

# Update on SCE's Alternative Fuel Transportation program

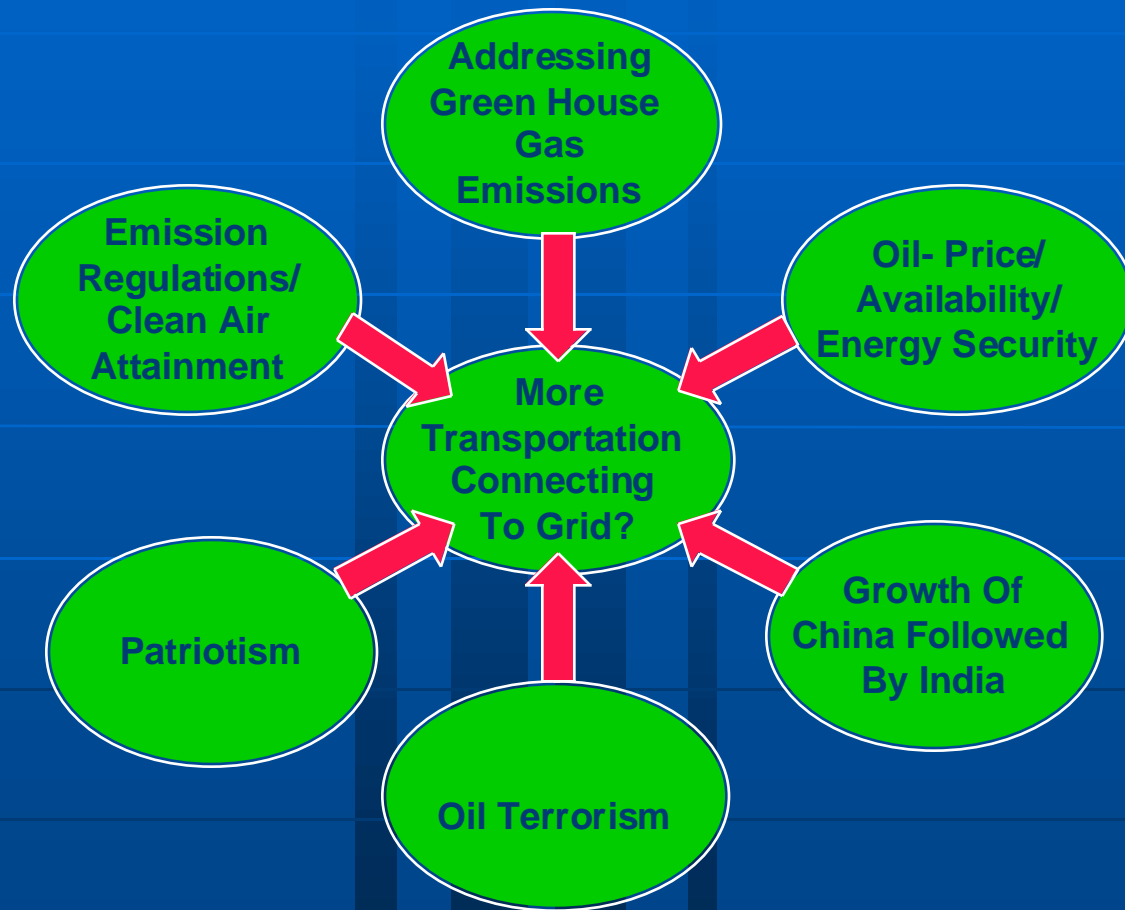
Reducing GHGs, Emissions  
and Petroleum

June 2005

# Overview

- n Huge change is underway in transportation and utilities have a role
- n Electro-drive (Battery, hybrids and fuel cells) are clearly sustainable
- n SCE's EV fleet has been hugely successful and we are now evolving into Hybrids and Fuel cells
- n Hybrids and Fuel Cells could present new opportunities through their grid connection
- n Conclusions

# Changes In Transportation- Impacting Utilities?

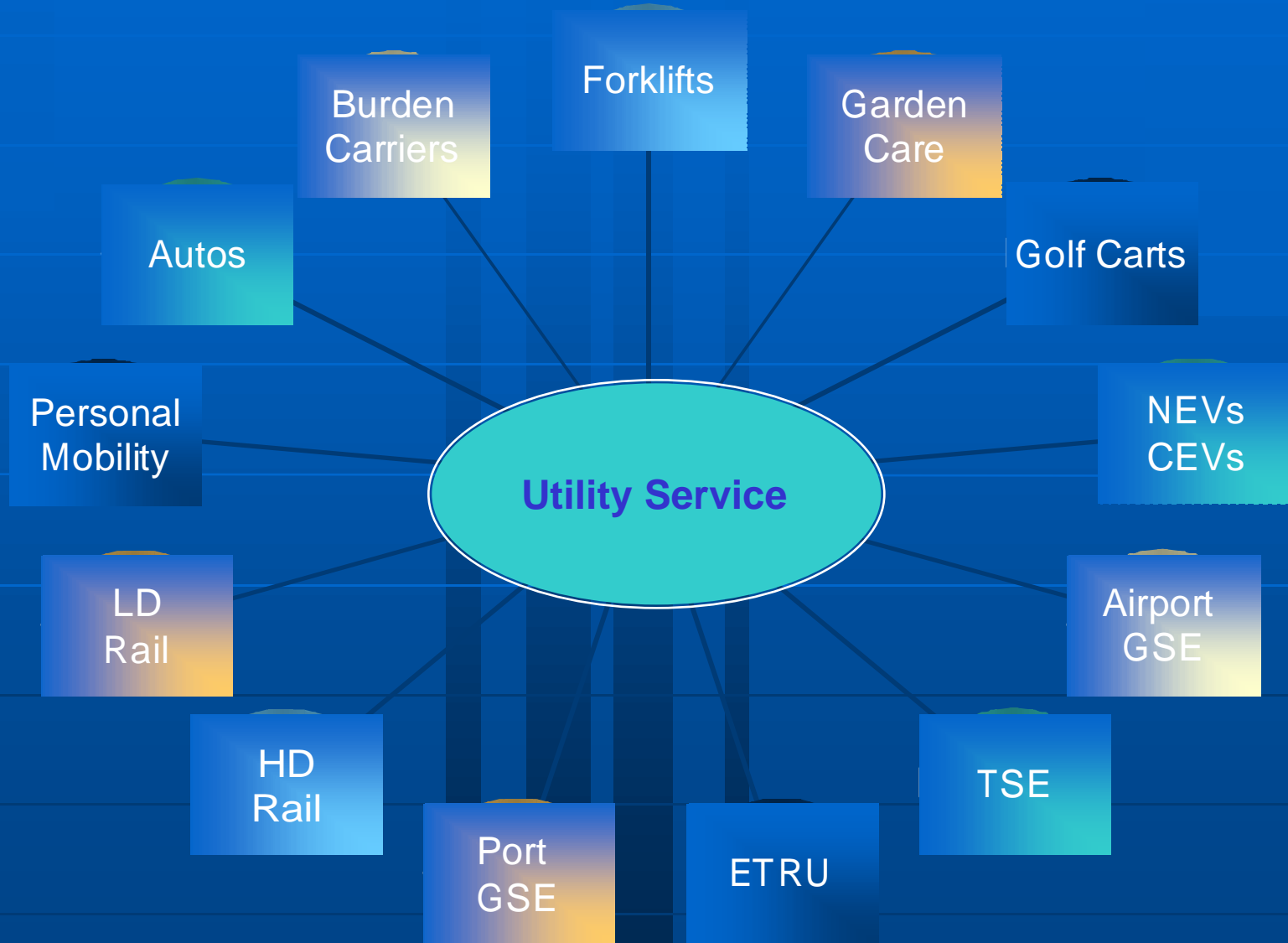


# Benefits of Plugging Transportation In

- ✓ About 20% cost of petroleum
- ✓ Utilizes excess off-peak capacity  
approx. 10-15,000 MWs (Ca.)
- ✓ Provides diversity for transportation fueling
- ✓ Expands use of renewables
- ✓ Reduces urban air pollution (Plant mix/ZEV miles)
- ✓ May represent cost reductions & bi-fueling for early FCEVs
- ✓ H2 Energy stations



# What Transportation Could Plug In?



# SCE's 2005 EV Program

<b>Fleet Statistics</b>	<ul style="list-style-type: none"> <li>➢ 190 currently active EVs in the fleet</li> <li>➢ 3 currently active OEM vehicle models</li> <li>➢ <b>11,556,100 miles driven</b></li> </ul>
<b>Maintenance Benefits<sup>1</sup></b>	<ul style="list-style-type: none"> <li>➢ 2,300 oil changes not needed</li> <li>➢ 80,900 labor and material saved</li> <li>➢ 1,223 smog checks avoided</li> <li>➢ \$42,800 saved</li> </ul>
<b>Energy Use<sup>2</sup></b>	<ul style="list-style-type: none"> <li>➢ 5,778,100 kWh of clean electricity used</li> <li>➢ <b>577,800 gallons of gasoline saved</b></li> </ul>
<b>Energy Cost<sup>2</sup></b>	<ul style="list-style-type: none"> <li>➢ \$520,000 in electricity costs</li> <li>➢ \$1,340,500 in gasoline costs avoided</li> <li>➢ <b>Net savings of 820,500</b></li> </ul>
<b>Environmental<sup>3</sup></b>	<ul style="list-style-type: none"> <li>➢ 11 600 quarts of oil saved</li> <li>➢ [REDACTED]</li> </ul>

Assumptions:

<sup>1</sup> \$35/oil change @ 5,000 mile intervals; Smog check every 2 years; \$35/smog check

<sup>2</sup> Average kWh/mile: 0.5; Gas: 20 mpg @ \$2.32/gallon; Electricity: 9 cents/kWh.

<sup>3</sup> 5 quarts per oil change; 0.24 lbs./mile net pollution (ICE minus power plant emissions).

Source: Bevilacqua Knight, Inc.; 484 g/mile ICE CO<sub>2</sub>. Source: GREET Transportation Fuel Cycle Analysis (Jan. 2000) – Greenhouse gas (CO<sub>2</sub>) resulting from electricity production not taken into account.



- ▼ EV fleet winding down due to lack of OEM manufacturing
- ▼ SCE will return the last EV to the OEM in 2009

MAKE	MODEL	BATTERY	QUANTITY	MILES*
Toyota	RAV4 EV	NiMH	157	1,093,800
Ford	Ranger EV	PbA	1	49,700
Ford	Th!nk Neighbor	VRLA	29	37,800
GEM	E825	Gel PbA	3	1,700
Special Project	Various	PbA and NiCd	(4)	34,100
Pending Donation / Return	Various	PbA, NiMH, Na-NiCl <sub>2</sub>	(5)	33,100
Retired	Various	PbA and NiMH	(460)	10,305,900

# SCE 2005 Hybrid Program

## Light Duty



- ✓ 2600 LDVs in SCE's fleet
- ✓ EPA Act compliance language to allow hybrids to comply
- ✓ Hybrids could reduce petroleum consumption up to 30%

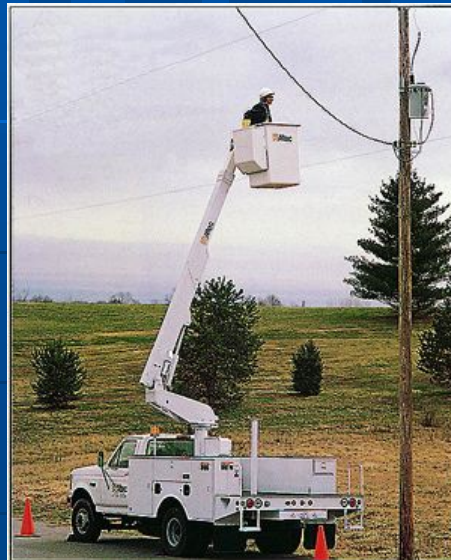
## Heavy Duty



- ✓ DaimlerChrysler Plug-in hybrid evaluation
- ✓ PHEVs could reduce petroleum consumption up to 60%
- ✓ Prototypes to SCE July



- ✓ Approx. 175 heavy duty trucks in SCE's fleet
- ✓ SCE working w/ 13 utility/Calstart consortium to establish bulk purchase program
- ✓ Eaton/International production version by 2007
- ✓ Hybrid drive reduces petroleum consumption up to 30%



## Medium Duty

- ✓ Approx. 425 medium duty trucks in SCE's fleet
- ✓ EPRI, SCE, PG&E and DWP together with other stakeholders are beginning a MDV plug-in-hybrid Program
- ✓ PHEVs could reduce petroleum consumption up to 60%

# SCE's 2005 Hydrogen Program



**SCE's General Office Hydrogen Station**

**STATUS:**  
Construction complete in December 05

**SCE's Mobile Refueler**

**STATUS:**  
Delivery expected in May



**SCE's DaimlerChrysler FCEV evaluation fleet**

**STATUS:**  
Contract completed

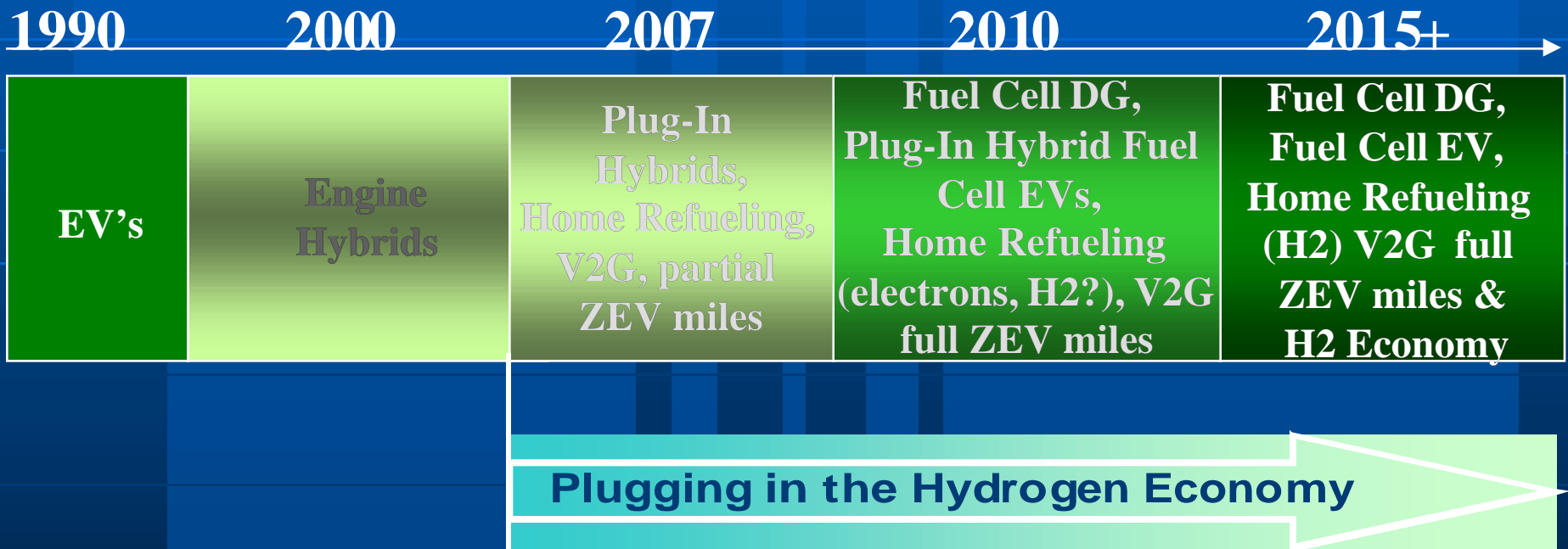


**SCE's Hyundai FCEV evaluation fleet**

**STATUS:**  
First vehicle expected in November 05



# Plugging In -Pathway To The Hydrogen Economy?



# Conclusions

# Appendix

# A Perfect Storm Is Brewing In Transportation... And Utilities Are In The Middle!

## Oil over \$50 barrel

- ✓ Goldman Sachs predicting 'super spike' in oil to \$105 a barrel
- ✓ US consumes about 21 million barrels of oil a day- a quarter of world's production
- ✓ Demand now straining global production system. Spare capacity of about 1.5 million barrels a day is the lowest in 30 years
- ✓ Today we consume about 30 billion barrels of oil a year yet we are only discovering about 10 billion new barrels a year of reserves

## Emissions

- ✓ 70% of emissions in California comes from transportation
- ✓ 90% of Californians live in unhealthy air
- ✓ 2010 Federal Clean Air requirements target 50% reduction of emissions from today's levels- we are less than 50% of the way there with existing regulations
- ✓ At least 10 mobile source regulations today- 15 more on the books impacting our customers

## Green House Gases

- ✓ By doing nothing to reduce U.S. oil consumption we are only hastening climate change crisis
- ✓ California adopted groundbreaking GHG reduction rules- auto makers file suit
- ✓ Possible new California Administration GHG initiative?
- ✓ CPUC order for utilities to include GHG "adder"
- ✓ CEC sponsored GHG En Banc



**More and More, Transportation is becoming  
"Electron" based  
(Battery, hybridization, hydrogen fuel cell  
powered)**

- ✓ Since scarcely any electricity in US is generated from oil, utilizing grid to power transportation makes sense
- ✓ Existing grid's excess capacity at night could support up to 30% of nation's vehicles equipped with plug-in 20-mile range batteries
- ✓ California alone could have 10-15,000 MWs of excess off-peak capacity today
- ✓ Long term, new generation such as nuclear, coal gasification & wind will begin replacing oil in many of our uses, including transportation

## China Followed by India

- ✓ Chinese petroleum demand is now second to US at 6.4 million barrels a day- could double by 2020
- ✓ Right now, there are about 800 million cars in active use worldwide. By 2050, China and India could drive total to 3.25 billion
- ✓ Middle classes of China and India now outnumber the entire US population
- ✓ Next ten years China will sell 140 million cars

## Religious Fundamentalism

- ✓ Over & above price at the pump - we're also paying \$400 billion for defense
- ✓ By doing nothing to lower oil consumption, we're financing both sides and strengthening world's worst governments

## Patriotism

- ✓ A recent survey showed two thirds of Americans, including NASCAR fans and conservatives, think buying more fuel-efficient cars is patriotic
- ✓ Together, CalPERS and CalSTRS are earmarking nearly \$1 billion to invest in clean technology companies