

WHAT ARE THE BENEFITS OF DRIVING A PEV? WHAT CARS ARE AVAILABLE?

Driving a Plug-in Electric Vehicle (PEV) is an exhilarating experience. PEV owners across the country have discovered the “PEV Smile.”

The California PEV Driving Experience



Drive a PEV Now
Available Today and
Dozens Coming Soon



**Experience the Most
High Tech Cars**



PEVs are Fast Off the Line

**Save Green by
Being Green**
Driving on Electricity
Saves Money



Fuel Anytime
Fuel While You Sleep and
Have a Full Tank in the
Morning



Fuel Anywhere
Use a Standard Wall
Outlet or a Charging
Station



**Clean the Air, Improve
Public Health, Reduce
Your Carbon Footprint**
PEVs Help Achieve All Three



**Support Energy
Independence**
PEVs Use Domestically
Produced Electricity



**Enjoy the Perks of
California PEV
Driving**
Parking, Driving, Buying benefits












Trend Set
PEVs Drive California's
Future



Source: California PEV Collaborative (CG2-1),
California PEV Resource Center

KEY MESSAGES

-  **Drive a PEV Now:** With several models available today and dozens coming in the next two years, major automakers are committed to PEVs as an essential part of their current and future model lineup.
-  **Experience the Most Technologically Advanced Fuel Efficient Cars Today:** PEV drivers get high performance, smooth acceleration, great torque and quiet comfort from their PEVs, plus the latest in high tech convenience. PEVs are fast off the line -- this is not your grandfather's golf cart!
-  **Save Green by Being Green:** With lower fuel costs (electricity vs. gasoline) and higher efficiency, PEVs cost less to operate over their lifetimes than comparable gasoline vehicles.
-  **Fuel Anytime:** PEV owners can choose when, and where, to plug in, similar to recharging a cell phone or laptop. Most drivers recharge their PEVs at night. Forget about looking for cheap gasoline! Program your PEV to start charging whenever low electricity rates are available.
-  **Fuel Anywhere:** PEVs come equipped with a charger cord that can plug into a standard wall socket, or a home charging station can be installed for faster fueling. Plus, California has the largest network of publicly accessible PEV charging stations in the nation and this network continues to expand. With the help of several new smart phone apps, you can find a charging station and even reserve a spot. And, charging stations at work are also becoming increasingly available.
-  **Clean the Air, Improve Public Health, Reduce Your Carbon Footprint:** Clean California electricity enables PEVs to significantly reduce greenhouse gas emissions and cut down on air pollution. California electricity generation continues to get cleaner everyday.
-  **Support Energy Independence. PEVs Use Electricity Generated from Domestic Sources:** Gasoline production relies heavily on imported oil, while electricity is generated more locally. PEV drivers help reduce our dependence on imported oil by spending their hard-earned dollars on fuel that is produced mainly in the state.
-  **Enjoy the Perks of California PEV Driving:** For many PEV drivers that means access to high-occupancy vehicle (HOV) lanes, purchase incentives, preferential and/or free parking, discounts on auto insurance, and the “thumbs up” sign from other motorists.
-  **Trend Set:** Californians are leaders and PEVs are no exception. Over half the PEVs in the country are here. Green technology and clean energy will propel California's economy in the 21st century. PEV automotive and infrastructure start-ups are creating new manufacturing, construction and service jobs. In the first half of 2011, California businesses captured nearly 70 percent of the total global electric vehicle venture capital investment. PEVs drive California's future, today.

WHAT IS A PEV?

A PEV is a Plug-in Electric Vehicle that runs at least partially on battery power and is recharged from the electricity grid.



Pure Battery Electric Vehicles (BEVs) run on electricity stored in batteries and have an electric motor rather than a gasoline engine.



Plug-in Hybrid Electric Vehicles (PHEVs) combine two propulsion modes in one vehicle – an electric motor (that is battery-powered and can be plugged in and recharged) and a gasoline engine (that can be refueled with gasoline).

BEVs and PHEVs – What’s the difference?

	BEV	PHEV
Emissions	Zero emissions from vehicle; only emissions are from utility electricity generation mix	Zero emissions when driving on electricity. Emissions when driving on gasoline depend on engine emissions certification
Range	Generally 70 to 100 miles (proportional to battery size) ; some models are higher	All electric range varies from 15 to 35 miles (proportional to battery size); gasoline range is about 300+ miles
Propulsion	Electric motor / battery only	Electric motor / battery <i>plus</i> gasoline engine
Re-fueling	Recharge with electricity	Recharge with electricity <i>and/or</i> refuel with gasoline

Source: California PEV Collaborative (CG2-2).

BEV and PHEV Graphics courtesy of the Electric Power Research Institute, *Plugging In: A Consumer's Guide to the Electric Vehicle*, 2011.

PEV MODEL AVAILABILITY Look for updates at www.DriveClean.ca.gov/PEV



Battery Electric Vehicle (BEV)

Available 2012	Available 2012	Coming Soon	Coming Soon
⚡ BMW ActiveE	⚡ Honda Fit EV	⚡ Audi e-tron	⚡ Mercedes-Benz
⚡ CODA Sedan	⚡ Mitsubishi i	⚡ BMW i3	⚡ SLS AMG E-Cell
⚡ Ford Focus Electric	⚡ Nissan LEAF™	⚡ Chrysler/Fiat	⚡ Tesla Model X
⚡ Ford / Azure	⚡ Smart ED	500 EV	⚡ Toyota Scion iQ-EV
⚡ Dynamics Transit	⚡ Toyota RAV4 EV	⚡ Chevrolet Spark	⚡ Volkswagen e-up!
⚡ Connect Electric	⚡ Tesla Model S	⚡ Wheego Whip LiFe	



Plug-in Hybrid Electric Vehicle (PHEV)

Available 2012	Coming Soon
⚡ Chevrolet Volt	⚡ Cadillac ELR
⚡ Ford C-MAX Energi	⚡ Infiniti Emerg-E
⚡ Honda Accord Plug-in	⚡ Mitsubishi Outlander
⚡ Toyota Prius Plug-in	⚡ Porsche 918 Spyder
⚡ Ford Fusion Energi	Hybrid



Source: California PEV Collaborative (CG2-3).

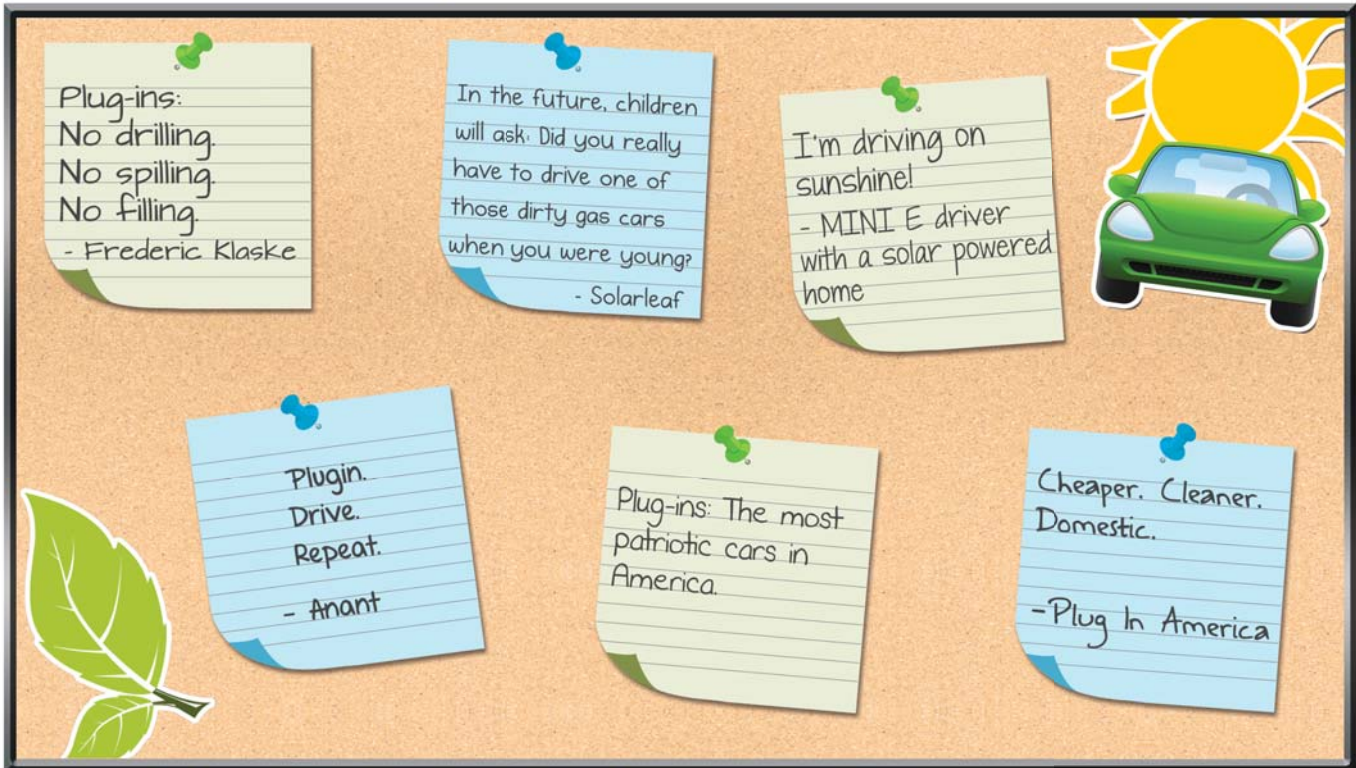
BEV and PHEV Graphics courtesy of the Electric Power Research Institute, *Plugging In: A Consumer's Guide to the Electric Vehicle*, 2011.

KEY FACTORS FOR PEV BUYERS TO CONSIDER

- ✓
HOW FAR DO I TYPICALLY DRIVE EVERY DAY?
Is my daily drive within the all-electric range of a PEV? 40 miles per day? 70 miles per day? 100 miles per day? More?
- ✓
DO I HAVE ACCESS TO WORK-PLACE OR PUBLIC CHARGING TO EXTEND MY DAILY RANGE?
Has my employer installed charging? Is there a charging station convenient to where I park, shop or eat? Is my car equipped to use DC fast charging?
- ✓
HOW OFTEN DO I TAKE TRIPS OVER 100 MILES?
Often or seldom? Do I have access to a gasoline car, car rental, car sharing services or public charging?
- ✓
WHERE DO I LIVE?
Single-family house? Apartment or condominium with parking?
- ✓
WHAT TYPE OF CHARGING DO I NEED AT HOME?
Options include slow charging on a standard wall outlet or faster charging using electric vehicle supply equipment (EVSE) connected to a circuit rated comparable to a clothes dryer.
- ✓
WHAT WILL IT COST TO INSTALL CHARGING AT HOME?
Charging using a 110 volt dedicated circuit is available to most home owners. The cost of a 240 volt charger and installation runs about \$1,500 (or more), depending on charging features and home installation requirements.
- ✓
DO I NEED ANY APPROVALS FROM OTHER PROPERTY OWNERS OR MANAGERS TO INSTALL A CHARGER?
Is there a Homeowners' Association? A Property Management Company?
- ✓
WHEN BUYING A CAR WHAT MATTERS MOST TO ME?
Driving on all-electric range? Overall fuel economy? Design? Performance? Power? Leadership? Image? Upfront Cost? Total Cost of Ownership? Low Emissions?
- ✓
WHAT ARE MY CURRENT COSTS FOR ELECTRICITY AND GASOLINE AND HOW WILL THEY CHANGE IF I BUY A PEV?
How much electricity do I use now and what do I pay? Have I contacted my local utility to learn what rate options are available? Are there special rates available for charging my PEV at night? How much will I save on gasoline purchases? Will I save time by using the carpool lane? Are there other financial benefits such as free metered parking for PEVs?

Source: California PEV Collaborative (CG2-4)

WHAT PEV DRIVERS ARE SAYING!





Sources: California PEV Collaborative (CG2-5). One-liners courtesy of www.PluginCars.com contestants, and other PEV drivers.

RESOURCES

The following websites have good up-to-date information about all models of PEVs. Interested drivers should also check on the websites of manufacturers of the cars they are interested in. Local utilities also have excellent information on their websites about infrastructure installation and electricity rates.

-  California Energy Commission
www.energy.ca.gov/drive/index.html
-  California PEV Resource Center
www.DriveClean.ca.gov/PEV
-  Electric Drive Transportation Association (EDTA)
www.GoElectricDrive.com
-  Plug In America - We Drive Change
www.pluginamerica.org
-  Plug-In Hybrid & Electric Vehicles - News
www.PluginCars.com
-  U.S. Department of Energy, Energy Efficiency & Renewable Energy, Alternative Fuels & Advanced Data Center
www.afdc.energy.gov/afdc
-  U.S. Department of Energy, Energy Efficiency & Renewable Energy, Clean Cities
www.cleancities.energy.gov

ADDITIONAL DATA AND SOURCES

-  Clean Fuel Connection, Inc. *For information on infrastructure installation costs:*
www.cleanfuelconnection.com/presentations
-  Los Angeles Times Blog and Next 10 *For information on global electric vehicle venture capital investments in California:*
Latimesblogs.latimes.com, "California leads venture funding for electric vehicle technology," December 7, 2011
www.Next10.org

California electricity offers cost-effective, efficient electric fuel, improved air quality, a reduced carbon footprint and less dependence on imported petroleum.

KEY MESSAGES

- Most charging occurs at home, at night.
- Workplace charging is the second most frequent choice.
- There are more than 1000 public charging locations in California today; this will continue to expand over the next several years.
 - Public charging stations are available today at public parking lots, retail chains such as Kohls and Walgreens, tourist destinations, entertainment venues, and airports.



HOME CHARGING

- Empirical data show that most charging occurs at home, at night. Benefits include:
 - The convenience of fueling while asleep;
 - Lower cost of night-time, off-peak electric fuel;
 - A full "tank" every morning!
- Every new PEV comes with portable charging equipment that plugs into a regular household outlet (Level 1).
- To charge up faster, PEV drivers can also purchase and install charging equipment, using a dedicated 240 volt circuit similar to that used by a clothes dryer (Level 2 charging).
- Many manufacturers offer PEV charging equipment – referred to as Electric Vehicle Supply Equipment (EVSE). PEV drivers can choose among a number of brands (including many made by California companies).
 - Some good sites:
www.DriveClean.ca.gov/PEV
www.pluginamerica.org
www.GoElectricDrive.com



WORKPLACE CHARGING

- Some workplaces allow employees to "top off" charge while at work, to "re-fill" the charge that it took to drive to work. Employers offer both Level 1 and Level 2 charging opportunities.
- Companies such as Google, Apple, NetFlx and electric utilities throughout California have already installed hundreds of Level 2 charging stations for employees to use at their worksites.



PUBLIC CHARGING

- PEV drivers can find public charging sites using web sites or mobile phone apps. For a list of the best resources go to the California PEV Resource Center, www.DriveClean.ca.gov/PEV.
- A growing set of smart phone apps enable PEV drivers to plan, monitor, and program charging. PEV drivers can use these apps to schedule charging for times when electricity rates are lowest, to reserve charge time on a reservation-enabled charger, and to be notified if charging is interrupted.
- Different and faster options for charging PEVs are evolving.
 - DC Fast Charging stations will be built in California in 2012. They can refuel up to 80% in approximately 30 minutes.
 - Battery Switching may offer Californians a different strategy for refueling PEVs in the future.
 - Inductive charging, where refueling is done "wirelessly", is being tested.

Source: California PEV Collaborative (CG3-1)

WHEN AND WHERE WILL I CHARGE?

Road Warrior Rick
Plug-in Hybrid Electric Vehicle (PHEV) Driver
Regional Sales Manager, Pharmaceutical Company
Northern California

"I drive hundreds of miles each week for my job, so fuel costs matter a lot!"



- Charge overnight in my condo's underground garage – standard 120 volt outlet (Level 1)
- Drive to doctors' offices north and west of San Francisco
- While parked to call on doctors, "top off" charge at hospital charging station, for 2 hours, Level 2
- Drive to doctors' offices in Oakland and Berkeley
- Tickets to Oakland A's game; pay \$3.00 to "top off" at Level 2 public charger
- Drive home, plug car into standard 120 volt outlet; car programmed to start charging at night when electricity rates are lowest
- Fully charged in morning!

Multi-tasking Maya
Battery Electric Vehicle (BEV) Driver
Information Technology Manager and Mom
Orange County

"Between my family and work, I have a lot of people who depend on me all day."



- Wake up to a fully charged car – 240 volt charger (Level 2)
- Drop kids off at school
- HOV lane in my Battery Electric car (BEV), arrive at work sooner
- Park at Level 2 charging station at work; "top off" charge, full by lunch
- Drive 35 miles back in HOV lane, pick up kids, get mom, go to one of the kid's basketball games – in a neighboring town, 10 miles away
- Take mom home, pick up pizza, head home for dinner and homework! BEV is programmed to start charging at night, when electricity rates are low
- Go to bed at 11PM and start all over again the next morning!

Source: California PEV Collaborative (CG3-2)

HOW LONG DOES IT TAKE TO CHARGE A PEV?

How long it takes to charge a PEV depends principally on how far the PEV has been driven on "electric miles" and the size of the battery. Charging speed is also governed by the PEV's on-board charger and power level of charging equipment, among other factors. The adoption of a standard connector (SAE J1772™) for Level 1 and Level 2 charging means virtually every new PEV can be charged up using any EVSE equipped with the standard connector.

Charging Level	Power Supply	Charger Power	Miles of Range for 1 Hour of Charge	Charging Times From Empty to Full*	
				BEV	PHEV
Level 1	120VAC Single Phase	1.4 kW @ 12 amp (on-board charger)	~3 - 4 miles	~17 Hours	~7 Hours
Level 2	240VAC Single Phase up to 19.2 kW (up to 80 amps)	3.3 kW (on-board)	~8 - 10 miles	~7 Hours	~3 Hours
		6.6 + kW (on-board)	~17 - 20 miles	~3.5 Hours	~1.4 Hours
DC Fast Charge Level 2	200 – 450 VDC up to 90 kW (approximately 200 amp)	45 kW (off-board)	~50 - 60 miles (~80% per 0.5 hr charge)	~30 - 45 Minutes (to ~80%)	~10 Minutes (to ~80%)

Source: California PEV Collaborative (CG3-3).








*SAE "Charging Configurations and Rating Terminology", Society of Automotive Engineers Hybrid Committee, version 031611, 2011.

SAE Assumptions: BEV = 25kWh usable battery; PHEV = 8kWh usable battery; Calculations reviewed and edited by EPRI.

Battery Electric Vehicle (BEV) assumes a 25 kWh usable battery pack size; for purposes of this table SAE data reflect a charging scenario of "empty to full" where charging starts at 20% State of Charge (SOC) and will stop at 100% SOC.

Plug-in Hybrid Electric Vehicle (PHEV) assumes an 8 kWh usable battery pack size; charging starts from 0% SOC since the hybrid mode is available.

WHAT DOES IT COST TO INSTALL CHARGING AND WHAT STEPS DO I TAKE?

-  **Level 1 (120 volt) home charging simply requires access to a standard household dedicated circuit (with available capacity) and use of the standard Level 1 portable charging device included with a PEV. The cost of charging is the effective electricity rate at the time.**
-  **Charging at home with Level 2 (240 volt) charging equipment requires both buying and installing Level 2 equipment, which together cost around \$1,500 (or more) for a typical California household.**
 -  EVSEs cost between \$500 and \$1,100 today, but this cost is expected to decline over time, with higher volume production.
 -  In California, permit costs for home EVSE installations vary widely – the average permit cost is about \$200, but permits can range from \$50 - \$600.
 -  Some automakers offer package pricing for EVSE and its installation. This is available through companies such as AeroVironment (Nissan LEAF™), SPX (Chevrolet Volt) and Best Buy (Ford Focus Electric).
 -  Incentives are available to help offset the cost of home charging equipment and installation. Current information on EVSE and home charging installation incentives can be found at www.DriveClean.ca.gov/PEV, www.GoElectricDrive.com, and www.afdc.energy.gov.afdc.
-  **The cost to “fill up” using workplace or public charging ranges from free to several dollars per hour, or via paid subscription services.**

STEPS FOR INSTALLING LEVEL 2 CHARGING AT HOME



STEP 5 Contact a Licensed Electrical Contractor and Install a Level 2 EVSE

A qualified EVSE installer is key.

Consult automakers, utilities, cities or state organizations to find licensed and insured electricians. Consider obtaining multiple quotes.

A building permit for the new circuit, and field inspection by a local building official, is typically required.

Once the Level 2 EVSE is installed, utility coordination complete, and the installation is approved by a building inspector, you are ready to charge!

STEP 4 Contact Your Local Utility

Learn how to maximize fuel cost savings.

Take advantage of rebates, incentives, and meet utility requirements.

Find step-by-step EVSE installation instructions on all major California utility websites.

STEP 3 Select a Level 2 EVSE to Buy

PEV manufacturers may recommend an EVSE, or have partnerships with EVSE manufacturers, retailers or installation providers; or PEV drivers can choose from a wide variety of EVSEs that are now available on the market.

Focus on UL or ETL listed EVSE products.

Consult automaker websites and Plug In America to learn more about different EVSE options.

STEP 2 Research Incentives

Ask utilities about available incentives.

Consult:
www.DriveClean.ca.gov/PEV,
www.afdc.energy.gov, and
www.GoElectricDrive.com

STEP 1 Consult PEV Automobile Dealers

Consult PEV automobile manufacturer websites.

Obtain advice on charging needs at home, EVSEs, installation, permits and incentives.

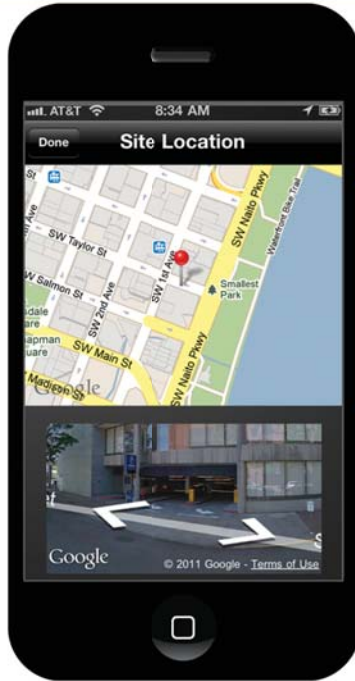
Determine whether Level 1 or Level 2 charging meets your needs.

Source: California PEV Collaborative (CG3-4)

PEV DRIVERS CAN USE SMART PHONES TO ENABLE SMART CHARGING



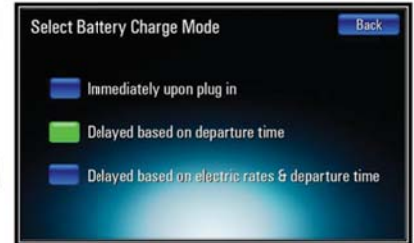
Public Charging Locator
BMW ActiveE app



Public Charging Locator
Recargo app



Program PEV to charge when electric rates are low - Chevy Volt



Public Charging Locator via PEV dashboard - Nissan LEAF™

Photos include examples from BMW ActiveE, Recargo, Chevy Volt, and Nissan LEAF™ and are a small representation of their capabilities.

Source: California PEV Collaborative (CG3-5)

RESOURCES

-  [Blink
www.blinknetwork.com/locator.html](http://www.blinknetwork.com/locator.html)
-  [California Energy Commission
www.energy.ca.gov/drive/index.html](http://www.energy.ca.gov/drive/index.html)
-  [California PEV Collaborative, Taking Charge, 2010
www.PEVCollaborative.org](http://www.PEVCollaborative.org)
-  [California PEV Resource Center
www.DriveClean.ca.gov/PEV](http://www.DriveClean.ca.gov/PEV)
-  [ChargePoint Network
www.chargepoint.net](http://www.chargepoint.net)
-  [Clean Fuel Connection, Inc. For information on charging infrastructure installation costs:
www.cleanfuelconnection.com/presentations](http://www.cleanfuelconnection.com/presentations)
-  [Electric Drive Transportation Association \(EDTA\)
www.GoElectricDrive.com; and www.GoElectricDrive.com/charging/chargingstationlocator.aspx](http://www.GoElectricDrive.com)
-  [Electric Power Research Institute brochure, Plugging In: A Consumer's Guide to the Electric Vehicle, No. 1023161
www.epri.com](http://www.epri.com)
-  [Plug In America - We Drive Change
www.pluginamerica.org](http://www.pluginamerica.org)
-  [Recargo
www.recargo.com](http://www.recargo.com)
-  [Society of Automotive Engineers
www.sae.org](http://www.sae.org)
-  [U.S. Department of Energy, Energy Efficiency & Renewable Energy, Alternative Fuels & Advanced Data Center
www.afdc.energy.gov/afdc/locator/stations/; and www.afdc.energy.gov/afdc/vehicles/electric.html](http://www.afdc.energy.gov/afdc/locator/stations/)
-  [U.S. Department of Energy's Vehicle Technologies Program - Plug-in Electric Vehicle Real-World Data from DOE's AVTA \(SAE Gov't - Industry 2012\) Jim Francfort - Idaho National Laboratory - January 2012 - Page 19
For information on PEV drivers charging at home and workplace: avt.inl.gov/pdf/phev/G100SAEGovtIndustryJan12.pdf](http://avt.inl.gov/pdf/phev/G100SAEGovtIndustryJan12.pdf)

FUEL COSTS: PEV VS. GASOLINE CARS?

Driving on electricity is usually much cheaper than using gasoline. Plug-in drivers have the additional benefits of more stable electric prices and the convenience of fueling at home or in the community.

KEY MESSAGES



Driving on Electricity Can Be Cheaper. \$0.10 per kilowatt hour (kWh) is the equivalent of driving on gasoline that costs less than \$1 per gallon!

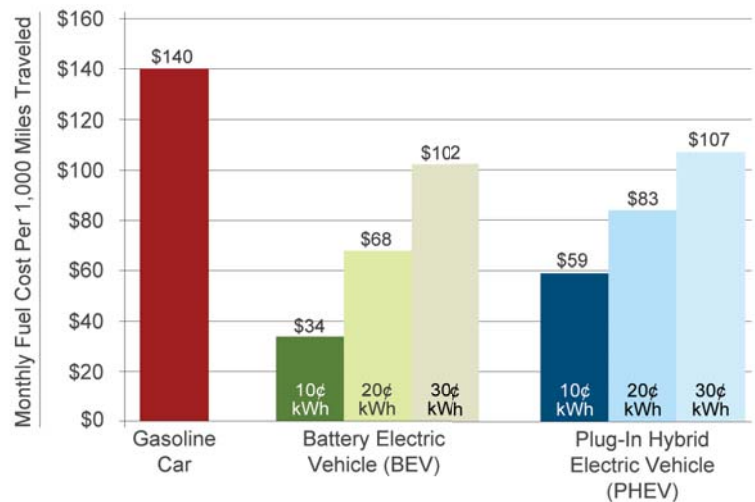


Plug-in Electric Vehicle (PEV) drivers may find residential time-of-use (TOU) rates worth considering. On a TOU rate, household electricity costs/kWh vary according to the time of day electricity is used.



Electricity Prices Are More Stable Than Oil Prices. Electricity is typically generated from diverse, domestic sources, and its price is more stable. Oil prices fluctuate widely, and are highly influenced by world events.

DRIVING ON ELECTRICITY CAN BE CHEAPER



Source: California PEV Collaborative (CG4-1).

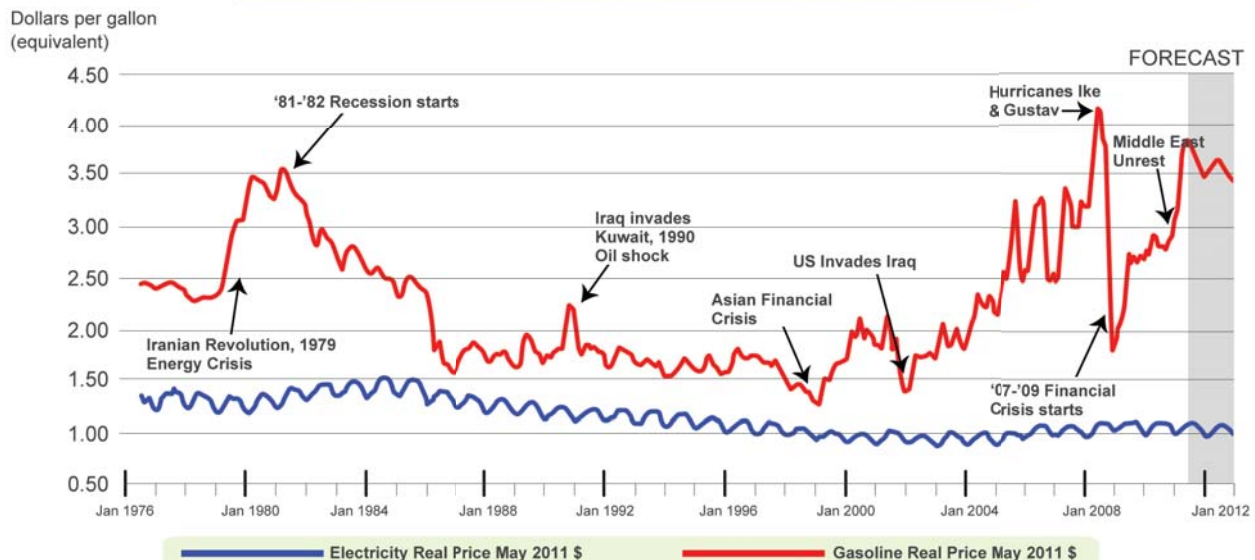
Assumptions

Gasoline Passenger Car, Average New Car, California 2010: 26 miles per gallon (MPG).
Battery Electric Vehicle (BEV): Example - 0.34 kWh/mile, fueled only by electricity; vehicle efficiency varies by model.

Plug-in Hybrid Electric Vehicle (PHEV): Example - 0.36 kWh/mile; 35 mile electric range; 37 MPG; vehicle efficiency varies by model. PHEV drives 2/3 miles on electric fuel, 1/3 miles on Premium gasoline fuel.

California Retail Gasoline Prices: \$3.635 / gallon Regular; \$3.849/ gallon Premium, January 2012. (See Additional Data and Sources)

ELECTRICITY PRICES ARE MORE STABLE THAN OIL PRICES



Source: California PEV Collaborative (CG4-2). Data compiled, converted, and presented by the Edison Electric Institute. Source: Energy Information Administration, Short-Term Energy Outlook, May 2011. Note: Based on a plug-in electric vehicle with an efficiency of 3.4 miles per kWh (like the Nissan LEAF™) and an internal combustion engine vehicle with a 30 mpg rating.

FUELING UP ON ELECTRICITY

How much it costs to “fill-up” depends on the battery’s state of charge and battery size.

For a PEV with an EPA-rated efficiency of 0.34 kWh per mile (similar to a Nissan LEAF™), at \$0.10 per kWh it will cost ~\$2.50 - \$2.65 to drive 70 - 75 electric miles.

Most PEVs can be programmed to charge when electricity rates are lowest.

Utility rates continue to evolve with new metering and rate options for PEV households expected over the next few years.

To keep fuel costs low, contact utilities to learn about choices in electricity rate options. Start thinking about kWh instead of MPG!

HOW FAR CAN YOU DRIVE ON \$25?

Plug-in Electric Vehicle (PEV), driving on electric miles only



Gasoline Car, Average New Car, California, 2010



0 100 200 300 400 500 600 700 800

Miles Driven:

Plug-in Electric Vehicle, driving on electric miles only vs. Average New California Light-duty Car, 2010

Source: California PEV Collaborative (CG4-3).

Assumptions

Gasoline Passenger Car, Average New Car, California 2010: 26 miles per gallon (MPG).
 Plug-in Electric Vehicle (PEV): Examples - Battery Electric Vehicle (BEV) or Plug-in Hybrid Electric Vehicle (PHEV) traveling only on electric miles, with 0.34 kWh/ mile fuel economy; vehicle efficiency varies by model.
 California Retail Gasoline Prices: \$3.635 / gallon Regular, January 2012.
 (See Additional Data and Sources).

ELECTRICITY 101

California policies regarding electricity rates are designed to encourage conservation and energy efficiency.

There are more than 50 utilities in California with varied electricity rate structures. In general, residential rates fall into three categories:

Tiered or block rate

The more electricity used, the more likely the household will move into a higher cost tier for the incremental electricity used. These rates are designed to encourage conservation. There is no difference in cost based on time of day.

Flat rate

The same price per kilowatt-hour is charged, regardless of how much is used or when it is used.

Time-of-Use (TOU) rate

This rate rewards customers who use electricity when it is cheapest for utilities to produce – generally, at night (also known as an off-peak rate); however it is coupled with higher daytime on-peak charges. Most drivers can get lower PEV TOU rates.

Source: California PEV Collaborative (CG4-4)

CHOOSING THE RIGHT ELECTRICITY RATE – ASK YOUR UTILITY FOR ADVICE

Rate Options Available to California PEV Drivers

Rate	Definitions and Benefits	Considerations
Tiered Rate	<p>Typical residential rate structure offered by investor-owned utilities and some municipal utilities. In general there is a monthly baseline of kWh at a fixed rate (\$/kWh). Anything above the baseline usage has a higher cost per kWh, for each tier.</p> <p>Benefits PEV drivers when (i) current electricity bill is fairly low, or (ii) energy efficiency measures or solar panels are installed at a home.</p>	<p>Adding PEV charging to the household load has the potential to shift a household into a higher tier, with higher costs per kWh, raising the average per kWh cost for household electric usage.</p> <p>Utilities offer Whole House Time-of-Use (TOU) and PEV- only TOU rates that may help drivers alleviate these concerns.</p> <p>Investing in home energy efficiency improvements can help PEV owners keep from moving into a higher-priced tier.</p>
Flat Rate per kWh	<p>Typical residential rate structure offered by some utilities.</p> <p>Benefits PEV drivers if the flat rate is relatively low.</p>	<p>Some utilities may offer discounts for PEV off-peak charging, or a lower off-peak PEV Time-of-Use Rate. PEV drivers may wish to inquire whether there is a lower off-peak rate, and whether there is a cost to the PEV driver to switch to that rate.</p>
Whole House Time-of-Use (TOU) Rate	<p>Single meter and same rate structure for whole house, including PEV. Rates vary by time of day.</p> <p>Benefits PEV drivers when most or all electricity usage is off-peak; i.e., family members are not at home during the day.</p>	<p>Lower off-peak rates at night, when PEV drivers typically charge up, could offer significant benefits.</p> <p>However, day-time costs per kWh for all household electric loads are significantly higher than day-time tiered or flat rates. Factors to consider when evaluating Whole House TOU rates include (i) how much day-time PEV charging will be needed, and (ii) whether family members are home during the day, adding much day-time household electric load.</p>
PEV Time-of-Use (TOU) Rate	<p>Separate rate and meter for PEV charging. Rates vary by time of day.</p> <p>Benefits PEV drivers when most PEV charging is likely to occur at night, when lower off-peak rates are offered. If current electricity usage is in a higher tier, or PEV charging could shift household into a higher tier, this rate structure may benefit PEV drivers.</p>	<p>Lower night-time off-peak PEV electricity rates will benefit PEV drivers, but it is important to determine whether there is a cost to the PEV driver to install a separate meter and/or service, or other equipment needed to take advantage of the low off-peak charging rate.</p> <p>Day-time cost per kWh for PEV charging on a PEV TOU rate is significantly higher than day-time tiered or flat rates.</p>






Source: California PEV Collaborative (CG4-5)

RESOURCES

-  Los Angeles Department of Water and Power (LADWP)
www.ladwp.com/ladwp/cms/ladwp000801.jsp
-  Pacific Gas and Electric Company (PG&E)
www.pge.com/electricvehicles/
-  Sacramento Municipal Utility District (SMUD)
www.smud.org/en/residential/environment/plug-in-electric-vehicles/
-  San Diego Gas & Electric (SDG&E)
www.sdge.com/ev
-  Southern California Edison (SCE)
www.sce.com/info/electric-car/residential/residential.htm

-  California Energy Commission
www.energy.ca.gov/drive/index.html
-  California PEV Resource Center
www.DriveClean.ca.gov/PEV
-  Electric Drive Transportation Association (EDTA)
www.GoElectricDrive.com
-  U.S. Department of Energy, Energy Efficiency & Renewable Energy, Alternative Fuels & Advanced Data Center
www.afdc.energy.gov/afdc/vehicles/electric.html
-  U.S. Department of Energy and U.S. Environmental Protection Agency
www.fueleconomy.gov/
-  U.S. Energy Information Administration: Weekly Retail Gasoline and Diesel Prices
www.eia.gov/dnav/pet/pet_pri_gnd_dcus_sca_w.htm

ADDITIONAL DATA AND SOURCES

-  Formula for equivalency of \$0.10 electricity rate to less than \$1/gallon gasoline:
Gasoline car @ 26 mpg x BEV @ 0.34 kWh/mi (example: EPA-rated efficiency for Nissan LEAF™) x \$0.1/kWh = \$0.88 /gallon of gasoline equivalency.
-  Gasoline Car: 26 Miles per Gallon (MPG) assumption reflects data from the California Air Resources Board regarding the fuel economy of the average new California light-duty passenger car for Model Year 2010; this data is equivalent to the United States E.P.A. trends report (www.epa.gov/otaq/fetrends.htm) for the national fleet.
-  Battery Electric Vehicle (BEV) and Plug-in Hybrid Electric Vehicle (PHEV) fuel economy assumptions used in graphs reflect real-world experience for BEVs (similar to a Nissan LEAF™) and PHEVs (similar to a Chevy Volt) as cited in U.S. Department of Energy, Energy Efficiency & Renewable Energy, Alternative Fuels and Advanced Data Center website www.afdc.energy.gov/afdc/vehicles/electric.html, and U.S. Department of Energy and U.S. Environmental Protection Agency, www.fueleconomy.gov
-  Driving proportions (electric vs. gasoline miles) used in graphs for a Plug-in Hybrid Electric Vehicle (similar to a Chevy Volt) reflect statements made by General Motors representatives at conferences (e.g., Plug-in 2011, Raleigh, North Carolina, July 2011) and at public hearings before the California Air Resources Board in January, 2012 to consider adoption of the 2012 Amendments to the California Zero Emission Vehicle Regulation.
-  California retail gasoline prices: Regular gasoline (Reformulated areas) is \$3.635/gallon; Premium gasoline (Reformulated areas) is \$3.849/gallon. Plug-in Hybrid Electric Vehicle uses Premium gasoline. Gasoline car uses Regular gasoline. Source: Weekly Retail Gasoline and Diesel Prices, for California, week of 1/2/12, U.S. Energy Information Administration.

HOW DO PEVS BENEFIT CALIFORNIA?

Plug-in Electric Vehicles (PEVs) benefit all Californians by bringing cleaner air, energy security, fuel cost savings, and economic growth while leveraging the state's leadership in technology and innovation.

KEY MESSAGES

PEV Benefits Include:

- Improving air quality and lowering greenhouse gas (GHG) emissions, resulting in better health and productivity.
- Creating new clean energy jobs.
- Enhancing energy security and national security by lowering dependence on foreign oil imports.
- Providing fuel cost savings that can help stimulate the local economy.
- Leveraging California's culture of leadership in technology and innovation.

BETTER AIR QUALITY FROM PEVS MATTERS

- Transportation emissions are the primary source of carcinogenic particulate matter, air toxins and smog in California.
- The transportation sector is the greatest source of GHG emissions in California. Greenhouse gases cause climate change, and with thousands of miles of coastline, California is particularly vulnerable to climate change impacts.
- Low-income and minority communities are disproportionately affected by transportation emissions and therefore stand to benefit the most from cleaner air.

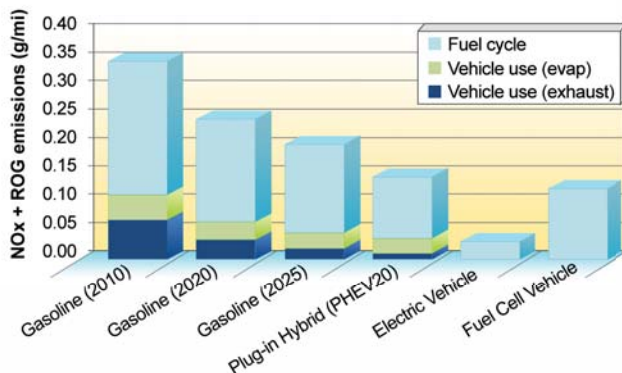
American Lung Association -- State of the Air 2011 Most Polluted Cities in America

Ozone (CA Cities: 8 of the Top 10)	Short-Term Particle Pollution (CA Cities: 6 of the Top 10)
#1 Los Angeles	#1 Bakersfield
#2 Bakersfield	#2 Fresno
#3 Visalia	#4 Los Angeles
#4 Fresno	#7 Visalia
#5 Sacramento	#9 Hanford (tie)
#6 Hanford	#9 Sacramento (tie)
#7 San Diego	
#9 Merced	

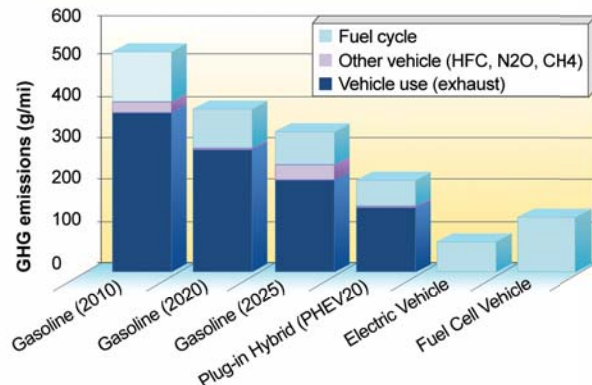
Source: California PEV Collaborative (CG1-1), American Lung Association in California, The Road to Cleaner Air, 2011.

PEVS DRAMATICALLY LOWER SMOG AND GREENHOUSE GAS EMISSIONS

SMOG FORMING EMISSIONS WELL TO WHEEL COMPARISON*



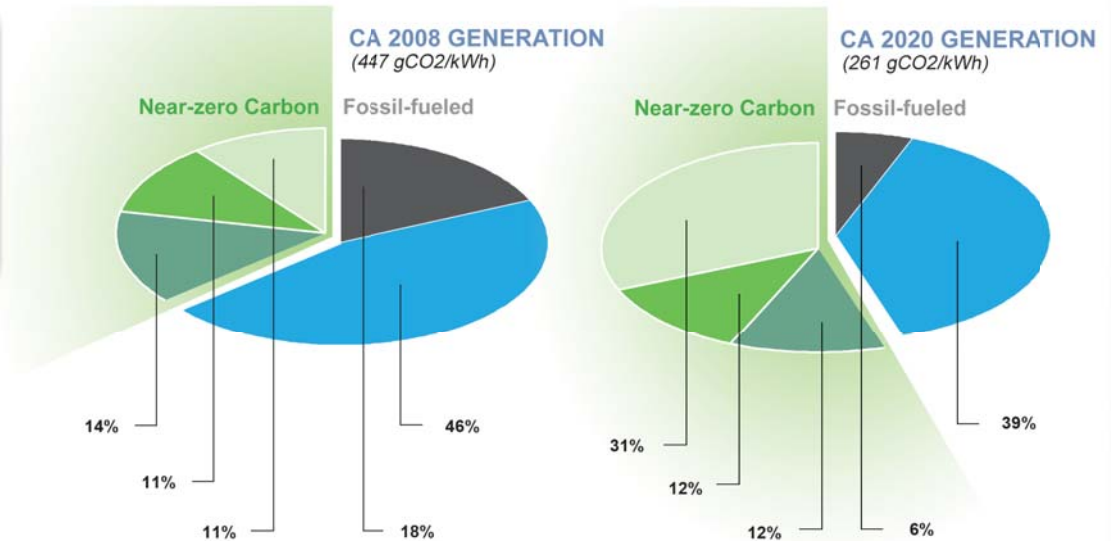
GREENHOUSE GAS EMISSIONS WELL TO WHEEL COMPARISON*



Source: California PEV Collaborative (CG1-2), California Air Resources Board, Advanced Clean Cars Summary, 2012. *Smog forming emissions include reactive organic gases (ROG) and oxides of nitrogen (NOx). GHG emissions include carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O) as well as HFC134a (a refrigerant used in some vehicle air conditioning systems). The Well to Wheel comparisons take into consideration emissions from production, distribution, and refining of fuels and the generation of electricity.

PEVs in California will offer continual improvements in air quality and greenhouse gas (GHG) emissions, as California's electricity grid becomes cleaner.

In 2008, California's electricity grid already had 35% lower carbon emissions than the United States grid. By 2020, California's electricity grid is expected to have 40% lower carbon emissions than in 2008.



Source: California PEV Collaborative (CG1-3). Taking Charge, California PEV Collaborative, 2011.

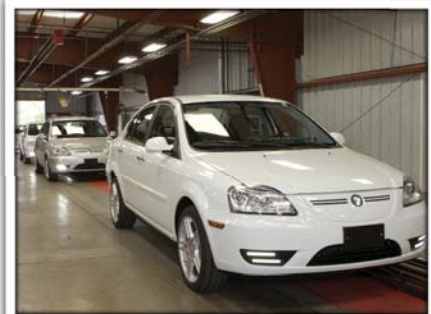
JOBS, ENERGY AND NATIONAL SECURITY, AND ECONOMIC GROWTH

New job creation and economic growth are propelled by California's leading role in the PEV and charging infrastructure industries.

- PEV job-related growth in California outpaces overall job creation, both over a 15 year period and, significantly, during the 2010 – 2011 economic downturn.
- In 2010 and in the first half of 2011, California attracted over 60% of total global venture capital investment in electric vehicle related sectors (\$1.3 billion).
- California is a global patent leader in electric vehicle technology.
- California PEV companies have re-started automotive manufacturing in the state. Manufacturing jobs account for over 50% of the jobs in the PEV sector, growing 130% between 2004 – 2010.



Tesla – Manufacturing plant, Fremont, California



CODA – Assembly line, Benicia, California

PEVs offer California greater energy and national security, while fostering California's transition to a clean energy economy.

- Because California's electricity is generated mostly in-state, from a wide variety of sources, PEVs provide Californians with "personal energy independence", by reducing their reliance on volatile world oil markets.
- Millions of transportation fuel dollars will go toward electricity generated mostly in-state rather than gasoline from foreign oil.

PEVs provide fuel savings to consumers, stimulating local economic growth.

- PEVs are more efficient and have lower relative fueling costs making them cheaper to operate than gasoline powered cars today.
- PEV fleets and drivers spend less on fuel, leaving businesses and families with additional income to spend on local goods and services. This reinvestment spurs economic growth in all sectors of the local economy.

CALIFORNIA LEADERSHIP IS ACCELERATING PEV MARKET SUCCESS



Chevrolet Volt

PEVs benefit from California's culture of leadership in technology and innovation.

- California has the most PEVs in the country.
- California's policies are leading the way in the global effort to produce the cleanest cars.
- California is ensuring that cities and towns throughout the state have charging infrastructure ready to support PEVs. The state is sponsoring over \$125 million in public, workplace, and DC fast charge infrastructure investments over the next few years.



Nissan LEAF™, PEV Parade, Santa Monica California 2011

CALIFORNIA CHARGES AHEAD

In 2012, Governor Jerry Brown strengthened the State's commitment to zero emission vehicles (ZEV) and infrastructure in order to protect the environment, stimulate economic growth and improve air quality. With an Executive Order, he established aggressive PEV vehicle and infrastructure targets that call for 1.5 million ZEVs and easy access to infrastructure for all Californians by 2025.














Source: California PEV Collaborative (CG1-4).

California PEV leadership is propelled by a wide range of entrepreneurs, Fortune 500 companies, high-tech start-ups, contractors, municipal safety officials, and a host of others who see opportunity in the clean energy economy. The California Plug-In Electric Vehicle (PEV) Collaborative, a multi-stakeholder public-private partnership, is working together to ensure a strong and enduring transition to a plug-in electric vehicle market in California. The Collaborative embodies all key California PEV stakeholders including elected and appointed officials, automakers, utilities, infrastructure providers, environmental organizations, research institutions and others.



Source: California PEV Collaborative (CG1-5).

RESOURCES

-  American Lung Association in California, The Road to Cleaner Air: Public Health and Global Warming Benefits of Advanced Clean Car Standards, 2011
www.lungusa.org/california
-  California Energy Commission
www.energy.ca.gov/drive/index.html
-  California PEV Collaborative, Taking Charge, 2010
www.PEVCollaborative.org
-  California PEV Resource Center – Advanced Clean Car Summary
www.DriveClean.ca.gov/PEV www.arb.ca.gov/msprog/clean_cars/acc%20summary-final.pdf
-  Consumer Reports, "LEAF and Volt Cheaper to Run than Gasoline Cars," December 2011
news.consumerreports.org/ca
-  Edison Electric Institute – Frequently Asked Questions About Electric Companies and Plug-in Electric Vehicles
www.eei.org
-  Electric Drive Transportation Association (EDTA)
www.GoElectricDrive.com
-  EPRI / NRDC – Environmental Assessment of Plug-in Hybrid Electric Vehicles, 2007
my.epri.com/portal/server.pt?space=CommunityPage&cached=true&parentname=ObjMgr&parentid=2&control=SetCommunity&communityID=404&RaiseDocID=00000000001015326&RaiseDocType=Abstract_id
-  Next 10 - For studies and data on PEV job-related growth and economic development:
www.next10.org
-  Press Release: Office of Governor Edmund G. Brown, Jr. March 23, 2012. "Governor Brown Announces \$120 Million Settlement to Fund Electric Car Charging Stations Across California; Issues Executive Order to Help Bring 1.5 Million Zero-Emission Vehicles Onto California's Roads"
www.gov.ca.gov
-  Press Release: California Air Resources Board re Advanced Clean Cars Program January 2012. For more information on Advanced Clean Cars, see: www.arb.ca.gov/msprog/consumer_info/advanced_clean_cars/consumer_acc.htm