



DOE Electric Vehicle Program

Electrifying the DOE Fleet





DOE Electric Vehicle Program

Definitions

- **Battery Electric Vehicle (BEV)** – A vehicle powered by electricity, generally provided by batteries. BEVs qualify in the Zero Emission Vehicle (ZEV) category for emissions.
- **Plug-in Hybrid Electric Vehicle (PHEV)** – A vehicle propelled by both an internal combustion engine and an electric motor.
- **Hybrid Electric Vehicle (HEV)** – A vehicle powered by two or more energy sources, one of which is electricity. HEVs combine the engine and fuel of a conventional vehicle with the batteries and electric motor of an EV.



DOE Electric Vehicle Program

Program Enablers

- Energy Policy Act (EPAAct) 1992/2005
- Energy Independence and Security Act (EISA) 2007
- Executive Order 13693, Planning for Federal Sustainability in the Next Decade (2015)
- Fixing America's Surface Transportation (FAST) Act (2015)



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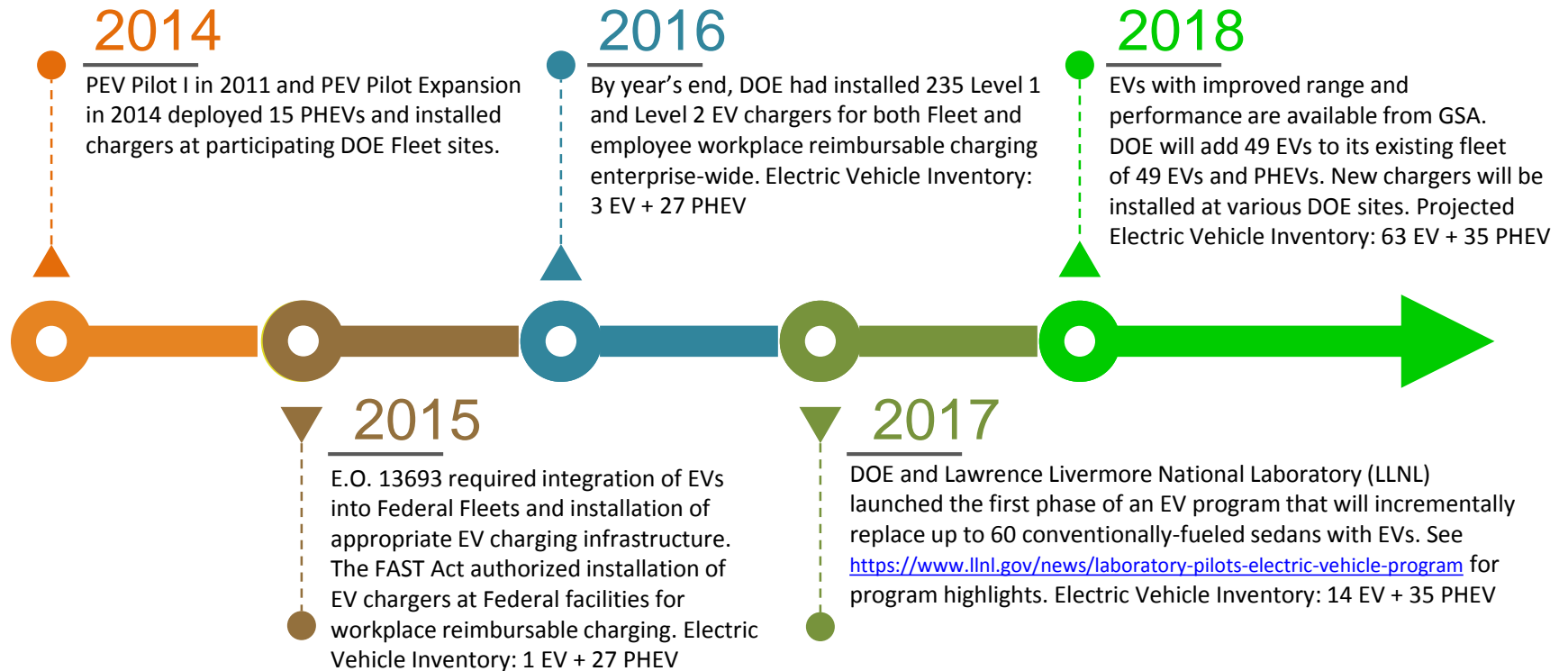
Why Consider Electricity as a Vehicle Fuel?

- Emissions Reduction
Electricity used in plug-in hybrid electric vehicles (PHEVs) and all-electric vehicles (EVs) offer significant emissions reduction over conventional fuels. EVs produce zero tailpipe emissions and PHEVs produce no tailpipe emissions when in all-electric mode.
- Fuel Economy
Light-duty EVs (or PHEVs in electric mode) can exceed 100 mpge and can drive 100 miles consuming only 25-40 kWh.
- Infrastructure Availability
The electric grid is available almost anywhere people drive and park, supporting a rapidly expanding network of electric vehicle charging infrastructure.
<http://www.eere.energy.gov/afdc/stations/advanced.php>



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DOE Electric Vehicle Program Time Line





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2018 EV Deployment Sites

Fleet Name	State	2018 Inventory (Actual)		2018 Acquisition (Planned)		Total Inventory 2018 Year-End
		EV	PHEV	EV	PHEV	
Argonne National Laboratory	IL		2			2
Bonneville Power Administration	WA		2			2
Bonneville Power Administration	OR		2			2
DOE Headquarters	DC		3			3
Fermilab	IL		1			1
Idaho National Laboratory	ID			2		2
Lawrence Berkeley National Laboratory	CA		1	8		9
Lawrence Livermore National Laboratory	CA	10		20		30
Los Alamos National Laboratory	NM		3	4		7
Mission Support Alliance	WA	1	1	2		4
National Energy Technology Laboratory	PA			1		1
National Energy Technology Laboratory	WV			1		1
National Renewable Energy Laboratory	CO			1		1
Nevada National Security Site	NV	2	11			13
Nevada Site Office (NNSA)	NV	1				1
Sandia National Laboratory	NM			3		3
Sandia National Laboratory	CA			1		1
Savannah River Site	SC		1			1
Stanford Linear Accelerator	CA		2	6		8
Oak Ridge National Laboratory	TN		5			5
Western Area Power Administration	CO		1			1
Total:						98



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Model Year 2018 EV Acquisitions



Make & Model	Ford Focus Electric	Chevy Bolt
Vehicle Type	Subcompact Sedan	Subcompact Sedan
Government Contract Price	\$16,701.36	\$32,118.00
Passenger Volume (cu. ft.)	91	94
Rear Legroom (in.)	33.2	36.5
Cargo Capacity (cu. ft.)	14	23 to 56, depending on seat configuration
Total Range (miles)	115	238
Recharge Times ^{(1), (2)}	120V=30 hrs; 240V=5.5 hrs; DC Fast=0.7 to 1.4 hrs	120V=59.5 hrs; 240V=9.3 hrs; DC Fast: 1.25 hrs
MPG Electric (combined/city/hwy)	107/118/96	*/128/110
Emission (gCO ₂ e/mile)	0	0
Annual Fuel Savings Versus Comparable Vehicle ⁽³⁾	211 gallons	240 gallons

- (1) All vehicles come with a Level 1 120V charger capable of plugging in to a 3-prong wall outlet. Charging times can vary based on type of charger.
- (2) DC Fast Charging capability comes standard on Ford Focus Electric. On Chevy Bolt, DC Fast Charging is an option for an additional price of \$681.75.
- (3) Based on 8,000 miles per year and city/highway combined fuel economy rating.



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PHEVs in the DOE Fleet



Chevy Volt



Ford CMAX Energi



Ford Fusion Energi



Chrysler Pacifica Hybrid



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2018 EV Charger Locations

Fleet Site	Number of EV Chargers				Use
	L1	L2	Solar (L2)	DC Fast (L3)	
Argonne National Laboratory, IL		2			Fleet
Bonneville Power Administration, WA		4			Fleet
DOE Germantown, MD			2		Workplace
DOE Headquarters, Washington DC		2			Both
Fermilab		4			Both
Hanford Site, WA		2			Fleet
Idaho National Laboratory, ID		3			Fleet
Lawrence Berkeley National Laboratory, CA	13	10			Both
Lawrence Livermore National Laboratory, CA	37	1	2 (mobile)		Both
Los Alamos National Laboratory, NM		5			Fleet
National Energy Technology Laboratory		4			Both
National Renewable Energy Laboratory, CO		36		1	Both
Nevada National Security Site, NV		15	2 (mobile)		Fleet
Oak Ridge National Laboratory, TN		23	25	1	Both
Pacific Northwest National Laboratory, WA	18	44			Both
Savannah River Site, SC		1			Fleet
Stanford Linear Accelerator, CA	26	7			Both
Western Area Power Administration, CO		1			Fleet
Total	94	164	31	2	



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EV Chargers Used at DOE Fleet Sites



Level 2 Charger
DOE/SC Fermilab, IL



Mobile Solar Level 2 Charger
DOE/NNSA Livermore, CA



Level 1 Cord Set



DC Fast Charger




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Supplemental Slides



EV Chargers Power Level Standards

Charger Type	AC	DC	
Level 1	120 V single phase ≤ 16 A ≤ 1.92 kW		
Level 2 208 V	208Y/120V 3-phase ≤ 48 A ≤ 9.98 kW		
Level 2 240 V	240 V split phase ≤ 30 A, ≤ 7.20 kW ≤ 32 A (2001), 7.68 kW ≤ 80 A (2009), ≤ 7.68 kW		
Level 3		200 – 600 VDC ≤ 400 A ≤ 240 kW	SAE J1772 Standard US Connector



Additional Resources and POCs

- **Chevy Bolt BEV, Ford Focus BEV, PHEVs, Mobile Solar Chargers and Level 2 Chargers Costs, Installation, Performance and Lessons Learned**
 - Mr. Ricky Medina
Manager, Site Services Division, Nevada National Security Site
medinarf@nv.doe.gov, phone: (702) 295-7009
- **Ford Focus BEV, Mobile Solar Chargers and Level 2 Chargers Costs, Installation, Performance and Lessons Learned**
 - Mr. Hanif Nassor-Covington
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