



# DOD Electric Vehicle Working Group



*Electric Mobility Workshop  
July 18, 2011*

Presented by  
Camron Gorguinpour, PhD  
Special Assistant  
Office of the Assistant Secretary of the Air Force  
*Installations, Environment & Logistics*  
[Camron.Gorguinpour@pentagon.af.mil](mailto:Camron.Gorguinpour@pentagon.af.mil)

# EV Project Objectives...



- ▶ Reduce Petroleum Consumption
- ▶ Reduce Greenhouse Gas Emissions
- ▶ Increase Use of Alternative Fuel Vehicles





# Project Goals

- ▶ Develop a strategy to *maximize use* of Electric Vehicles in DOD's non-tactical ground fleet, while *minimizing lifecycle investment*.
- ▶ Achieve lifecycle cost parity (or better) between EV's and comparable ICE vehicles.
- ▶ Begin a 3–5 year large-scale integration of EV's in FY2012.

# Project Strategy



- ▶ This project is currently operating under three distinct but inter-related lines of activity:
  - EV Industry Analysis
  - Baseline Fleet & Charging Infrastructure Analyses
  - EV Ancillary Services Analysis
- ▶ Successful completion of each of these activities will not only support DOD fleet electrification but also generate a extensive body of knowledge that can be applied elsewhere.

# Current Fleet Statistics



**Total # Non-Tactical Vehicles: ~194,710**

Vehicle Type	% of Fleet	Ave. Annual Miles
MD Trucks*	22%	6251
LD 4x2 Trucks	15%	7690
LD Pass. Vans	11%	9043
Compact Sedans	9%	~16325
Midsize Sedans	9%	~16325
HD Trucks	9%	3516

\*Largest Fuel Consumer in DOD Non-Tactical Fleet: ~43 M gallons of petroleum/year

# EV/PHEV Opportunities



Vehicle Class	Est. # OEM's
MD Truck/Van	10
LD 4x2 Truck	2
LD Pass. Van	4
Compact Sedan	10
Mid-Size Sedan	13
HD Truck	2

- ▶ MD Trucks/Vans present the greatest opportunity for impact in DOD's non-tactical fleet, by volume, petroleum consumption, and variety of manufacturers.
- ▶ MD Trucks/Vans typically have well-defined duty cycles, which makes it easier to "right-size" batteries.

# Strategies for Improving EV Financial Outlook



## Volume Pricing

- DOD's non-tactical ground fleet consists of ~200,000 vehicles.
- Annual volumes in the 10,000's can significantly reduce price of EV sedans.
  - Passenger sedans compose ~20% of fleet.
- Annual volumes of ~1,000 can significantly reduce the price of EV trucks.
  - LD/MD/HD trucks compose ~52% of fleet.

## Battery Right-Sizing

- DOD MD/HD trucks average ~6,000/3,000 miles per year, respectively.
- A significantly downsized battery can provide the same functionality as ICE trucks for the vast majority of DOD applications.
- Goal for battery right-sizing is to match the battery size to the average daily range, as close as possible.

## Ancillary Services

- Hardware and software exist to integrate EV's with micro- and macro-grids.
  - OEM support necessary for implementation.
- Revenue estimates range from ~\$2,000-\$6,000/vehicle, depending on vehicle type.
- Cost savings estimates from peak shaving are ~\$1,200-\$1,800/vehicle.
- Dependent on regional/local conditions.
- Supports base-level energy management.

## Infrastructure Planning

- Cost of EV charging hardware is minimal, particularly with volume.
- Infrastructure improvements may be significant but vary by location.
- Co-locating multiple EV chargers may significantly reduce installation costs.
- Coordination of charging times and ancillary services may help mitigate strains on grid.
- INL currently working on baseline analyses.

# EV Financing



- ▶ Fleet budgets do not allow for large-volume purchase of vehicles, so leasing/alternate financing models are necessary.
- ▶ Some passenger EV financing options are currently available that present a reasonable financial proposition for DOD.
- ▶ Broader financing options may require more definitive analyses of EV useful life and residual values.
- ▶ Partnering with GSA on a variety of activities.
- ▶ Alternative financing models (e.g. ESPC's) are currently being explored.



# The Volt Example

- ▶ Based on FY2011 retail lease pricing, the incremental total cost of ownership for a Chevy Volt is  $< \$100/\text{month}$ .
- ▶ With volume pricing, that incremental cost could be even less.
- ▶ Nominal value estimates for EV ancillary services show  $\sim \$100\text{--}150$  revenues or savings per vehicle each month
- ▶ Value proposition for MD/HD trucks could be even better.



# Current Activities



- ▶ Issued broad-ranging RFI to EV Industry (responses due today)
  - Follow-up with Industry Day at Pentagon on August 1.
- ▶ OSD allocated resources to conduct site analyses for EV charging infrastructure at 10–15 base.
  - Corresponding resources available to assess EV ancillary services costs and potential revenues/savings.
- ▶ Partnering with GSA to conduct comprehensive assessment of EV useful life and residual values.
- ▶ Planning technology demonstrations for EV ancillary services.
- ▶ Big announcement coming soon...stay tuned!

# Timeline



- ▶ Goal is to *begin* integration of EV's into non-tactical fleet beginning in Summer 2012.
  - Exact numbers and types of vehicles are dependent on available business models.
  - It is expected that broader integration will take place over 3–5 years.
- ▶ To meet targeted deployment timeline, the aforementioned “Key Activities” must be completed in a matter of months.
  - Currently identifying necessary resources to carry out “Key Activities”

# Conclusion



- ▶ This project is expanding rapidly, and we are engaging industry, academia, and government on multiple fronts.
- ▶ The level of data collection and analysis proposed and underway will create a substantial body of information for DOD and others.
- ▶ We stand ready to support JBLM's fleet electrification efforts.

# Questions?

