Task 3) results in high confidence that the suggested vehicle can meet mission requirements. The suggested vehicles for the full fleet rely on the extrapolation of those monitored vehicles and the guidance identified in Section 3.

F.1 Monitored Vehicle General Services Administration Replacement Approach

The vehicles monitored include a pickup truck, a heavy-duty truck, a passenger van, and a cargo van for which no GSA-listed replacements are currently available.

F.2 All Monitored Vehicle Replacement Approach

Table F-1 provides a replacement approach using currently or soon-to-be available PEVs. Although not currently listed by GSA, these or similar vehicles may be listed by the year identified or JBLM may choose to justify the replacement.

Table F-1. DCA Support Group all monitored vehicle replacement approach.

All Monitored Vehicle Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Replacement Year
G41-74299	Ford Ranger	2004	Pickup Truck	Outlander	2016
G71-0684A	Chev. C6500 Stake	2005	Stake Truck	NA	2017
G43-1195H	Chev. 15 Pas Van	2011	Passenger Van	VTRUX Van	2018
G42-0289G	Chev. G1300	2008	Cargo Van	eNV200	2018

F.3 Sedan Fleet Replacement Approach

GSA currently lists only sedans for PEVs. It is assumed that additional sedans will be added to the list in the next few years. Table F-2 provides the list of sedans in the DCA Support Group fleet. The projected year of replacement is identified based on the GSA requirements and expected usage. The mileage is projected from the odometer reading in 2013 and annual mileage provided by JBLM. No sedans are projected to be replaced in the next few years. For illustration, the vehicles marked in green in this table reflect potential replacement vehicles that are included in Section 4.3.1.

Table F-2. DCA Support Group sedan fleet replacement approach.

Sedan Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Estimated Mileage	Replacement Year
2455F	Chevrolet Malibu	2007	Sedan - Midsize	Leaf	23,974	2018
4586L	Ford Focus	2012	Sedan - Compact	Volt	38,540	2021
2998K	Chevrolet Malibu	2010	Sedan - Midsize	Leaf	28,724	2021

Sedan Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Estimated Mileage	Replacement Year
4590L	Ford Focus	2012	Sedan - Compact	Focus	16,507	2022
4589L	Ford Focus	2012	Sedan - Compact	Focus	15,963	2022
4588L	Ford Focus	2012	Sedan - Compact	Volt	32,954	2022
4587L	Ford Focus	2012	Sedan - Compact	Leaf	24,265	2022
4585L	Ford Focus	2012	Sedan - Compact	Leaf	19,072	2022
4591L	Ford Focus	2012	Sedan - Compact	Focus	38,555	2022
4592L	Ford Focus	2012	Sedan - Compact	Focus	33,533	2022

F.4 Near-Term Non-Sedan Vehicle Replacement Approach

Another approach to the replacement strategy is to consider vehicles that may be replaced in the next 2 years. Table F-3 identifies the non-sedan vehicles in the DCA Support Group fleet that are projected to be replaced in 2015 and 2016. The projected year of replacement is identified based on the GSA requirements and expected usage. The mileage is projected from the odometer reading in 2013 and annual mileage provided by JBLM. As before, the potential replacement vehicle may not be GSA-listed but could be by the replacement year identified or JBLM may consider its justification for replacement. (Note that JBLM may have replaced several of these vehicles in 2014.) For illustration, the vehicle marked in orange was monitored; therefore, high confidence exists in the potential replacement. That vehicle and the vehicles marked in green in this table reflect potential replacement vehicles that are included in Section 4.3.2.

Table F-3. DCA Support Group near-term replacement approach.

Near-Term Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Estimated Mileage	Replacement Year
G42-1051F	Ford F150	2007	Pickup	VTRUX PU	47,598	2015
G43-23834	Dodge 3500	2002	Pickup	Rav4 EV	26,156	2015
G43-19791	Dodge B3500	2002	Van - Cargo	VTRUX Van	17,148	2015
G43-1404D	FordE250	2006	Van - Pass	VTRUX Van	38,067	2015
G43-1394D	Chevrolet G2300	2006	Van - Cargo	VTRUX Van	48,710	2015
G43-27624	Chevrolet G2300	2004	Van - Cargo	eNV200	34,837	2015
G62-1480D	Ford F150	2006	Pickup	VTRUX PU	39,742	2015
G41-74299	Ford Ranger	2004	Pickup	Outlander	32,933	2016
G41-1805H	Dodge Dakota	2009	Pickup	VTRUX PU	32,945	2016
G42-0960D	Ford F150	2006	Pickup	Rav4 EV	12,144	2016
G42-0886H	Ford F150	2006	Pickup	Rav4 EV	20,570	2016
G42-0963D	Ford F150	2006	Pickup	VTRUX PU	33,600	2016
G42-2361B	Chevrolet C1500	2006	Pickup	Rav4 EV	18,855	2016
G42-2360B	Chevrolet C1500	2006	Pickup	eNV200	27,269	2016
G42-2362B	Chevrolet C1500	2006	Pickup	eNV200	33,714	2016
G43-1927H	Chevrolet CG3300	2009	Van - Pass	VTRUX Van	95,400	2016
G43-1406D	Ford E250	2006	Van - Pass	VTRUX Van	20,029	2016
G43-1403D	Ford E250	2006	Van - Pass	VTRUX Van	3,168	2016
G43-1402D	Ford E250	2006	Van - Pass	VTRUX Van	30,061	2016

Near-Term Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Estimated Mileage	Replacement Year
G43-1393D	Chevrolet G2300	2006	Van - Cargo	VTRUX Van	16,284	2016
G43-1377D	Chevrolet G2300	2006	Van - Cargo	eNV200	30,927	2016
G43-1952H	Ford E350	2009	Van - Pass	VTRUX Van	22,510	2016
G61-0958D	Ford Ranger	2006	Pickup	Rav4 EV	22,473	2016
G62-1479D	Ford F150	2006	Pickup	Rav4 EV	23,479	2016

Appendix G
Public Works Group Vehicle Analysis

There are four replacement approaches identified for Public Works:

- Monitored vehicles
  - GSA-listed PEVs only
  - All potential PEV types
- Full fleet
  - GSA-listed PEVs only for sedans
  - All potential PEV types for non-sedan vehicles.

The extensive analysis conducted for monitored vehicles (Task 3) results in high confidence that the suggested vehicle can meet mission requirements. The suggested vehicles for the full fleet rely on the extrapolation of those monitored vehicles and the guidance identified in Section 3.

G.1 Monitored Vehicle General Services Administration Replacement Approach

The vehicles monitored include minivans, passenger vans, and pickup trucks for which no GSA-listed replacement is currently available.

G.2 All Monitored Vehicle Replacement Approach

Table G-1 provides a replacement approach using currently or soon-to-be available PEVs. Although not currently listed by GSA, these or similar vehicles may be listed by the year identified or JBLM may choose to justify the replacement.

Table G-1. Public Works all monitored vehicle replacement approach.

All Monitored Vehicle Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Replacement Year
G42-0505A	G1300	2004	Passenger van	VTRUX Van	2015
G42-1054F	F150	2008	Pickup Truck	eNV200	2015
G43-0822G	F350	2008	Pickup Truck	eNV200	2015
G43-1961H	C3500	2009	Pickup Truck	eNV200	2016
G43-1892H	C2500HD	2009	Pickup Truck	eNV200	2016
G42-0610K	C1500	2010	Pickup Truck	Rav4 EV	2017
G41-1100K	GR Caravan	2010	Minivan	Outlander	2017
G42-0619K	C1500	2010	Pickup Truck	Rav4 EV	2017
G41-1180K	GR Caravan	2010	Minivan	Outlander	2017
G42-0658K	F150	2010	Pickup Truck	Rav4 EV	2017
G43-0944G	G3500	2008	Passenger van	VTRUX Van	2018
G43-1155L	F350	2011	Pickup Truck	Rav4 EV	2018
G41-1605L	Dakota	2011	Pickup Truck	Rav4 EV	2018
G71-0133L	E450	2011	Passenger van	eNV200	2021

G.3 Sedan Fleet Replacement Approach

GSA currently lists only sedans for PEVs. It is assumed that additional sedans will be added to the list in the next few years. Table G-2 provides the list of sedans in the Public Works fleet. The projected year of replacement is identified based on the GSA requirements and expected usage. The mileage is projected from the odometer reading in 2013 and annual mileage provided by JBLM. No sedans are projected to be

replaced in the next few years. For illustration, the vehicles marked in green in this table reflect potential replacement vehicles that are included in Section 4.4.1.

Table G-2. Public Works sedan fleet replacement approach.

Sedan Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement PEV	Estimated Mileage	Replacement Year
G11-2699G	Chevrolet Impala	2008	Sedan - Large	Leaf	27,171	2018
G10-7692F	Dodge Avenger	2008	Sedan - Compact	Leaf	13,983	2018
G10-7693F	Dodge Avenger	2008	Sedan - Compact	Leaf	25,753	2018
G13-1592H	Ford Focus	2009	Sedan - Compact	Focus	24,863	2019
G13-1593H	Ford Focus	2009	Sedan - Compact	Focus	13,699	2019
G10-6384L	Dodge Avenger	2011	Sedan - Compact	Focus	31,736	2021

G.4 Near-Term Non-Sedan Vehicle Replacement Approach

Another approach to the replacement strategy is to consider vehicles that may be replaced in the next 2 years. Table G-3 identifies the vehicles in the Public Works fleet that are projected to be replaced in 2015 and 2016. Heavy-duty trucks and specialty vehicles are not included in this list. The projected year of replacement is identified based on the GSA requirements and expected usage. The mileage is projected from the odometer reading in 2013 and annual mileage provided by JBLM. (Note that JBLM may have replaced several of these vehicles in 2014.) For illustration, the vehicles marked in orange were monitored; therefore, high confidence exists in the potential replacement. Those vehicles and the vehicles marked in green in this table reflect potential replacement vehicles that are included in Section 4.5.2.

Table G-3. Public Works near-term replacement approach.

Near-Term Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement PEV	Estimated Mileage	Replacement Year
G41-65969	Chevrolet S10	2002	Pickup	eNV200	21,182	2015
G41-65886	Chevrolet S10	2002	Pickup	eNV200	30,322	2015
G41-1373A	Chevrolet Colorado	2004	Pickup	eNV200	38,556	2015
G41-1390A	Dodge Caravan	2005	Minivan	Outlander	27,323	2015
G41-54255	Chevrolet S10	2001	Pickup	eNV200	36,931	2015
G41-71760	Ford Ranger	2003	Pickup	eNV200	39,157	2015
G42-42268	Chevrolet G1500	2002	Van - Cargo	eNV200	33,268	2015
G42-3440A	Chevrolet G1300	2004	Van - Cargo	eNV200	43,496	2015
G42-1054F	Ford F150	2008	Pickup	eNV200	34,940	2015
G42-0540A	Chevrolet G1300	2004	Van - Cargo	Rav4 EV	52,435	2015
G42-0506A	Chevrolet G1300	2004	Van - Cargo	eNV200	65,738	2015
G42-0505A	Chevrolet G1300	2004	Van - Cargo	eNV200	38,222	2015
G42-3472A	Chevrolet C1500	2005	Pickup	eNV200	41,387	2015
G42-3476A	Ford F150	2006	Pickup	VTRUX PU	96,998	2015
G42-49108	Chevrolet C1500	2003	Pickup	eNV200	29,859	2015
G42-49085	Chevrolet C1500	2002	Pickup	VTRUX PU	56,207	2015
G43-4932A	Ford E350	2004	Van - Pass	VTRUX Van	11,966	2015
G43-3464B	Chev. C2500HD	2006	Pickup	VTRUX PU	79,539	2015
G43-3438B	Ford F350	2005	Pickup	VTRUX PU	56,247	2015

Near-Term Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement PEV	Estimated Mileage	Replacement Year
G43-25849	Ford E350	2003	Van - Pass	VTRUX Van	30,507	2015
G43-25835	Chevrolet C3500	2003	Pickup	eNV200	29,102	2015
G43-25821	Ford E350	2003	Van - Pass	VTRUX Van	23,230	2015
G43-21439	Chevrolet C2500	2003	Pickup	VTRUX PU	33,382	2015
G43-21392	Ford E350	2002	Van - Pass	VTRUX Van	54,071	2015
G43-1774F	Ford E350	2005	Van - Pass	VTRUX Van	26,875	2015
G43-9862	Dodge 3500	2001	Pickup	eNV200	28,489	2015
G43-0958A	Ford F350	2004	Pickup	VTRUX PU	49,625	2015
G43-0824G	Ford F350	2008	Pickup	VTRUX PU	49,502	2015
G43-0822G	Ford F350	2008	Pickup	Rav4 EV	37,766	2015
G43-0821G	Ford F350	2008	Pickup	eNV200	37,875	2015
G43-0814G	Ford F350	2008	Pickup	eNV200	41,063	2015
G43-0811G	Ford F250	2008	Pickup	VTRUX PU	48,619	2015
G43-0942G	Chevrolet G3500	2008	Van - Pass	VTRUX Van	34,682	2015
G43-0946G	Chevrolet G3500	2008	Van - Pass	VTRUX Van	32,652	2015
G43-0943G	Chevrolet G3500	2008	Van - Pass	VTRUX Van	37,168	2015
G43-0963A	Ford F250	2004	Pickup	eNV200	83,842	2015
G43-25846	Ford F350	2003	Pickup	eNV200	36,997	2015
G43-27635	E350 CUTAW	2004	Van - Cargo	eNV200	54,122	2015
G43-3431B	Dodge 2500	2005	Pickup	eNV200	23,108	2015
G43-3429B	RAM 2500	2005	Pickup	VTRUX PU	47,321	2015
G43-3419B	Chevrolet C3500	2005	Pickup	eNV200	57,858	2015
G43-3440B	Dodge 2500	2005	Pickup	eNV200	46,072	2015
G43-3448B	Ford E350	2003	Van - Pass	VTRUX Van	25,502	2015
G43-3462B	Dodge Sprinter	2006	Van - Cargo	VTRUX Van	36,066	2015
G61-14332	Chevrolet S10	2003	Pickup	VTRUX PU	33,010	2015
G61-14331	Chevrolet S10	2003	Pickup	eNV200	29,473	2015
G61-0715A	Chevrolet Blazer	2004	SUV	Outlander	48,757	2015
G61-0702A	Ford Ranger	2004	Pickup	VTRUX PU	39,872	2015
G61-0286G	Ford Escape HYB	2008	SUV	Rav4 EV	35,129	2015
G62-3694B	Chevrolet Tahoe	2005	SUV	Outlander	67,732	2015
G62-3689B	Chevrolet Tahoe	2005	SUV	Outlander	55,497	2015
G62-18256	Chevrolet K2500	2003	Pickup	eNV200	41,158	2015
G62-1472D	Ford F150	2006	Pickup	eNV200	25,679	2015
G62-1375M	Dodge Ram 1500	2007	Pickup	eNV200	73,434	2015
G62-0727A	Chevrolet K1500	2004	Pickup	eNV200	49,511	2015
G62-0726A	Chevrolet K1500	2004	Pickup	VTRUX PU	59,968	2015
G62-0725A	Chevrolet K1500	2004	Pickup	eNV200	59,972	2015
G63-12057	Chevrolet K2500	2002	Pickup	VTRUX PU	53,946	2015
G63-7560	Dodge 3500	2001	Pickup	VTRUX PU	49,946	2015
G63-0684L	Ford F250	2008	Pickup	VTRUX PU	43,087	2015
G63-2737B	Chevrolet K3500	2005	Pickup	eNV200	43,087	2015

Near-Term Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement PEV	Estimated Mileage	Replacement Year
G63-2751B	Chevrolet K3500	2005	Pickup	eNV200	39,407	2015
G63-2738B	Chevrolet K3500	2005	Pickup	eNV200	39,653	2015
G63-0616A	Chevrolet K3500	2004	Pickup	eNV200	37,171	2015
G63-0606A	Ford F350	2004	Pickup	VTRUX PU	35,199	2015
G63-0605A	Ford F350	2004	Pickup	eNV200	61,177	2015
G71-0120A	Ford F550	2004	Pickup	eNV200	56,202	2015
G71-0128A	Ford F550	2004	Pickup	VTRUX PU	41,730	2015
G71-3294	Ford F450	2003	Pickup	eNV200	125,364	2015
G71-3290	Ford F450	2003	Pickup	eNV200	38,473	2015
G42-0883H	Ford F150	2009	Pickup	Outlander	25,779	2015
G43-3447B	Ford E350	2006	Pickup	VTRUX Van	31,157	2016
G43-25896	Ford E350	2004	Van - Pass	VTRUX Van	23,787	2016
G43-25893	Ford E350	2004	Van - Pass	VTRUX Van	37,639	2016
G43-25891	Ford E350	2004	Van - Pass	VTRUX Van	29,130	2016
G43-1961H	Chevrolet C3500	2009	Pickup	eNV200	30,409	2016
G43-1892H	Chevrolet C2500HD	2009	Pickup	eNV200	22,378	2016
G43-0904K	Ford F350	2008	Pickup	eNV200	35,537	2016
G43-0825G	Ford F350	2008	Pickup	Outlander	32,346	2016
G43-0812G	Ford F250	2008	Pickup	eNV200	40,313	2016
G43-0807G	Ford F250	2008	Pickup	Outlander	35,053	2016
G62-1076G	Chevrolet K1500	2008	Pickup	Outlander	38,749	2016
G62-0208H	Chevrolet K1500	2009	Pickup	Outlander	32,148	2016

Appendix H
Motor Transport Branch Vehicle Analysis

There are four replacement approaches identified for the Motor Transport Branch:

- Monitored vehicles
  - GSA-listed PEVs only
  - All potential PEV types
- Full fleet
  - GSA-listed PEVs only for sedans
  - All potential PEV types for non-sedan vehicles.

The extensive analysis conducted for monitored vehicles (Task 3) results in high confidence that the suggested vehicle can meet mission requirements. The suggested vehicles for the full fleet rely on the extrapolation of those monitored vehicles and the guidance identified in Section 3.

H.1 Monitored Vehicle General Services Administration Replacement Approach

The vehicles monitored include several vehicle types for which no GSA-listed replacement is currently available. The sedans monitored are shown in Table H-1, along with potential replacement PEVs and year of potential replacement.

Table H-1. Motor Transport Branch GSA vehicle replacement approach.

GSA Replacement Approach					
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement PEV	Replacement Year
G11-2676G	Chevrolet Impala	2008	Large Car	Leaf	2015
G12-0662H	Ford Fusion HEV	2010	Midsize Sedan	Fusion	2015
G10-6379L	Dodge Avenger	2011	Midsize Sedan	Leaf	2017
G11-0493L	Chevrolet Impala	2012	Large Car	Fusion	2017
G10-2878L	Chevrolet Malibu	2011	Midsize Sedan	Leaf	2018
G11-2675G	Chevrolet Impala	2008	Large Sedan	Leaf	2018
G11-0678K	Chevrolet Impala	2010	Large Car	Leaf	2018
G10-7664F	Dodge Avenger	2008	Compact Sedan	Volt	2018

Note that the GSA schedule does not currently list the Leaf, although it did in previous years. It is expected that it will be listed again by 2015.

H.2 Monitored Non-Sedan Vehicle All Replacement Approach

Table H-2 provides a replacement approach for the non-sedan-type monitored vehicles using currently or soon-to-be available PEVs. Although not currently listed by GSA, these or similar vehicles may be listed by the year identified or JBLM may choose to justify the replacement.

Table H-2. Motor Transport Branch non-sedan monitored vehicle replacement approach.

Monitored Vehicle All Replacement Approach					
Fleet Vehicle Id	Model	Year	EPA Class	Potential Replacement PEV	Replacement Year
G41-65991	Dodge Dakota	2002	Pickup Truck	VTRUX PU	2015
G43-25839	Ford F350	2003	Pickup Truck	eNV200	2015
G41-1288A	Sport Trac	2004	Pickup Truck	Rav4 EV	2015
G43-3717A	Ford E350	2004	Cargo Van	VTRUX Van	2015

Monitored Vehicle All Replacement Approach					
Fleet Vehicle Id	Model	Year	EPA Class	Potential Replacement PEV	Replacement Year
G43-4937A	Ford E350	2004	Cargo Van	VTRUX Van	2015
G63-0271A	Ford F350Stake	2004	Stake Truck	NA	2015
G71-0674A	Ford F650 18'BO	2004	Delivery Van	VTRUX Van	2015
G42-3471A	Chevrolet G2300	2005	Cargo Van	eNV200	2015
G61-1155D	Ford Escape HYB	2006	SUV	Rav4 EV	2015
G42-0988F	Chev. Express 13	2007	Cargo Van	VTRUX Van	2015
G41-1161G	Chevrolet Uplander	2008	Minivan	Rav4 EV	2015
G41-1180G	Chevrolet Uplander	2008	Minivan	Rav4 EV	2015
G41-1367G	Dodge Dakota	2008	Pickup Truck	Rav4 EV	2015
G41-1373G	Dodge Dakota	2008	Pickup Truck	Rav4 EV	2015
G41-1376G	Dodge Dakota	2008	Pickup Truck	Rav4 EV	2015
G41-1392G	Chevrolet Uplander	2008	Minivan	Outlander	2015
G41-1395G	Chevrolet Uplander	2008	Minivan	Rav4 EV	2015
G43-0860G	Chevrolet CG3300	2008	Passenger Van	VTRUX Van	2015
G62-0979G	Dodge 1500	2008	Pickup Truck	VTRUX PU	2015
G82-0509A	Ford F650 Stake	2004	Stake Truck	NA	2016
G43-3881H	Ford E350	2009	Passenger Van	VTRUX Van	2016
G62-4526H	Chevrolet Tahoe	2009	SUV	Outlander	2016
G41-1100K	Dodge GR Caravan	2010	Minivan	Outlander	2017
G43-0790K	Chevrolet CG3300	2010	Passenger Van	VTRUX Van	2017
G43-0792K	Chevrolet CG3300	2010	Passenger Van	VTRUX Van	2017
G43-0801K	Chevrolet CG3300	2010	Passenger Van	VTRUX Van	2017
G43-0875K	Ford E350	2010	Cargo Van	VTRUX Van	2017
G43-1389K	Chevrolet CG3300	2010	Passenger Van	VTRUX Van	2017
G71-0062G	Ford F750	2008	Stake Truck	NA	2018
G42-0698K	Chevrolet C1500	2011	Pickup Truck	VTRUX PU	2018
G43-1191L	Chevrolet CG3300	2011	Passenger Van	VTRUX Van	2018
G62-1094L	Chev. Avalanche	2011	SUV	Rav4 EV	2018

H.3 Sedan Fleet Replacement Approach

GSA currently lists only sedans for PEVs. It is assumed that additional sedans will be added to the list in the next few years. Table H-3 provides the list of sedans in the Motor Transport fleet. The projected year of replacement is identified based on the GSA requirements and expected usage. The mileage is projected from the odometer reading in 2013 and annual mileage provided by JBLM.

Because of the large number of sedans in the Motor Transport Branch fleet (122), only those whose replacement is projected in 2015 and 2016 are identified in the table. For illustration, the vehicles marked in orange were monitored; therefore, high confidence exists in the potential replacement. These vehicles and the vehicles marked in green in this table reflect potential replacement vehicles that are included in Section 4.5.1.

Table H-3. Motor Transport Branch sedan fleet replacement approach.

Sedan Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement PEV	Estimated Mileage	Replacement Year
G10-5386H	Pontiac G6	2009	Sedan - Compact	Focus	58,385	2015

Sedan Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement PEV	Estimated Mileage	Replacement Year
G12-0371L	Pontiac G6	2009	Sedan - Compact	Volt	56,293	2015
G13-0180A	Ford Focus	2008	Sedan - Compact	Focus	43,174	2015
G10-3046K	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	46,519	2015
G10-3048K	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	48,489	2015
G12-0622H	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	62,327	2015
G12-0623H	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	61,312	2015
G12-0625H	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	42,231	2015
G12-0627H	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	40,268	2015
G12-0632H	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	62,985	2015
G12-0633H	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	64,221	2015
G12-0634H	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	73,208	2015
G12-0648H	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	54,366	2015
G12-0650H	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	52,078	2015
G11-0498L	Chevrolet Impala	2012	Sedan - Large	Fusion	84,574	2015
G11-0499L	Chevrolet Impala	2012	Sedan - Large	Fusion	67,368	2015
G11-0500L	Chevrolet Impala	2012	Sedan - Large	Fusion	106,276	2015
G11-0673K	Chevrolet Impala	2010	Sedan - Large	Leaf	37,394	2015
G11-0675K	Chevrolet Impala	2010	Sedan - Large	Fusion	83,377	2015
G11-0676K	Chevrolet Impala	2010	Sedan - Large	Fusion	108,700	2015
G11-0677K	Chevrolet Impala	2010	Sedan - Large	Leaf	37,357	2015
G11-0679K	Chevrolet Impala	2010	Sedan - Large	Fusion	43,496	2015
G11-0680K	Chevrolet Impala	2010	Sedan - Large	Leaf	38,653	2015
G11-0681K	Chevrolet Impala	2010	Sedan - Large	Fusion	87,368	2015
G11-0689K	Dodge Charger	2010	Sedan - Large	Fusion	113,004	2015
G11-0690K	Dodge Charger	2010	Sedan - Large	Fusion	101,041	2015
G11-0691K	Dodge Charger	2010	Sedan - Large	Fusion	109,055	2015
G11-0692K	Dodge Charger	2010	Sedan - Large	Fusion	124,104	2015
G11-1290H	Chevrolet Impala	2009	Sedan - Large	Fusion	46,318	2015
G11-1292H	Chevrolet Impala	2010	Sedan - Large	Leaf	36,589	2015
G11-2665G	Chevrolet Impala	2008	Sedan - Large	Fusion	44,157	2015
G11-2666G	Chevrolet Impala	2008	Sedan - Large	Leaf	38,352	2015
G11-2669G	Chevrolet Impala	2008	Sedan - Large	Leaf	36,185	2015
G11-2674G	Chevrolet Impala	2008	Sedan - Large	Fusion	51,376	2015
G11-2676G	Chevrolet Impala	2008	Sedan - Large	Fusion	52,163	2015
G11-2677G	Chevrolet Impala	2008	Sedan - Large	Fusion	40,467	2015
G11-2678G	Chevrolet Impala	2008	Sedan - Large	Fusion	50,390	2015
G11-2684G	Chevrolet Impala	2008	Sedan - Large	Leaf	36,748	2015
G11-2685G	Chevrolet Impala	2008	Sedan - Large	Fusion	55,842	2015
G11-2692G	Chevrolet Impala	2008	Sedan - Large	Fusion	54,718	2015
G11-2711G	Chevrolet Impala	2008	Sedan - Large	Fusion	61,389	2015
G11-2748G	Chevrolet Impala	2008	Sedan - Large	Fusion	99,461	2015
G11-2751G	Chevrolet Impala	2008	Sedan - Large	Fusion	87,723	2015
G11-3665F	Chevrolet Impala	2007	Sedan - Large	Fusion	43,262	2015
G11-8395F	Chevrolet Impala	2008	Sedan - Large	Leaf	35,524	2015

Sedan Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement PEV	Estimated Mileage	Replacement Year
G10-7531F	Pontiac G6	2008	Sedan - Compact	Volt	45,555	2016
G10-7539F	Pontiac G6	2008	Sedan - Compact	Volt	31,238	2016
G13-0181A	Ford Focus	2008	Sedan - Compact	Focus	43,800	2016
G10-0417F	Saturn Aura Hyb	2007	Sedan - Midsize	Leaf	31,463	2016
G10-3047K	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	43,334	2016
G12-0636H	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	39,380	2016
G12-0637H	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	41,510	2016
G11-0473L	Chevrolet Impala	2011	Sedan - Large	Fusion	80,052	2016
G11-1412L	Chevrolet Impala	2008	Sedan - Large	Leaf	39,935	2016
G11-2659G	Chevrolet Impala	2008	Sedan - Large	Leaf	38,736	2016
G11-2680G	Chevrolet Impala	2008	Sedan - Large	Leaf	37,029	2016
G11-2688G	Chevrolet Impala	2008	Sedan - Large	Leaf	37,686	2016
G11-2697G	Chevrolet Impala	2008	Sedan - Large	Leaf	36,803	2016
G11-3666F	Chevrolet Impala	2007	Sedan - Large	Leaf	35,362	2016

H.4 Near-Term Non-Sedan Vehicle Replacement Approach

Another approach to the replacement strategy is to consider vehicles that may be replaced in the next 2 years. Motor Transport Branch had 1,060 vehicles at the time of the analysis, with 927 remaining after subtracting the heavy-duty vehicles, specialty vehicles, low-speed vehicles, and buses. Of those 927 vehicles, 637 vehicles are projected to be replaced in 2015 and 2016.

There are 120 vehicles with a projected odometer reading over 70,000 miles at replacement. The 82 vehicles with mileage over 80,000 miles are identified in Table H-4, along with the vehicles monitored and certain other vehicles eligible for replacement. As before, many of these vehicles may have been replaced in 2014. For illustration, the vehicles marked in orange were monitored; therefore, high confidence exists in the potential replacement. These vehicles and the vehicles marked in green in this table reflect potential replacement vehicles that are included in Section 4.5.2.

Table H-4. Motor Transport Branch near-term non-sedan replacement approach.

Near-Term Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement PEV	Estimated Mileage	Replacement Year
G61-1155D	Ford Escape HYB	2006	SUV	Rav4 EV		2015
G41-1161G	Chevrolet Uplander	2008	Minivan	Rav4 EV		2015
G41-1180G	Chevrolet Uplander	2008	Minivan	Rav4 EV		2015
G41-1392G	Chevrolet Uplander	2008	Minivan	Outlander		2015
G43-3717A	Ford E350	2004	Cargo Van	VTRUX Van		2015
G43-4937A	Ford E350	2004	Cargo Van	VTRUX Van		2015
G43-0860G	Chevrolet CG3300	2008	Passenger Van	VTRUX Van		2015
G41-65991	Dodge Dakota	2002	Pickup Truck	VTRUX PU		2015
G62-0979G	Dodge 1500	2008	Pickup Truck	VTRUX PU		2015
G41-1376G	Dodge Dakota	2008	Pickup Truck	Rav4 EV		2015
G31-1390	Ford E450	2002	Van - Cargo	VTRUX Van	97,055	2015
G32-0108F	Chevrolet Senator	2008	Van - Pass	VTRUX Van	119,703	2015
G32-0215F	Chevrolet Senator	2008	Van - Pass	VTRUX Van	111,956	2015
G32-0217F	Chevrolet Senator	2008	Van - Pass	VTRUX Van	110,567	2015

Near-Term Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement PEV	Estimated Mileage	Replacement Year
G32-0104F	Supreme SII	2008	Van - Pass	VTRUX Van	85,842	2015
G41-68897	Dodge Caravan	2005	Minivan	Outlander	103,079	2015
G41-1379A	Dodge GR Caravan	2005	Minivan	Outlander	101,838	2015
G41-1620D	Dodge GR Caravan	2006	Minivan	Rav4EV	94,324	2015
G41-5435B	Dodge GR Caravan	2006	Minivan	Rav4EV	90,674	2015
G41-71778	Dodge Caravan SE	2005	Minivan	Rav4EV	89,698	2015
G41-1369G	Dodge Dakota	2008	Pickup	Outlander	84,651	2015
G41-1642D	Ford Ranger	2006	Pickup	Rav4EV	82,467	2015
G41-2146F	Chevrolet Uplander	2007	Minivan	Rav4EV	82,069	2015
G42-0536A	Ford E150	2004	Van - Pass	VTRUX Van	94,728	2015
G42-3452A	Chevrolet G1300	2004	Van - Cargo	VTRUX Van	84,474	2015
G42-2834H	Ford F150	2008	Pickup	VTRUX PU	82,789	2015
G43-1366D	Chevrolet G2300	2006	Van - Cargo	VTRUX Van	119,159	2015
G43-0904G	Chevrolet CG3300	2008	Van - Pass	VTRUX Van	101,774	2015
G43-2605L	Chevrolet CG3300	2005	Van - Pass	VTRUX Van	101,664	2015
G43-4945A	Chevrolet G2300	2005	Van - Cargo	eNV200	97,928	2015
G43-0960A	Chevrolet CG3300	2004	Van - Pass	VTRUX Van	97,607	2015
G43-1385D	Chevrolet G2300	2006	Van - Cargo	eNV200	97,447	2015
G43-0905G	Chevrolet CG3300	2008	Van - Pass	VTRUX Van	96,349	2015
G43-1367D	Chevrolet G2300	2006	Van - Cargo	eNV200	92,293	2015
G43-4960A	Ford E350	2005	Van - Pass	VTRUX Van	92,124	2015
G43-1380D	Chevrolet G2300	2006	Van - Cargo	eNV200	88,024	2015
G43-1381D	Chevrolet G2300	2006	Van - Cargo	eNV200	86,670	2015
G43-4944A	Chevrolet G2300	2005	Van - Cargo	eNV200	86,607	2015
G43-0956A	Chevrolet C3500	2004	Pickup	VTRUX PU	86,463	2015
G43-4956A	Ford E350	2005	Van - Pass	VTRUX Van	85,910	2015
G43-1365D	Chevrolet G2300	2006	Van - Cargo	eNV200	85,843	2015
G43-1358D	Ford E350	2006	Van - Pass	VTRUX Van	84,492	2015
G43-1359D	Ford E350	2006	Van - Pass	VTRUX Van	84,420	2015
G43-0859G	Chevrolet CG3300	2008	Van - Pass	VTRUX Van	83,134	2015
G43-0876G	Chevrolet CG3300	2008	Van - Pass	VTRUX Van	82,854	2015
G43-0853G	Chevrolet CG3300	2008	Van - Pass	VTRUX Van	81,629	2015
G43-0863G	Chevrolet CG3300	2008	Van - Pass	VTRUX Van	80,451	2015
G62-0976G	Dodge 1500	2008	Pickup	VTRUX PU	168,153	2015
G62-1071G	Chevrolet K1500	2008	Pickup	VTRUX PU	150,535	2015
G62-0977G	Dodge 1500	2008	Pickup	VTRUX PU	145,643	2015
G62-1062G	Chevrolet Tahoe	2008	SUV	Outlander	143,726	2015
G62-0683A	Ford Expedition	2004	SUV	Outlander	132,471	2015
G62-1052L	Chevrolet K1500	2005	Pickup	VTRUX PU	126,116	2015
G62-0694A	Ford Explorer	2004	SUV	Outlander	109,891	2015
G62-1432D	Chev. Trailblazer	2006	SUV	Outlander	106,496	2015
G62-1063G	Chevrolet Tahoe	2008	SUV	Outlander	106,020	2015
G62-1068G	Chevrolet K1500	2008	Pickup	VTRUX PU	102,970	2015
G62-3741B	Dodge Durango	2006	SUV	Rav4EV	81,789	2015

Near-Term Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement PEV	Estimated Mileage	Replacement Year
G62-4630D	Dodge Durango	2007	SUV	Rav4EV	80,989	2015
G63-0621D	Ford F350	2006	Pickup	VTRUX PU	107,461	2015
G63-9491	Chevrolet K3500	2002	Pickup	VTRUX PU	94,044	2015
G63-2057A	Ford F350 CREWC	2004	Pickup	VTRUX PU	88,257	2015
G71-2739	Ford F450	2002	Pickup	Rav4EV	88,181	2015
G71-3295	Ford F550	2003	Pickup	Rav4EV	87,534	2015
G71-0115A	Ford F650 18'BO	2004	Van - Cargo	eNV200	80,748	2015
G62-4526H	Chevrolet Tahoe	2009	SUV	Outlander		2016
G41-5863H	Chevrolet HHR	2009	SUV	Rav4EV	13,188	2016
G62-4517H	Chev. Avalanche	2009	SUV	Rav4EV	19,652	2016
G62-0277H	Chev. Trailblazer	2009	SUV	Rav4EV	21,475	2016
G41-5864H	Chevrolet HHR	2009	SUV	Rav4EV	25,876	2016
G41-1773H	Dodge GR Caravan	2009	Minivan	Outlander	33,652	2016
G41-5843H	Dodge GR Caravan	2009	Minivan	Rav4EV	39,195	2016
G41-5857H	Dodge GR Caravan	2009	Minivan	Rav4EV	42,807	2016
G41-5841H	Dodge GR Caravan	2009	Minivan	Rav4EV	47,894	2016
G41-5844H	Dodge GR Caravan	2009	Minivan	Outlander	52,131	2016
G41-1772H	Dodge GR Caravan	2009	Minivan	Outlander	53,640	2016
G41-1776H	Ford Ranger	2009	Pickup	VTRUX PU	91,982	2016
G42-0900H	Chevrolet G1300	2009	Van - Cargo	VTRUX Van	100,068	2016
G42-0906H	Chevrolet G1300	2009	Van - Cargo	VTRUX Van	94,020	2016
G43-3881H	Ford E350	2009	Van - Pass	VTRUX Van	49,085	2016
G43-1934H	Chevrolet CG3300	2009	Van - Pass	VTRUX Van	121,591	2016
G43-3880H	Ford E350	2009	Van - Pass	VTRUX Van	119,178	2016
G43-3891H	Ford E350	2009	Van - Pass	VTRUX Van	110,431	2016
G43-1887H	Chevrolet CG3300	2009	Van - Pass	VTRUX Van	103,472	2016
G43-3884H	Ford E350	2009	Van - Pass	VTRUX Van	91,956	2016
G43-1962H	Ford F350	2009	Pickup	Rav4EV	82,004	2016
G43-3890H	Ford E350	2009	Van - Pass	VTRUX Van	80,296	2016
G62-4527H	Chevrolet Tahoe	2009	SUV	Outlander	220,642	2016
G62-0200H	Chevrolet K1500	2009	Pickup	VTRUX PU	117,369	2016
G62-4136G	Chev. Avalanche	2009	SUV	Outlander	102,536	2016
G62-0216H	Chevrolet G1300	2009	Van - Cargo	VTRUX Van	92,105	2016
G42-0907H	Chevrolet G1300	2009	Van - Cargo	VTRUX Van	41,150	2016
G42-0904H	Chevrolet G1300	2009	Van - Cargo	VTRUX Van	45,820	2016
G42-0901H	Chevrolet G1300	2009	Van - Cargo	VTRUX Van	47,520	2016
G43-1965H	Ford E350	2009	Van - Pass	VTRUX Van	76,746	2016
G43-3882H	Ford E350	2009	Van - Pass	VTRUX Van	78,805	2016
G43-3889H	Ford E350	2009	Van - Pass	VTRUX Van	79,980	2016
G63-1464H	K2500HD	2009	Pickup	VTRUX Van	54,122	2016
G41-1804H	Dodge Dakota	2009	Pickup	VTRUX Van	49,191	2016
G41-1819H	Dodge Dakota	2009	Pickup	VTRUX Van	47,053	2016
G42-0912H	Chevrolet C1500	2009	Pickup	VTRUX Van	46,039	2016
G62-0199H	Chevrolet K1500	2009	Pickup	VTRUX Van	46,039	2016

Near-Term Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement PEV	Estimated Mileage	Replacement Year
G42-0910H	Chevrolet C1500	2009	Pickup	VTRUX Van	42,248	2016
G41-1803H	Dodge Dakota	2009	Pickup	VTRUX Van	38,834	2016
G62-0220H	K1500	2009	Pickup	VTRUX Van	35,891	2016
G63-1458H	K3500	2009	Pickup	VTRUX Van	35,317	2016
G42-0913H	C1500	2009	Pickup	VTRUX Van	34,012	2016
G62-4246H	1500	2009	Pickup	VTRUX Van	33,419	2016
G61-1857H	DAKOTA	2009	Pickup	VTRUX Van	30,824	2016

Appendix I
Balance of JBLM Fleet

The balance of the JBLM Fleet includes 205 vehicles, without the specialty vehicles, buses, and heavy-duty trucks. These vehicles were not monitored during the study, but have vehicles that may be replaced in the near term.

I.1 Sedan Fleet Replacement Approach

GSA currently lists only sedans for PEVs. It is assumed that additional sedans will be added to the list in the next few years. Table I-1 provides the list of the 32 sedans in the balance of the JBLM fleet not previously addressed that are projected to be replaced by 2017. The projected year of replacement is identified based on the GSA requirements and expected usage. The mileage is projected from the odometer reading in 2013 and annual mileage provided by JBLM. Vehicles marked in green in this table reflect potential replacement vehicles that are included in Section 4.6.1.

Table I-1. Balance of Fleet sedan fleet replacement approach.

Sedan Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Estimated Mileage	Replacement Year
G10-7541F	Pontiac G6	2008	Sedan - Compact	Focus	37,883	2015
G10-5325H	Pontiac G6	2009	Sedan - Compact	Volt	54,236	2015
G10-1069K	Ford Fusion HEV	2010	Sedan - Midsize	Fusion	41,552	2015
G10-7540F	Pontiac G6	2008	Sedan - Compact	C-Max	34,342	2016
G10-2841L	Dodge Avenger	2011	Sedan - Compact	Volt	43,911	2016
G10-7529F	Pontiac G6	2008	Sedan - Compact	Leaf	35,346	2016
G10-7668F	Dodge Avenger	2008	Sedan - Compact	Volt	67,699	2016
G10-2950L	Ford Fusion HEV	2011	Sedan - Midsize	Fusion	15,581	2016
G11-0476L	Chevrolet Impala	2011	Sedan - Large	Leaf	11,311	2016
G11-0475L	Chevrolet Impala	2011	Sedan - Large	Volt	75,455	2016
G11-2543G	Chevrolet Impala	2008	Sedan - Large	Leaf	37,242	2016
G11-0477L	Chevrolet Impala	2011	Sedan - Large	Fusion	72,698	2016
G11-0466K	Chevrolet Impala	2011	Sedan - Large	Leaf	36,445	2016
G11-2053G	Chevrolet Impala	2011	Sedan - Large	Fusion	66,055	2016
G11-0479L	Chevrolet Impala	2011	Sedan - Large	Leaf	45,262	2016
G11-0481L	Chevrolet Impala	2011	Sedan - Large	Focus	36,678	2016
G10-7525F	Pontiac G6	2008	Sedan - Compact	Leaf	23,000	2017
G10-3003K	Chevrolet Malibu	2010	Sedan - Midsize	Volt	56,473	2017
G10-5364H	Pontiac G6	2009	Sedan - Compact	Focus	53,519	2017
G10-7669F	Dodge Avenger	2008	Sedan - Compact	Focus	46,324	2017
G10-6362L	Chevrolet Malibu	2011	Sedan - Midsize	Volt	34,916	2017
G10-5715M	Hyundai Sonata HEV	2012	Sedan - Large	Fusion	15,371	2017
G10-5714M	Hyundai Sonata HEV	2012	Sedan - Large	Fusion	74,09	2017
G10-5713M	Hyundai Sonata HEV	2012	Sedan - Large	Fusion	17,524	2017
G11-2552G	Chevrolet Impala	2008	Sedan - Large	Volt	40,153	2017
G11-2551G	Chevrolet Impala	2008	Sedan - Large	Leaf	17,475	2017
G11-2550G	Chevrolet Impala	2008	Sedan - Large	Leaf	31,661	2017
G11-2547G	Chevrolet Impala	2008	Sedan - Large	Leaf	57,003	2017
G11-2545G	Chevrolet Impala	2008	Sedan - Large	Fusion	43,527	2017

Sedan Fleet Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Estimated Mileage	Replacement Year
G11-2544G	Chevrolet Impala	2008	Sedan - Large	Leaf	35,778	2017
G11-0478L	Chevrolet Impala	2011	Sedan - Large	Leaf	37,214	2017
G13-4623L	Ford Focus	2012	Sedan - Compact	Focus	21,572	2017

I.2 Near-Term Non-Sedan Vehicle Replacement Approach

Another approach to the replacement strategy is to consider non-sedan vehicles that may be replaced in the next 2 years. Of the 205 vehicles in the balance of the fleet, there are 47 vehicles whose odometer is expected to exceed 60,000 miles at the time of project replacement. They are identified in Table I-2, along with other vehicles (marked in green), whose potential replacement flows into those identified in Section 4.6.2. Table I-2 identifies the balance of fleet vehicles that are projected to be replaced in 2015 and 2016. (Note that JBLM may have replaced several of these vehicles in 2014.)

Table I-2. Balance of Fleet near-term replacement approach.

Near-Term Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Estimated Mileage	Replacement Year
G41-2114F	Chevrolet Uplander	2007	Minivan	Rav4 EV	72,645	2015
G41-1177G	Chevrolet Uplander	2008	Minivan	Rav4 EV	68,954	2015
G41-4535F	Chevrolet Uplander	2007	Minivan	Rav4 EV	66,553	2015
G41-5433B	Dodge GR Caravan	2006	Minivan	Rav4	63,451	2015
G42-0034G	Chevrolet C1500	2008	Pickup	VTRUX PU	70,455	2015
G43-1409D	Ford E350	2006	Van - Pass	VTRUX Van	95,847	2015
G43-1415D	Ford E350	2006	Van - Pass	VTRUX Van	80,320	2015
G43-1755F	Ford E350	2007	Van - Pass	VTRUX Van	64,489	2015
G61-1144B	Dodge Dakota	2005	Pickup	Rav4 EV	83,122	2015
G61-0259G	Saturn Vue AWD	2008	SUV	Outlander	72,194	2015
G61-0210G	Dodge Dakota	2008	Pickup	Rav4 EV	67,056	2015
G62-3684B	Chevrolet Tahoe	2005	SUV	Outlander	109,869	2015
G62-0668A	Chevrolet Tahoe	2004	SUV	Rav4 EV	85,325	2015
G62-1468D	Ford F150	2006	Pickup	Rav4 EV	84,373	2015
G62-4284A	Ford F150 CREW	2005	Pickup	Rav4 EV	79,443	2015
G62-2208F	Dodge Durango	2007	SUV	Rav4 EV	78,714	2015
G62-3737B	Ford F150	2006	Pickup	Rav4 EV	64,735	2015
G62-1415D	Chevrolet Suburban	2006	SUV	Rav4 EV	64,659	2015
G62-1495D	Chevrolet K1500	2007	Pickup	VTRUX PU	63,721	2015
G63-2647D	Chevrolet Suburban	2007	SUV	Rav4 EV	82,641	2015
G63-2634D	Dodge Ram 2500	2007	Pickup	Rav4 EV	76,553	2015
G71-0101G	Ford F550	2003	Pickup	VTRUX PU	71,511	2015
G41-1792H	Dodge GR Caravan	2009	Minivan	Outlander	95,580	2016
G41-1790H	Dodge GR Caravan	2009	Minivan	Outlander	94,162	2016
G41-1791H	Dodge GR Caravan	2009	Minivan	Outlander	90,585	2016
G62-2498H	Chev. Trailblazer	2009	SUV	Outlander	59,303	2016
G61-1865H	Ford Escape	2009	SUV	Rav4 EV	57,534	2016
G62-0215H	Chevrolet G1300	2009	Van - Cargo	VTRUX Van	56,550	2016

Near-Term Replacement Approach						
Fleet Vehicle Id	Make/Model	Year	EPA Class	Potential Replacement Vehicle	Estimated Mileage	Replacement Year
G62-0219H	Chevrolet G1300	2009	Van - Cargo	VTRUX Van	46,703	2016
G41-1800H	Ford Ranger	2009	Pickup	Rav4 EV	64,577	2016
G43-1957H	Chevrolet CG3300	2009	Van - Pass	VTRUX Van	77,382	2016
G43-3888H	Ford E350	2009	Van - Pass	VTRUX Van	64,284	2016
G43-1928H	Chevrolet CG3300	2009	Van - Pass	VTRUX Van	62,652	2016
G43-2775H	Chevrolet CG3300	2009	Van - Pass	VTRUX Van	61,838	2016
G62-4512H	Dodge 1500	2009	Pickup	VTRUX PU	99,643	2016
G63-1482H	Chevrolet K2500	2009	Pickup	VTRUX PU	93,293	2016