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Manuel Alvarez
Manager, Reg. Pol. & Affairs
Manuel.Alvarez@sce.com

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California Energy Commission
Dockets Office, MS-4
RE: Docket No. 09-IEP-1K
1516 Ninth Street
Sacramento, CA 95814-5512

Re: 2009 Integrated Energy Policy Report (IEPR) Docket Number #09-IEP-1K: Written Comments of Southern California Edison Company (SCE) On Transportation Energy Forecasts

To Whom It May Concern:

SCE thanks the California Energy Commission (Energy Commission) for the opportunity to comment on the Energy Commission staff' s draft Transportation Energy Forecasts for California presented at the August 24, 2009 Workshop. SCE' s comments focus on Electric Transportation (ET) and the development of infrastructure to support it. SCE is providing responses to the following questions from the workshop notice that are appropriate for Electric Transportation (ET).

Workshop Questions

Q2. What are the critical technological and economic factors affecting the growth in consumption of alternative and renewable transportation fuels in transportation and off-road applications? Will adequate supply of fuels and appropriate distribution infrastructure capacity be available? What vehicle technologies will be available and how ill these manufacturer offerings affect consumer choice and use of vehicles? What are expectations with regard to public refueling site availability for renewable and alternative fuels and how will these plans affect demand for these fuels? What are expectations for fleet and in-home fueling or recharging for natural gas and electric vehicles and how will the availability of these technologies affect fuel demand? Will the natural gas and electricity supply sectors facilitate or incentivize the use of natural gas and electricity as transportation fuels and, if so, by what means?

Q3. How will changes in the regulatory environment influence alternative and renewable transportation fuel supply, demand, and prices? How will the consumption of the various conventional and alternative fuels are affected by the Energy Independence and Security Act of 2007, Renewable Fuels Standards II, AB 1493 greenhouse gas rules. Low Carbon Fuel Standards, and other federal and state regulations and policies? What are the key policy concerns revealed by staff transportation energy demand forecasts and assessments? What are the various options available to address these policy concerns and which options are the most preferred to address California' s future transportation energy needs?

In addition, the Energy Commission staff requested responses to the three follow-up questions below in reference to SCE' s presentation at the workshop:

(1) What areas/counties do you consider as SCE's service territory?

(2) What are the attributes for Plug-In Hybrid Electric Vehicles (PHEVs) and Battery-powered Electric Vehicles (BEVs) projected to enter SCE' s service territory?

(3) Are there particular infrastructure barriers that you know of that would prevent PHEVs and BEVs from growing in the manner you are projecting?

Because there is insignificant overlap between the Workshop notice questions and the staff follow-up questions, the discussion below addresses all of them.

Response

PHEVs and BEVs (collectively referred to herein as plug-in electric vehicles "PEV") help support environmental and energy security goals through reduced CO2 emissions, tailpipe emissions, and fossil fuel consumption. Currently there are many factors driving the electrification of transportation (i.e., state and federal policy, technological innovation, and consumer demand). In the near-term, at least 15-20 new PEV models are expected to come to market in SCE' s service territory by 2015, thus creating a great sense of urgency to ensure electric system infrastructure readiness to support ET. The long-term potential is very large, yet there are barriers to an orderly and seamless ET commercialization that need to be addressed.

I. Attributes of PHEV and BEV Anticipated to Develop in SCE's Service Territory

SCE' s service territory covers a large and economically diverse area in central, coastal and southern California.[1] In order to determine the number of PEVs coming into SCE territory, SCE conducted research to confirm which automobile manufacturers will produce PEVs. SCE reviewed and compiled production announcements from all pertinent automobile manufacturers. In instances where specific production quantities were not provided, SCE used historical models for new vehicle production to infer production amounts. In addition to historical models, SCE made projections to follow the typical s-curve, which is used to forecast how specialized products, services and technologies move from small niche markets into the mainstream. In instances where large automakers who are under the California Zero Emissions Vehicle (ZEV) mandate did not announce plans for producing PEVs, a placeholder was inserted to account for future product announcements. A low and a high case were created, with the average (middle case) of the two being used.

The following manufacturers and models were incorporated into SCE' s PEV market projections

[1]SCE's service territory includes all or parts of the following counties: Mono, Inyo, Tulare, Kern, Santa Barbara, Ventura, Los Angeles, San Bernardino, Orange and Riverside. Appendix A contains a map of SCE's service territory.

Figure A: Manufacturer Chart

Large Manufacturers	Model	Production Year
Ford	Transit Connect[1]	2010
	Focus-Based BEV[1]	2011
	PHEV[1]	2012
Chrysler	BEV (Dodge Circuit?)[2]	2010
	BEV – City EV[2]	2011
	PHEV[2]	2012
Chevrolet	Volt PHEV[3]	2010
GM	Saturn Vue-Based PHEV[4]	2011
Nissan	BEV[5]	2010
Hyundai	PHEV[6]	2012
Mitsubishi	MiEV[7]	2010
Toyota	Prius PHEV[8]	2010
	Urban Commuter BEV[8]	2012
Honda	N/A	N/A
Remaining ZEV Manufacturers (Volkswagen, Daimler, BMW)	PHEV	2012
	BEV	2012

Small Manufacturers / Start-Ups	Model	Production Year
BYD	F3DM PHEV[9]	2011
Fisker	Karma PHEV[10]	2010
Tesla	Roadster BEV[11]	2009
	Model S BEV[12]	2011
Th!nk	Th!nk City BEV[13]	2010
Miles	BEV[14]	2010
Bright	IDEA PHEV[15]	2012

1 http://autoshows.ford.com/278/2009/02/11/ford-announces-transit-connect/

2 http://www.media.chrysler.com/dcxms/assets/attachments/Restructuring_Plan_for_LongTerm_Viability.pdf (slide 135)

3 http://www.chevrolet.com/pages/open/default/future/volt.do?evar2=HP_Mast_Volt#

4 http://fastlane.gmblogs.com/archives/2009/05/plug-

5 http://www.nissannews.com/newsrelease.do?id=735&mid=185

6 http://www.hyundainews.com/Auto_Show_News/Seoul_Motor_Show/2009_Seoul_Motor_Show/Press_Release.asp

7 http://www.edmunds.com/insideline/autoshows/newyork/2009/mitsubishiimievusboundnews.html

8 http://pressroom.toyota.com/pr/tms/toyota/maintain-pace-broaden-scope.aspx?ncid=12045

9 http://www.byd2009.com/press.php?id=7 http://www.greencarcongress.com/2009/01/byd-shows-produ.html

10 http://karma.fiskerautomotive.com/news_items/download/11/2009-03-24.pdf
http://karma.fiskerautomotive.com/pages/preorder

11 http://www.teslamotors.com/media/press_room.php?id=841

12 http://www.teslamotors.com/media/press_room.php?id=1284

13 http://www.think.no/think/Press-Pictures/Press-releases/Think-Announces-U.S.-Factory-Plans

14 http://www.milesev.com/administration/DownloadFile.aspx?fileId=64

15 http://www.brightautomotive.com/press-releases/bright-automotive-announces-world-s-first-purpose-built-100-mpg-vehicle-for-commercial-and-government-fleets.html

Once production plans had been determined, a series of 37 assumptions were made to make more accurate forecasts about PEV production and market penetration. Assumptions were ranked on a scale of negative five to positive five, with negative numbers reflecting scenarios that hurt

market penetration and positive numbers reflecting scenarios that helped market penetration. Experts discussed the assumptions to determine if supply would be increased or decreased. The overall impact of the assumptions was assessed, and assumptions that drove PEV market penetration outweighed assumptions that slowed it.

The assumptions that were determined to be the most influential were separated to highlight their impact (Figure B).

Figure B: Key Assumptions

	Assumptions Driving PEV Market Penetration
1	Mass production of PEVs between 2010 and 2012 will lower production costs through economies of scale
2	State and Federal tax credits and policies will encourage automakers to produce PEVs while helping customers to purchase PEVs
3	An economic recovery by 2011 will drive automotive purchases
4	With an economic recovery by 2011, oil prices will increase due to demand in developing nations, e.g. China
5	Southern California will receive a larger share of PEVs because of the greater number of early adopters, the region's familiarity with hybrids, awareness of planned or existing PEV charging infrastructure, and CARB policy mandates

As a result of key assumptions 1 and 2, SCE modified its initial projections, moving from the middle case to a slightly higher case (Figure C). This shift represents automakers willingness to produce more vehicles, based on economies of scale and available tax credits and purchase incentives. The economic recovery and increase in oil prices were determined to drive the market by 3% and 5% respectively (visible in Figure G). The impacts of assumptions 5 will be discussed below.

Figure C: Adjusted Case

Figure 1									
Modified Case: PHEVs & BEVs 2009-2015									
Note: Light green boxes are PHEVs produced in the US	Blue boxes are BEVs produced in the US	Aggressive Automaker							
Orange boxes are PHEVs produced in other countries	Purple boxes are BEVs produced in other countries								
		2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
Large Manufacturer	Ford Transit Connect - BEV	0	1,000	5,000	5,250	5,500	6,000	6,500	29,250
	Ford Focus-Based BEV	0	0	5,000	5,500	6,250	7,250	10,000	34,000
	Ford PHEV	0	0	0	5,000	5,500	6,500	9,000	26,000
	Chrysler BEV	0	500	2,500	10,000	12,000	16,000	18,000	59,000
	Chrysler PHEV 1	0	0	0	10,000	12,000	16,000	20,000	58,000
	Chrysler PHEV 2	0	0	0	10,000	12,000	16,000	20,000	58,000
	Chevy PHEV Volt	0	0	5,000	65,000	70,000	80,000	100,000	320,000
	Saturn Vue-Based PHEV	0	0	5,000	20,000	25,000	32,000	40,000	122,000
	Nissan BEV	0	1,000	5,000	10,000	18,000	26,000	50,000	110,000
	Hyundai PHEV	0	0	0	1,000	2,000	3,500	6,000	12,500
	Mitsubishi MiEV BEV	0	250	4,000	6,000	10,000	16,000	25,000	61,250
	Toyota Prius PHEV	150	0	10,000	50,000	55,000	60,000	80,000	255,150
	Toyota BEV	0	0	5,000	5,500	6,250	7,250	10,000	34,000
	Honda	0	0	0	0	0	0	0	0
	Remaining ZEV Manufacturer's* PHEV	0	0	0	20,417	22,000	25,000	30,000	97,417
	Remaining ZEV Manufacturer's* BEV	0	0	0	4,375	5,000	5,750	7,000	22,125
Small Manufacturer / Start-Up	BYD F3DM PHEV	0	0	3,000	3,500	7,000	10,000	16,000	39,500
	Fisker Karma PHEV	0	250	2,000	2,500	3,200	4,000	5,000	16,950
	Bright IDEA PHEV	0	0	0	100	5,000	10,000	20,000	35,100
	Tesla Roadster BEV	* 500	300	350	425	500	700	1,000	3,775
	Tesla Model S BEV	0	0	1,000	1,500	3,000	4,000	5,000	14,500
	Think BEV	0	2,500	3,000	3,500	7,000	10,000	16,000	42,000
	Miles BEV	0	250	1,000	1,500	2,000	2,600	3,300	10,650
Total		**650**	**6,050**	**56,850**	**241,067**	**294,200**	**364,550**	**497,800**	**1,461,167**

	2009-2015	%
US Manufactured PHEVs	619,100	42%
Foreign Manufactured PHEVs	421,517	29%
US Manufactured BEVs	303,175	21%
Foreign Manufactured BEVs	117,375	8%
Total	1,461,167	

Remaining ZEV Manufacturers - Volkswagen, Daimler, BMW

BEV to PHEV Ratio
29% BEV
71% PHEV

* Per a conversation with Tesla Motors - Tesla explained that a majority of the 500 vehicles delivered in the US in 2009 are in California
Note: Figures are impacted by Assumptions 1 and 2

The adjusted projections determined the projected number of PEVs in the United States between 2009 and 2015. The critical next step was to determine approximately how many of these vehicles would come to Southern California. While data from the National Automobile Dealers Association Data showed that California generally has approximately 11% of the total vehicles in the U.S (Figure D), it actually has approximately 25% of the hybrid vehicles in the nation (Figure E).

Figure D

New Vehicle Registrations	2004	2005	2006	2007	2008
U.S.	17,419,471	16,690,280	16,564,575	16,007,379	13,209,577
California	2,122,834	2,144,882	2,086,931	1,871,132	1,401,305
CA share of US Market	12.19%	12.85%	12.60%	11.69%	10.61%

http://www.nada.org/NR/rdonlyres/ACF47371-BFC7-4A29-8883-FF7F0A4F5D4E/0/NADA_Data_2009.pdf

Figure E

Hybrid Sales	2005	2006	2007	2008	CYTD - April 2009	Source
Entire U.S.	205,828	251,862	347,102	313,781	74,630	Greencarcongress.com[1]
California	44,714	67,533	91,417	74,932	16,874	Hybridcars.com[2]
CA share of US Market	21.72%	26.81%	26.34%	23.88%	22.61%	

[1] http://www.greencarcongress.com/2009/08/sales-20090804.html
[2] http://www.hybridcars.com/hybrid-sales-dashboard/june-2009-dashboard.html

Of that 25%, a large portion is in Southern California. According to data from Hybridcars.com, Los Angeles has typically had approximately 45% of all the hybrid vehicles in the state (Figure F).

Figure F

Percent of CA Hybrids	2006	2007	2008	CYTD Apr 2009
Los Angeles	45.89%	44.45%	44.89%	49.03%
San Diego	7.60%	8.02%	8.99%	8.31%
San Francisco	30.54%	29.85%	27.80%	34.88%
Sacramento	7.29%	8.61%	8.70%	Not Available

http://www.hybridcars.com/hybrid-sales-dashboard/june-2009-dashboard.html

As California has approximately 25% of the hybrid vehicles in the United States, and Southern California has approximately 50% of the hybrid vehicles in California, it can be assumed that Southern California has approximately 12.5% of the hybrid vehicles in the United States.[2]

PEVs are a new, clean technology, whose introduction and adoption may mirror that of conventional hybrid vehicles. Just as California, particularly southern California, was an early adopter and champion of conventional hybrid vehicle technology, it is poised to lead the nation in PEV implementation. While the region has 12.5% of the hybrid vehicles in the United States, it is likely to have an even greater portion of the PEVs, especially during the early years of PEV production. As stated in assumption 5 in Figure C, Southern California will receive a larger share of PEVs because of the greater number of early adopters, the region' s familiarity with hybrids, awareness of planned or existing PEV charging infrastructure (the area already has over 600 units of public charging infrastructure[3]), and CARB policy mandates[4].

The additional portion of the PEV market that the Southern California region will have is affected by the type of vehicle involved. BEVs have a limited range and are more reliant on public charging infrastructure, which is already widely available in Southern California. While the charging infrastructure will have to be updated to work with the new generation of plug-in vehicles, upgrading the infrastructure will be easier and less expensive than installing new infrastructure. As a result, it is assumed that Southern California will have approximately 18% of the nation' s BEVs.

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[2]This statistic applies to all of Southern California. As you can note by reference to Appendix A, SCE does not serve all of Southern California. So, this percentage would require some adjustment to apply solely to SCE's service territory.

[3] CALSTART – www.calstart.org

[4] Executive Order S-1-07: Low Carbon Fuel Standard (LCFS) - http://www.arb.ca.gov/fuels/lcfs/lcfs.htm
Zero Emissions Vehicle (ZEV) Mandate - http://www.arb.ca.gov/msprog/zevprog/zevprog.htm

PHEVs have a limited all-electric range, but their range is extended by having an internal combustion engine (ICE). The ICE can be refueled at any gas station, enabling the vehicle to continue driving even after the all-electric range has been surpassed. Because PHEVs are not as reliant on public charging infrastructure as BEVs, they will be adopted more easily in other states. Taking all factors into consideration, it can be assumed that Southern California will have approximately 14% of the nation's PHEVs.

Figure G : PEV Projections for United States and Southern California

United States			2009	2010	2011	2012	2013	2014	2015	Total	%
PHEV / BEV production		BEVs	500	5,800	31,850	53,550	75,500	101,550	151,800	420,550	28.78%
Tax Credits		PHEVs	150	250	25,000	187,517	218,700	263,000	346,000	1,040,617	71.22%
			2009	2010	2011	2012	2013	2014	2015	Total	%
Economic Impact*	3%	BEVs	15	174	956	1,607	2,265	3,047	4,554	12,617	28.78%
		PHEVs	5	8	750	5,625	6,561	7,890	10,380	31,218	71.22%
			2009	2010	2011	2012	2013	2014	2015	Total	%
Oil Prices**	5%	BEVs	25	290	1,593	2,678	3,775	5,078	7,590	21,028	28.78%
		PHEVs	8	13	1,250	9,376	10,935	13,150	17,300	52,031	71.22%
New Total			2009	2010	2011	2012	2013	2014	2015	Total	%
		BEVs	540	6,264	34,398	57,834	81,540	109,674	163,944	454,194	28.78%
		PHEVs	162	270	27,000	202,518	236,196	284,040	373,680	1,123,866	71.22%
Southern California			2009	2010	2011	2012	2013	2014	2015	Total	%
	18%	BEVs	150	1,128	6,192	10,410	14,677	19,741	29,510	81,808	34.21%
	14%	PHEVs	23	38	3,780	28,353	33,067	39,766	52,315	157,341	65.79%
		Total PEVs	**173**	**1,165**	**9,972**	**38,763**	**47,745**	**59,507**	**81,825**	**239,149**	

* Assumption 3
** Assumption 4

II. Barriers to PEV Development in SCE's Service Territory

In order to support the development of PEV in SCE's service territory, a number of barriers need to be overcome. That being said, with a determined effort, these barriers can be overcome in the short run and need not preclude anticipated PEV development.

(1) *Development of Metering and Charging Infrastructure*. The electrification of transportation requires not only that PHEVs and BEVs be produced, but also that adequate charging infrastructure is in place to ensure a successful transition from fossil fuels to electric fuel. There are numerous issues associated with infrastructure development and readiness, including:

- Who will develop and pay for the necessary infrastructure, and how long will it take to develop? ET development will involve the construction of new charging stations, customer circuit panel upgrades, conduit, wiring and trenching, sub-metering, and load control/interface installations. Elements of the Smart Grid, such as energy storage and smart metering are also important investments related to efficient, controlled PEV charging.

- How can charging infrastructure be paid for in a way that protects ratepayers? Effective charging infrastructure will benefit a broad range of stakeholders, not limited solely to electricity customers. Thus, it is important to determine how costs will be allocated in light of the wide range of benefits that may incentivize increased electric fuel use.

- The importance of home and commercial/workplace PEV re-charging to take advantage of the existing electricity infrastructure.

- The need for national and international codes and standards so that PEV adoption reaches its full potential.

(2) *Streamline the permitting and inspection requirements and contractor installation process for residential and commercial PEV charging equipment.* This is especially critical for PEV customers requiring 240V charging circuits. Based on SCE' s experience in the 1990s and recent EV demonstration programs, there are multiple steps and parties that impact the timing of residential charger installation and circuit activation. SCE is continuing to examine ways to manage the SCE-controlled aspects of the process, including customer interactions with call centers and utility service planners.

(3) *Incorporation of PEV charging with renewable energy supply, including, but not limited to, photovoltaic ("PV") arrays over charging stations or off-peak charging that takes advantage of overnight wind resources expected in the utility resource portfolio.* It is important to consider the potential of PEV charging to help integrate intermittent renewable generation and maximize efficiencies on the grid, particularly during the off-peak period. ET load management might be able to increase customer use of renewable energy and also assist in controlling electricity costs. However, additional development of intelligent communicating chargers, inverters, and control software will also be needed.

(4) *Other issues in meeting demand for increased energy*. Ensuring that customer demand is met is vitally important. Constraints on generation, such as the potential mandated closure of "once-through-cooling" plants (currently 40% of California' s generating capacity), and limits on new construction (as with the "priority reserve" lawsuit freeze on emissions permits for new generation) are potential threats to future reliability. Using new transmission as a reliability resource depends on the siting and licensing process, which is extremely time-consuming. Thus, it is difficult to reconcile increasing ET electrical demand with plant closures and other restrictions on generating and transmission capacity. These "non-ET issues" will need to be addressed.

III. Conclusion

In conclusion, SCE appreciates having the opportunity to submit these written comments and looks forward to working with Energy Commission staff in the future as it works to define the future of ET. If implemented properly, ET can produce immense benefits for California. If you have any questions, or need additional information about these comment, please contact me at 916-441-2369.

Very truly yours,

/s/ Manuel Alvarez

Manuel Alvarez

APPENDIX A

Map of SCE's Service Territory