

We encourage you to forward this message broadly to anyone you think has heard about plug-in hybrids or is reading about the news from GM.

## CALCARS' BOTTOM-LINE REACTION

"We commend GM for being the first out of the starting gate in the Great Plug-In Car Race of 2007. GM's announcements are the biggest victories yet for CalCars.org and other PHEV advocates. Now our campaign is in third gear. We'll work with the auto industry, government, fleet buyers and advocates to get to the day -- soon, not in a decade -- when customers can buy PHEVs as easily as any other car."

-- Felix Kramer, Founder of CalCars.org.

The California Cars Initiative <<http://www.calcars.org>> is a Palo Alto-based nonprofit startup. We're a group of entrepreneurs, engineers, environmentalists and consumers, since 2002 promoting plug-in hybrids (PHEVs). CalCars.org is itself a hybrid, focusing both on public policy and technology development. CalCars was first to convert a hybrid to a 100+MPG plug-in hybrid in 004.

We'll have more to say over time; here are 16 Questions and Answers, also viewable at <<http://www.calcars.org/gm-phevs-faq.html>>. See our FAQ <<http://www.calcars.org/faq.html>> and News Archive <<http://www.calcars.org/news-archive.html>> for more. In some cases, we refer to comments made by GM representatives at its January 5, 2007 telephone media briefing. (The following can be used by media as quotes from Felix Kramer, CalCars.org founder.)

## 16 Points about GM's Long-Awaited Breakthrough PHEVs

**1. WHAT'S THE BIG NEWS?** General Motors is working on two PHEVs headed for production: the Saturn Vue Green Line PHEV and the E-Flex Chevy Volt "no compromise" concept car. And it has signed development contracts for two battery packages, from Johnson Control/SAFT and Cobasys/A123Systems, to test in the Vue this year.

**2. IS THE VOLT A PLUG-IN HYBRID?** Of course -- though it is confusing. Standard hybrids are called hybrid-electric vehicles because they have two propulsion SYSTEMS: gasoline engines and electric motors. Plug-in hybrid-electric vehicles have two fuel SOURCES: electricity is primary, something else (gasoline, ethanol, biodiesel, hydrogen) is the "range extender." (We don't like the name or acronym all that much, but we seem to be stuck with them.)

**3. WHAT'S A SERIES HYBRID?** In a Chevy Volt "series" plug-in hybrid like the Chevy Volt, only the electric motor powers the wheels. A small, efficient, internal combustion engine runs at constant speed as needed to charge the battery for long trips. In the Saturn Vue "parallel" hybrid, both the electric motor and the internal combustion engine power the wheels. Engineers see series systems as simpler, but say parallel PHEVs create the most optimal combination of weight and power in components, to get the best MPG equivalent. Both series and parallel approaches can make great PHEVs!

**4. WHY DID GM EVOLVE?** We think it's a response to the growing interest and demand for plug-in hybrids. We credit the recognition by far-sighted people at the company that no new technology is needed to fuel cars with cheaper, cleaner, domestic electricity -- and thereby invigorate GM by getting customers excited about advanced cars that address energy independence and global warming.

**5. WHAT ABOUT GM'S CRITICS?** This company has a controversial past. It created and then crushed the EV1, a triumph of engineering. And it's still part of an auto industry lawsuit against the State of California. But looking to the future, we can only welcome the world's top car-maker's embrace of electrification to move from the petroleum wasteland into the promising territory of renewable energy. Some initial analyst, environmentalist and media reports were skeptical. We see a program with a dedicated staff of hundreds of people inspired to stake their careers on cars that fulfill their dreams for a sustainable world. Rick Wagoner, Bob Lutz, Beth Lowery and the entire GM team merit our congratulations and respect -- and our help.

**6. WHERE DID GM FALL SHORT?** No timetable to commercialization and mass production. Here's where we differ most with GM, which

says batteries for the Volt in particular might not be available until 2010-2012. We aim to encourage GM to hasten PHEVs' entry into the marketplace. The perfect should not be the enemy of the good. Of course, we don't want shortcuts on safety and operational reliability. But we do want car-makers to build very good PHEVs now -- then make them better. We believe GM doesn't fully recognize how many early adopters and fleets will pay more for early PHEVs. We urge GM to ask California and federal agencies to modify or eliminate "life of car" battery warranty requirements for large demonstration fleets, while maintaining all other emissions standards. Letting market forces decide who will pay for cars with "batteries-in-progress" will speed commercialization. Later, the requirements can be reinstated for consumers.

**7. WHAT ABOUT THOSE BATTERIES?** The auto industry is moving to lithium-ion batteries -- like those in cameras and laptops. With the prospect of car-makers' volume purchases, manufacturers will now build larger, better, more affordable batteries. Safety issues can be addressed by chemistry, electronics and good mechanical design. Battery shelf and cycle life and costs are improving steadily. At its January 5 news briefing, GM engineers said on a technical level they were "confident and comfortable" with Li-Ion batteries, and that they had identified batteries they consider acceptable at the cell level -- but that more electronics integration work was necessary to build them into packs. We know pricing issues can be addressed for demonstration fleets,. We want car-makers to be incremental and begin building "good enough" PHEVs.

**8. WHAT ABOUT INTERMEDIATE TIMETABLES?** We'd like to see PHEVs built by car-makers joining the after-market conversion vehicles already on the roads, pronto. In September, GM announced Project Driveway, to place 100 fuel-cell SUVs in California, New York and Washington. Our goal is to create receptive conditions so that GM can gear up to deliver a similar Project Plug-In with 1,000 PHEVs. CalCars and our partners will cooperate by mobilizing the key players -- government agencies, regulators, legislators, utilities, corporate fleet buyers and early adopters -- to do their part.

**9. WHY ARE DEMONSTRATION FLEETS SO CRITICAL?** They will help refine PHEVs and show America and the world what's possible now. They will position the industry for the kind of accelerated deployment that could at any moment become necessary if we encounter supply chain disruptions and skyrocketing oil prices or a world waking up to the dangers of greenhouse gases. (Remember what happened after Pearl Harbor -- after saying it was impossible, the industry switched

from cars and trucks to planes and tanks in one year.) And they'll ensure high volume sales later. Here's why: while tens of thousands of early adopters and fleet buyers will want first- and second-generation PHEVs, millions of retail PHEV customers will wait for the third or fourth versions. Here are two examples of such customer behavior: We conceive of GM's 1997 EV1 as version 1.0 of a great electric roadster. This car with lead-acid batteries was soon followed by version 2.0, with greater range nickel-metal batteries, then in 2003 by AC Propulsion's TZero, a 0-60 screamer that was version 3.0. And in 2006 Tesla Motors came out what we see as EV1 version 4.0, selling its first hundred cars in three weeks. (Bob Lutz says the Roadster inspired him to sponsor the Volt.) Similarly, Toyota's Prius version 1.0 was introduced only in Japan in 1997. Version 2.0 was received with enthusiasm worldwide in 2001. But it was only version 3.0 in 2004 that Prius became a popular sensation and was named Motor Trend Car of the Year. The planet needs the evolution/adoption rate for PHEVs to be fast. Since PHEVs are so obviously in the public interest, nationally and internationally, it's urgent to get started!

**10. IS THE PLUG-IN HYBRID CAMPAIGN OVER?** Definitely not. Commercialization won't happen automatically. There's no bigger plus than to have car-makers agreeing that PHEVs are a good idea. But if we declare victory and walk away, we might not see PHEV prototypes until 2010-2012 and significant numbers of PHEVs on the road for a decade. That's why we need to keep up the pressure and the incentives. That's why to get PHEVs to dealers nationwide, the ball is in our court as well as GM's.

**11. WHAT DO WE NEED NATIONALLY?** A Presidential State of the Union address with an Executive Order. Energy Department actions to fund R&D and deployment, offer production and buyer incentives, and commit to purchases of tens of thousands of vehicles for civilian and military use. Congressional passage of legislation enabling and funding those programs. More cities, counties, states and companies joining Plug-In Partners' soft-fleet orders program.

**12. WHERE DOES CALIFORNIA FIT IN?** Many states -- New York, Texas and Minnesota in particular -- have taken strong steps in support of PHEVs. But California may be best positioned to lead the commercialization of PHEVs. This is appropriate, since many key automotive innovations, from catalytic converters to regional Air Quality Management Districts, originated in California. And the modern PHEV was invented by Prof. Andy Frank at the University of California at Davis. (See the just-published first book on PHEVs, "Plug-In Hybrids: The Cars That Will Recharge America," by Sherry Boschert <<http://www.sherryboschert.com>>.)

Many constituencies can pitch in to make California plug in. (See all the entities listed at CalCars Partners <<http://www.calcars.org/partners.html>>.)

\* California has advanced automotive technology design and production clusters. Its universities have led in developing and studying PHEVs. Its high-tech industries and environmental entrepreneurs have enthusiastically embraced PHEVs. The state's utilities and the Electric Power Research Institute have been central to efforts to develop and promote PHEVs. (Because producing and selling power have been "de-coupled," California utilities don't benefit by selling more electricity. They gain by getting customers to conserve and use electricity more efficiently.)

\* California's owners and advocates for electric cars have helped spark global interest in all types of plug-in vehicles. The growing number of owners and drivers of PHEVs from after-market converters will soon start public discussions about their real-world experiences and what they want.

\* California's many supporters of a Hydrogen Highway can enthusiastically back this car as a critical step toward their goals, since GM plans to provide a version that uses a fuel cell as the range extender for a FC-PHEV.

\* California is the world leader in defining government roles in automotive development. The Pavley Bill of 2003, AB 1493, limiting cars' greenhouse gas emissions, and AB32, the Global Warming Solutions Act of 2006, charge the state's Air Resources Board with developing policies and regulations. (Ten other states and Canada follow ARB's standards.) The ARB, the California Energy Commission, the Legislature, the agencies and Governor's office have all said they can't wait to work closely with car-makers to commercialize PHEVs. Support is equally strong at local and county levels.

**13. WHAT HAPPENS NEXT?** Beth Lowery, VP for Energy and Environment, said on January 5th that GM is open to considering all options for partnerships and programs. PHEV advocates will find ways to smooth the path forward and provide GM and other automakers' needs with incentives to create the best business case for PHEVs. To deploy demonstration fleets and speed commercialization, a range of players can become "Godfathers" to GM and other car companies -- making offers so good they can't refuse.

**14. WHAT DOES IT MEAN FOR THE AUTO INDUSTRY?** The world's #1 car-maker is placing a big bet on electrification of transportation as a strategy for growth and prosperity. In doing so, it is first out of the gate in the great plug-in car race of 2007. More auto-makers are responding to the growing interest in PHEVs. (See <<http://www.calcars.org/carmakers.html>> for our tracking of their comments.) DaimlerChrysler has a Mercedes Sprinter prototype development program for large 15-passenger commercial vans. GM and Toyota have both said they want to be first on PHEVs. Ford and Nissan are exploring PHEVs. As other auto-makers jump in, we relish the prospect of a growing competition to build the best PHEVs using diverse technical approaches, components and features.

**15. HOW QUICKLY COULD PHEVS PENETRATE THE WORLD'S AUTO FLEET?** International Investment managers Alliance Bernstein projects that by 2030, hybrids and PHEVs could be 85% of new car sales. (For a copy, see link on the CalCars.org home page.) Those aggressive numbers assume an end to business as usual because of higher fuel prices, carbon caps or taxes, employee benefits, government incentives. They validate the idea that PHEVs will become the dominant platform for MOST automobiles, building on PHEVs' simple concept: power local travel electrically from an ever-greener grid, and evolve the range extender fuel to increasingly renewable sources.

**16. WHAT CAN SUPPORTERS, ADVOCATES, FANS DO?** Learn more at CalCars News-Archive <<http://www.calcars.org/news-archive.html>> and Audio-Video Clips <<http://www.calcars.org/audio-video.html>>. Distribute handouts and articles from Downloads and Flyers <<http://www.calcars.org/downloads.html>>. Sign up with Plug-In Partners <<http://www.pluginpartners.org>>. Give your time and money to CalCars.org <<http://www.calcars.org/sponsor.html>> and Plug In America <<http://www.pluginamerica.com>>. Contact your Senators and Representatives and urge them to co-sponsor the bipartisan, bi-cameral Vehicle and Fuel Choices for American Security Act developed by SetAmericaFree <<http://www.setamericafree.org>>. Send us endorsements from your elected officials, communities and organizations (see <<http://www.calcars.org/endorsements.html>>). Make sure your print, broadcast and online media are paying attention. And let your dealer know you want your next car to plug in!