

DOCKETED

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SCE Feedback Form for Input Scenarios_August 23_2017_draft response DT_HS

Additional submitted attachment is included below.

Feedback Form for Recommendations on LDV Scenario Inputs

Please fill in any rows you would like to provide input on by listing the variables' "input scenario" you most believe represent low, most likely (mid) and/or high cases, referring to the scenario chart presented at the Wednesday's presentation and **attached as pdf to the email**. Please indicate either trends you foresee, or expected 2030 levels. If you believe that none of the CEC-presented scenarios represent your belief, please feel free to write a comment on the scenario you think we should consider.

For example, if you think it is possible, but not most likely, that PEVs will cost the same as ICEs by 2030, please put "Price Parity by 2030" in the Vehicle Price HIGH column.

Scenario Name	Low PEV	Mid PEV	High PEV	Additional Comments:
Gasoline Prices	Low Prices	Mid Prices	High Prices	
Natural Gas Prices	Mid Prices	Mid Prices	Low Prices	
Electricity Prices	High Prices	Low Prices	new Very Low Price Case	Under "High PEV" scenario, an overall very low price for every hour of the year can be assumed that averages a mix of mostly off-peak charging with a little bit of charging at higher prices even if an off-peak price can't be modeled yet. Because of very favorable off-peak electricity prices offered for charging (both residential and non-residential) today and in new proposed rates (e.g. SCE's applications for new residential and commercial rates designed to increase EV adoption), and because of mandatory TOU rates for residential, we suggest that EV drivers will mostly charge off-peak (as this now includes both night and daytime – and only excludes the evening ramp). As a result a new very low price case should be developed.
Rebates	PEV Rebates to 2020	PEV Rebates to 2025	PEV Rebates to 2030	
Tax Credits	PEV Tax Credit to 2020	PEV Tax Credit to 2030	PEV Tax Credit to 2030	EV tax credits currently phase out for each automaker reaches 200,000 units. A typical automaker may only get about 240,000 tax credits as a result. However, this applies to both legacy automakers as well as the many start-ups, so total value is very large because there are so many start-ups. There is not a date expiration. In addition, LCFS credits today provide \$3000-\$6,000 value at \$100-\$200 per ton for a compact EV over its life (more for larger vehicles) and this is not accounted for in the CEC model. This amount more than offsets any issues with some automaker's tax credits expiring. As a result of these two factors, the tax credit assumption should continue.
HOV Lane Access	BEV only	BEV and PHEV	BEV and PHEV	

<p>Fuel/Technology Type & Parameter (Preferences)</p>	<p>All</p>	<p>All, Augmented Preferences for PEV increase @2.5% a year up to 2025 and increase @5% a year after 2025</p>	<p>All, Augmented Preferences for PEV increase @10% a year</p>	<p>As more and more consumers become aware of BEVs and PHEVs and their favorable attributes (0-40 acceleration, range, quietness, favorable up-front prices and operating costs, etc.) more and more consumers will want them. This trend has been happening and will accelerate with increased word-of-mouth, increased automaker advertising / competition, more and larger EV events (e.g. ride-and-drives, national drive electric week), favorable press (e.g. Elon Musk), and longer range EVs and PHEVs. PHEVs will especially benefit as understanding of this technology is low. In addition, a new trend has emerged: third party advertising, and this trend will accelerate. For example, funding is now in place for broad and targeted, brand neutral market education on EVs at about \$12 million per year including radio, dealer programs, ride-and-drives, etc. Sources of this funding include Veloz, Electrify America, SCE, SDG&E, PG&E, LADWP, SMUD efforts.</p> <p>A potential way to examine the increasing level of consumer adoption of EVs is to look at other similar technology adoption. For example, adoption of diesel vehicles in Europe. While diesel had a 10 percent market share in the mid-1990s, by 2000 it hit 31 percent. By 2012, it was in the majority at 55 percent.</p> <p>“Word-of mouth” effect can also be estimated through simple analysis or established using other similar technology or market development data. SCE can provide further comments in this area later.</p>
<p>Vehicle Classes</p>	<p>Most Likely</p>	<p>PEVs in all classes</p>	<p>PEVs in all classes</p>	<p>Since 2011, PEVs have advanced into additional classes more quickly than most expected. See example from EPRI pasted below. Since that chart was made there have been more announcement regarding electric pick-ups. CARB’ ZEV review has reached similar conclusions. This trend should continue to accelerate as EV sales accelerate. Also competitive pressures will force automakers to seek their own niches in “underserved” segments. PHEVs are especially suited to these larger vehicles, and more and more automakers are mastering the PHEV technology.</p>
<p>Vehicle Price</p>	<p>Most likely</p>	<p>Parity at 2025</p>	<p>Lower at 2025</p>	<p>Bloomberg and others whose studies show price parity reaches at earlier time. See links in the Additional References below. It’s important to remember that cost is not price, and that automakers prices (lease or up-front) are very low for PHEVs and BEVs compared to their gasoline counterparts. The CEC example of discontinued RAV4 EV does not show this. Automakers are doing cross product line subsidies to price EVs because of mpg standards and ZEV requirements. As a result, the CEC prices for EV classes should be less than shown in the CEC’s powerpoint. Also the CEC staff could</p>

				obtain data from the mid-term review TAR report by CARB (through Joshua Cunningham) showing increases in gasoline and diesel vehicle prices to comply with mpg standards. The real question is not EV or PHEV prices but the price deltas.
Fuel Economy	PEV 25% below most likely	Most Likely	Most Likely	
Maintenance Cost	Most Likely	Most Likely	Most Likely	
Range	Most Likely	ARB High Tech	PEV 25% Above Most Likely	SCE is Ok with ARB High Tech specification on range.
Acceleration	Most Likely	Most Likely	25% Better	EV acceleration for 0 to 40 mph is very good and typically much better than conventional vehicles. As battery sizes for BEVs and PHEVs increase, even more automakers will offer this
# of Makes and Models	Most Likely	PEV 25% above Most Likely	PEV 50% above Most Likely	<p>The number of makes and models per both CARB and EPRI will soon hit about 70 types and this trend should continue from 2021 to 2030. The number of makes and models is much higher when looking worldwide, and it is not hard to bring these extra models that are available today to California. Similar to the vehicle class question above, competitive pressures will accelerate this trend so that automakers offer even more makes and models.</p> <p>In addition, as discussed below (summary of EPRI report) fuel cells will face challenges. One way to address this challenge is to introduce plug-in hybrid FCEVs, as suggested by CEC staff and recent automaker announcements. We agree a few of these models should be included.</p>
Refueling Time	PEV 25% Above Most Likely	PEV 25% Below Most Likely	PEV 25% Below Most Likely	Refueling time should not have a large impact. The paradigm for BEVs and PHEVs is so very different than conventional vehicles because most EVs are refueled low cost at home overnight and this trend should continue due long-range EVs and PHEVs not needing much away-from home charging. Of course the market for those who normally park on the street or at large apartments and condos is different and solutions will emerge (e.g. ridesharing, urban DC charging plazas, etc.).
Time to Refuel Station	PEV 25% Above Most Likely	Most Likely	PEV Same as gasoline	

Additional references provided by SCE

Electric Cars to Reach Price Parity by 2025

Bloomberg:

<https://about.bnef.com/blog/electric-cars-reach-price-parity-2025/>

<https://www.bloomberg.com/news/articles/2017-05-26/electric-cars-seen-cheaper-than-gasoline-models-within-a-decade>

<https://www.bloomberg.com/news/articles/2017-07-06/the-electric-car-revolution-is-accelerating>

UBS:

<https://www.ft.com/content/6e475f18-3c85-11e7-ac89-b01cc67cfeec>

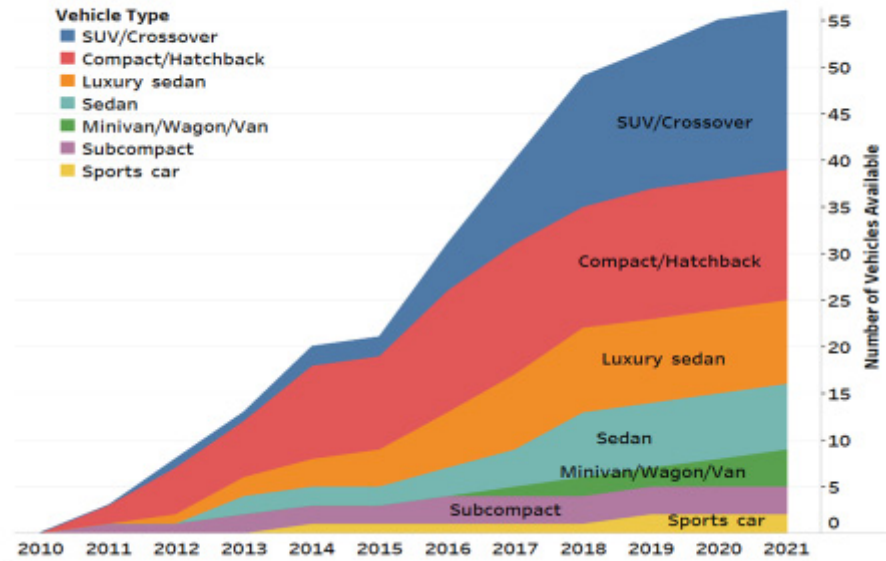
EI forecast:

[http://www.edisonfoundation.net/iei/publications/Documents/IEI_EEI%20PEV%20Sales%20and%20Infrastructure%20thru%202025_FINAL%20\(2\).pdf](http://www.edisonfoundation.net/iei/publications/Documents/IEI_EEI%20PEV%20Sales%20and%20Infrastructure%20thru%202025_FINAL%20(2).pdf)

Regarding fuel cell EVs, EPRI has a recent fuel cell EV status report by Dr. Kalhammer who led CARB's independent expert fuel cell and battery assessment teams about 15 years ago. The main findings from that report include the following key findings on fuel cell EVs:

- Performance output exceeds DOE's goal
- Longevity of commercially viable stacks does not meet DOE's commercial readiness goal
- Costs do not meet DOE's commercial readiness goal
- Experts disagree on how to meet cost goals
- Cost-competitive mass manufacture is not yet established
- Additional uncertainties impact investment timing
- Therefore, the beginning of PEMFC mass production is unlikely to occur before the mid-2020s at the earliest—and only if all technology life and cost issues are positively resolved and the necessary production commitments are made within the next 3–5 years.

Customer choice increasing with 30+ plug-in electric vehicles arriving 2016 – 2021



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