California Air Resources Board

2006 ZEV Technology Review

Sacramento, CA
September 27, 2006

Comments by Felix Kramer, Founder
The California Cars Initiative

Prius PHEV Pioneers

Felix Kramer (right), CalCars Founder, in ’06, world’s first non-engineer consumer PHEV owner

Ron Gremban, CalCars Tech Lead, owner/ driver of world’s first PHEV Prius in ’04

What Does “100+MPG (+ Electricity)” Mean?

50.8 miles @124.1MPG = $1.13 gasoline + $0.71 electricity. Total: **$1.84** or **3.6** cents/mile, compared to $**2.79** or **5.5** cents/mile for Prius, **$4.00-$12.00** or **8-20** cents/mile for 35-12 MPG non-hybrids. We get **566 mi@130MPG** with most driving boosted and some all-electric trips.

SMUD assumptions: $2.75/gallon, $0.102/kWh, 50 MPG Prius. When roll in "electric miles" to gasoline, ***76 MPG equivalent;*** *at Felix’s $3.00 & $.086,* ***83 MPG equivalent***

Multiple and Evolving Reasons to Plug In

1. Saving money
2. Lower CO2
3. Energy independence
4. Silent driving
5. Avoid the pump
6. High-MPG "coolness“ (not a joke)

Charging Calculus (after 9 Inconvenient Seconds)

- PG&E off-peak $0.086/kwh = 2.2 cents/electric mile
- Summer on-peak $0.293/kwh = 7.6c/e-mile
- Prius: 5.5 cents/mile
- "Opportunistic Charging“ calls for rate-price signals at least for critical peaks

Evolving to V2H (Vehicle-to-Home)

Phase 1: Standard grid-connected system (car charges from grid)

Phase 2: Islanded off-grid system ties in PHEV for extended outages; battery + engine = emergency power

Benefits:

•Cleaner/cheaper than emergency generator

•PHEV enables use & storage of renewable energy

Growing Support and Optimistic Future Trends

2004: What's a PHEV?

2005: Prove demand & pricing

2006: How/when can I get one?

Recent praise for PHEVs from: George Bush, Alan Greenspan, James Hansen, Senators Brownback/Clinton/Obama, Bill Ford, Bill Press, John Doerr

2007: Incentives; 3rd parties manage battery costs and risks

2008: Volume production extending existing lines

2009: Optimized PHEVs

2010: Movement toward PHEVs as default vehicle drivetrain

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For more information:
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CalCars
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