

# **Silicon Valley Manufacturing Group**

## **“Power and Motion” Conference**

AMD/Sunnyvale, April 24, 2003

### ***How California Can Continue To Lead the Way to Cleaner, More Efficient Cars***

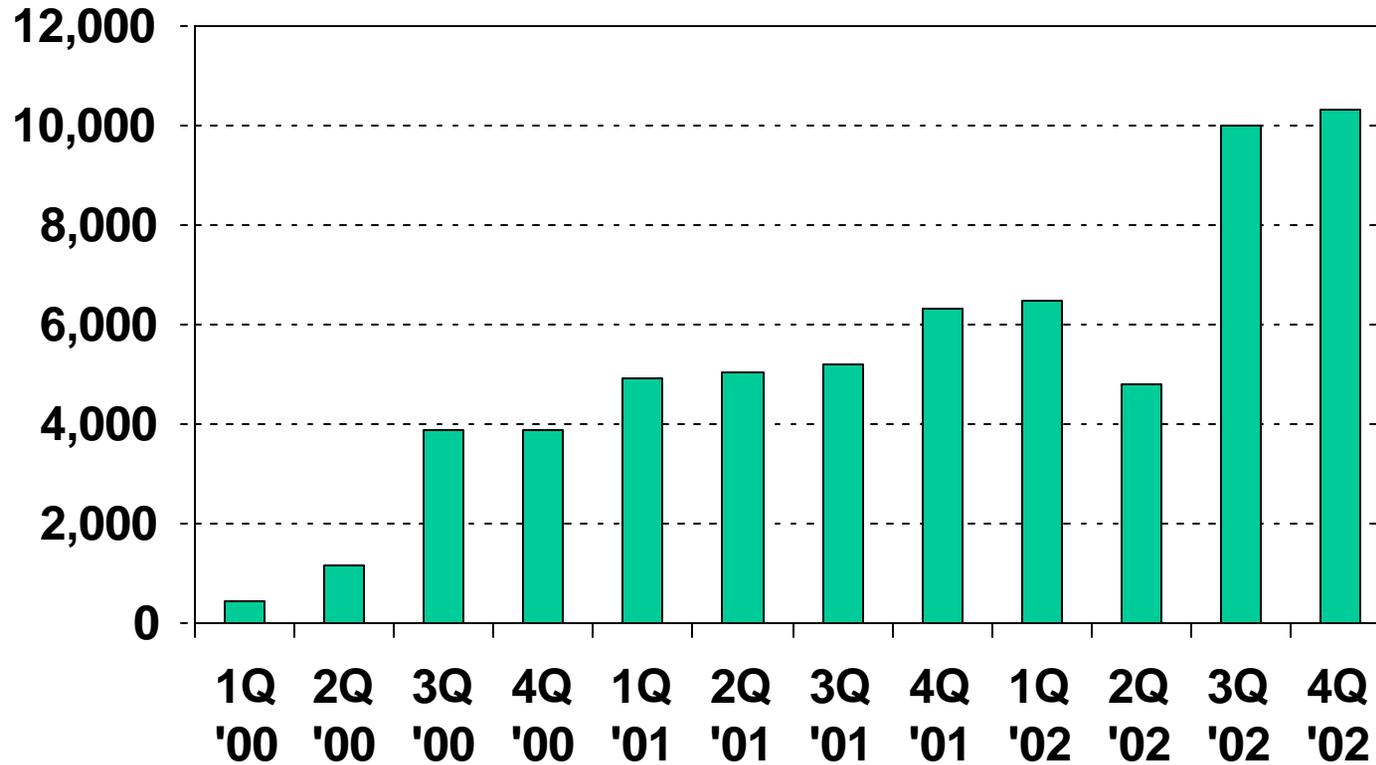
Felix Kramer, Founder [info@calcars.org](mailto:info@calcars.org)



[www.calcars.org](http://www.calcars.org)

**CalCars**  
THE CALIFORNIA  
CARS INITIATIVE

# U.S. sales of Honda and Toyota hybrids



(source: Electric Drive Transportation Association <http://www.evaa.org>)

## *2004 Toyota Prius continues hybrid evolution*



- 15% better mpg
- 30% lower emissions
- improved acceleration
- larger interior

# *Hybrid vehicles in the pipeline*

## **2004**

- Ford Escape
- Daimler Dodge RAM Contractors Special

## **2005**

- Lexus RX330
- GM Saturn Vue
- Toyota Highlander

## **2005-2007**

- GM Sierra, Silverado, Suburban, Tahoe, Yukon '05-'07 (electric “assist”)

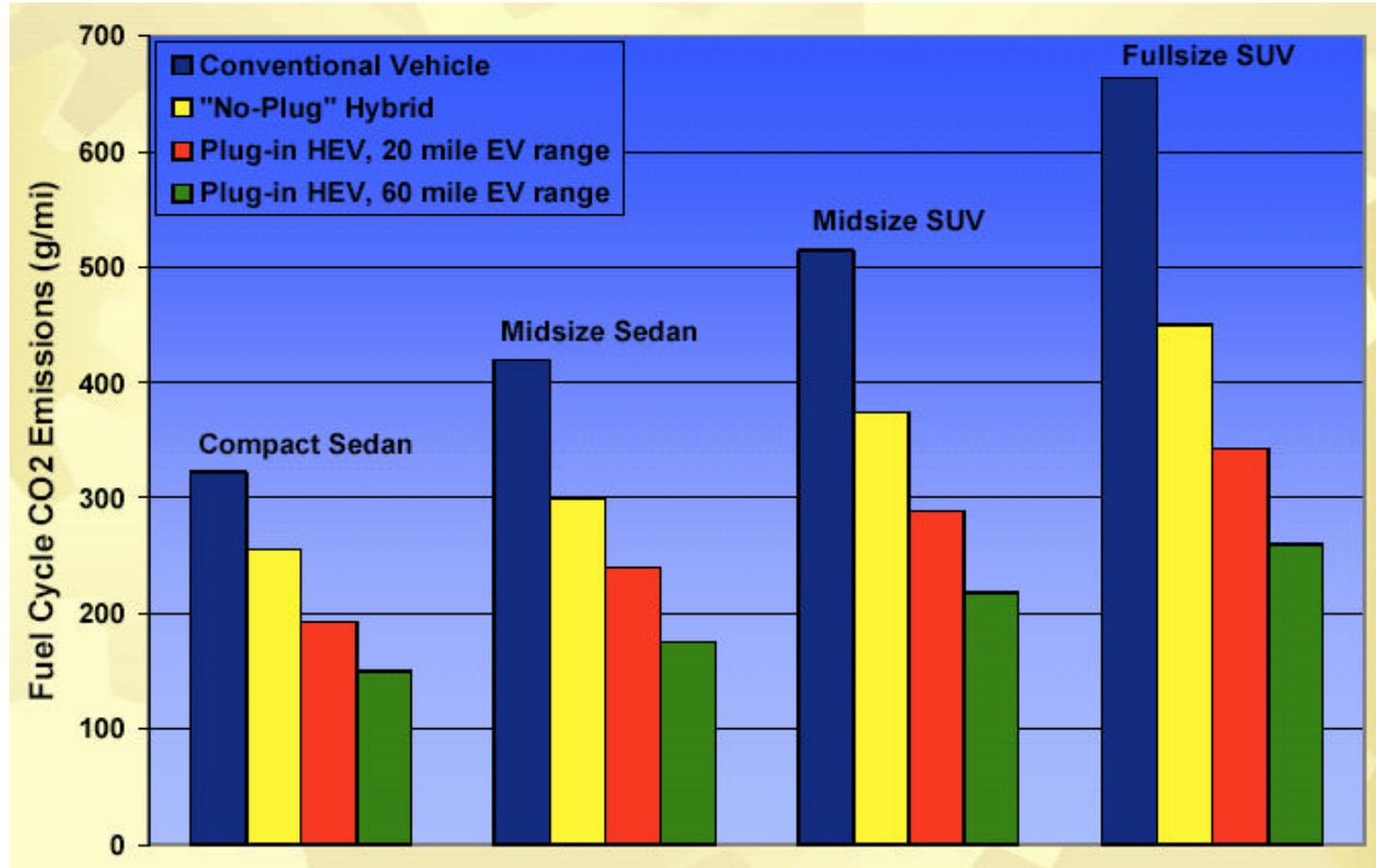
## **2006-2007**

- GM Equinox, Malibu (starter-alternator)

## **2007**

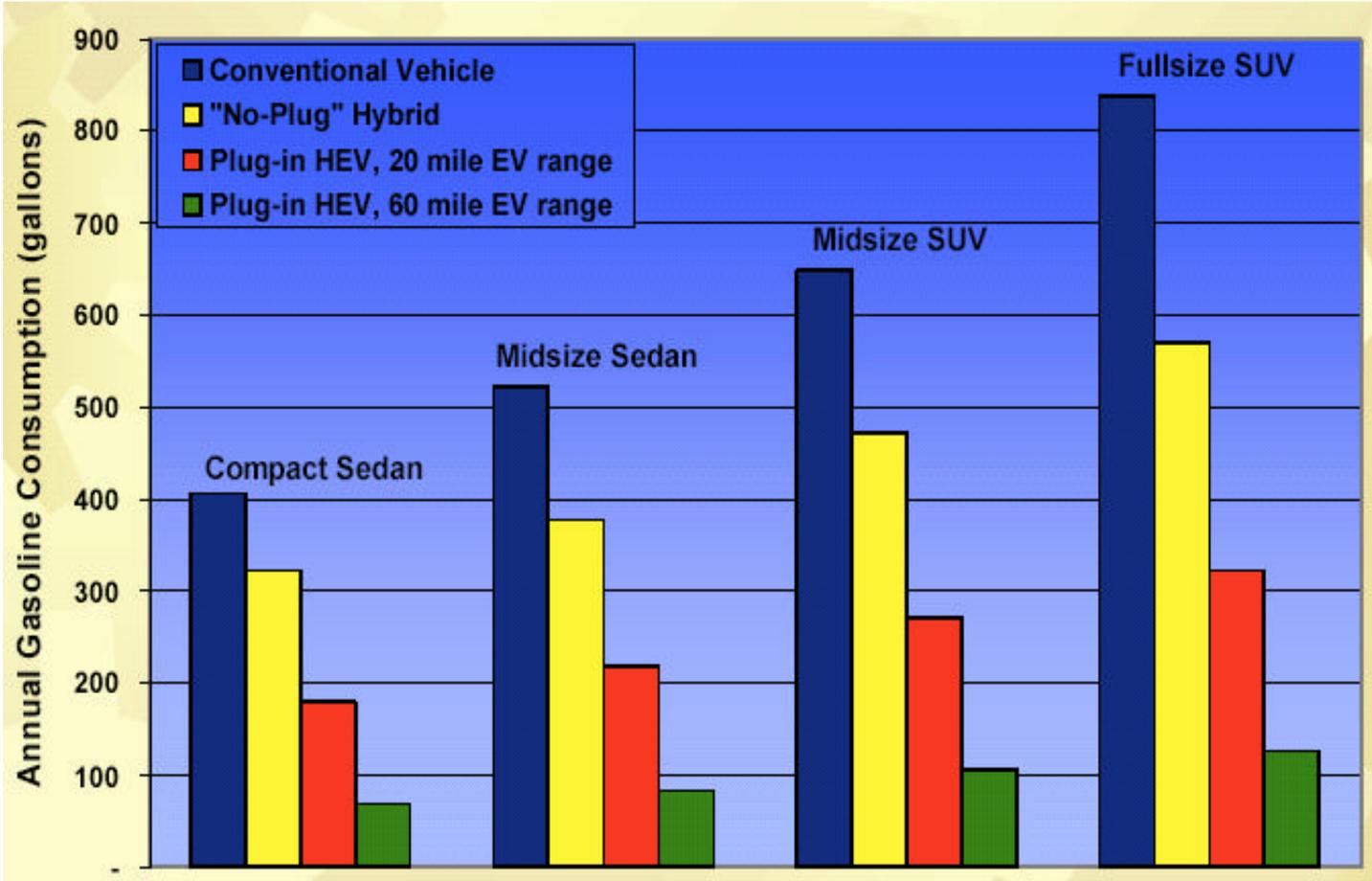
- Daimler-Chrysler sedan

# Emissions compared “wheel-to-well”



(Source: EPRI and UC Davis)

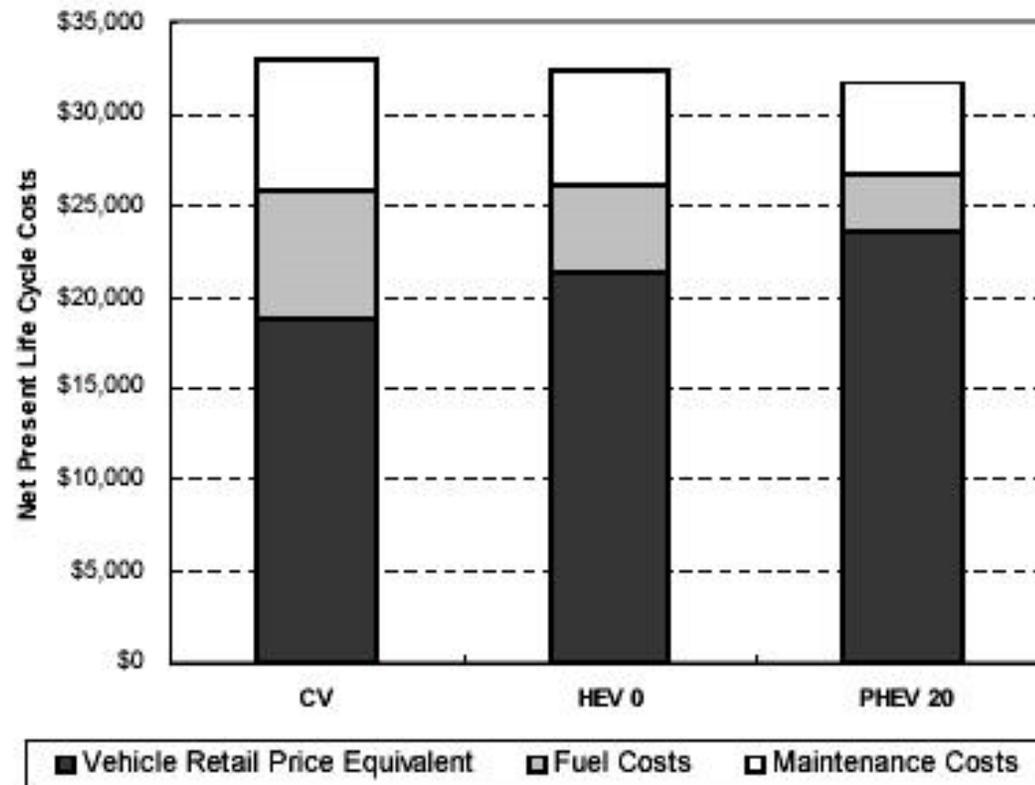
# Cut trips to the pump up to 85%



(Source: EPRI and UC Davis)

# Lower total cost of ownership (TCO)

*Net present value of full life-cycle costs for mid-sized sedans*



*HEV 0 means current hybrid, no electric range; PHEV 20 means plug-in hybrid with 20-mile all-electric range*

*(Source: EPRI March '03 study reflecting new battery data)*

# ***Benefits of plug-in hybrids***

## **Cleaner and cheaper**

- Less air pollution, global warming gases
- Grid power costs less than gasoline
- Lower lifetime total cost of ownership

## **More convenient**

- Fewer trips to gas station -- car is ready to go every AM
- Stored energy for fleets, in blackouts
- Likely access to HOV lanes when run in all-electric mode

## **Safer and more enjoyable**

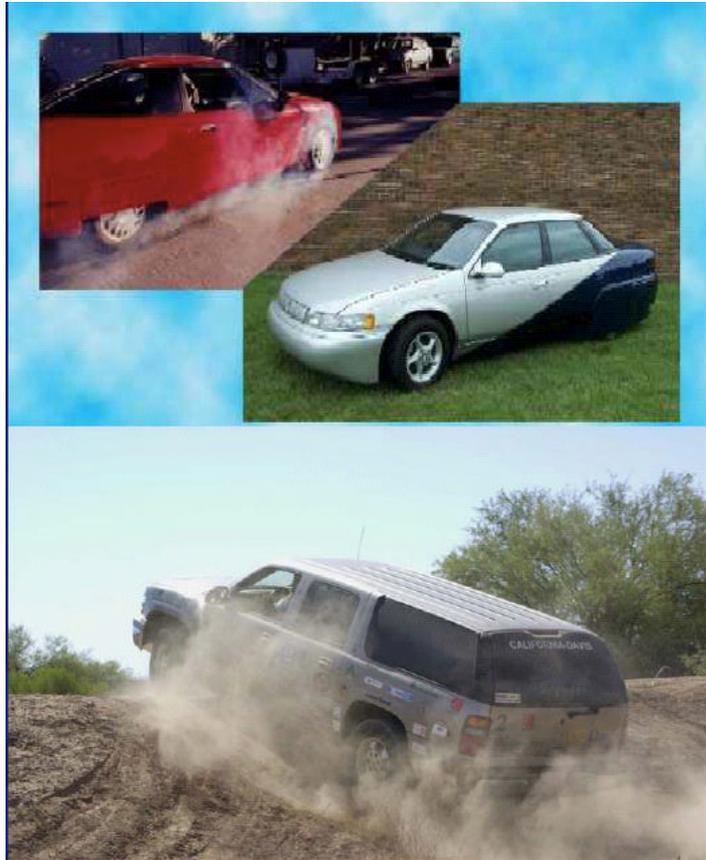
- Better handling from lower center of gravity
- Quieter, improved acceleration

## *Plug-in hybrid retrofit by AC Propulsion*



Retrofit in 2002-2003  
of a conventional  
VW Jetta converted  
it into a plug-in with  
a 30-35 mile  
battery-only range

# *Plug-in prototypes developed by UC Davis Advanced Hybrid Vehicle Research Center*



Prof. Andrew Frank, director  
(dates completed):

- Ford Taurus 1997
- Mercury Sable 1999
- Chevy Suburban 2001
- Ford Explorer 2002

# ***California leads the nation in car innovation***

- 1895 First Bureau of Highways established
- 1900 American Auto Association formed
- 1920s Traffic islands, stop lights, motels -- all start here
- 1947 County Air Pollution Control Districts created
- 1959 Air quality auto standards, pollution controls established
- 1967 US allows California to set its own emissions standards
- 1968 California Air Resources Board (CARB) formed
- 1970 State Clean Air Act leads to catalytic converters
- 1976 Limitations on lead in gas
- 1990 Low and Zero Emission Vehicles standards

# ***What people are saying about hybrids, plug-in hybrids and CalCars***

- “The state wants to encourage and promote initiatives in California that can succeed in catalyzing the development of these far better cars” -- *Woody Clark, Governor’s senior energy advisor*
- “We hope CalCars will help create the conditions so these advanced hybrids can be built in the factories of major auto manufacturers” -- *Andy Frank, UC Davis*
- “We at Flexcar are in full support of the continued development and implementation of environmentally sound and economically viable hybrid vehicles” -- *Rod Diridon, Jr., General Manager, Flexcar*



# *Models that could become plug-in hybrids*



Honda HR-V



Toyota RAV4



Hyundai Santa Fe

Volkswagen Jetta  
and other sedans



Ford Escape



# CalCars promotional bumper stickers



## *CalCars' vision for California and the U.S.*

- **Better cars:** all-electric for local use, unlimited range  
electric-gas hybrid for distance
- **Cleaner cars:** lower emissions and reduced  
dependence on imported oil
- **Bridge to and basis for future car technologies:**  
fuel cell cars will be fuel cell/plug-in electric hybrids
- **Create new market channel:** model for California's  
individual and institutional buyers to choose, develop  
and commercialize new technologies

## ***For more information about CalCars:***

*[www.calcars.org](http://www.calcars.org)    [info@calcars.org](mailto:info@calcars.org)*

- In-depth info on plug-in hybrid technology
- Details about vehicles
- Links to resources on related topics
- How individuals, companies and organizations can help create the next generation of vehicles
- Download/view this presentation at [www.calcars.org/calcars-svmg.pdf](http://www.calcars.org/calcars-svmg.pdf)