
EV Roadmap 8
Portland, Oregon

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Current State of the Market for LD PEVs

Overall PEV sales are mostly flat in 2015 largely because share of car sales is down. Within cars PEV shares have leveled, not fallen.

On average, the luxury/performance Tesla accounts for 40% of BEV sales.
Plug-in hybrids (PHEVs) sold are smaller than HEVs. Battery electric vehicles (BEVs) are greater.
Current State of the Market for LD PEVs

Incentives, planning, coordination, diverse models, and higher oil prices made initial PEV sales rise faster than initial HEV sales.
Current State of the Market for LD PEVs

Are incentives or planning/organization more cost effective? Are both necessary to meet emissions reduction goals?

Of 12 incentive states:
- 10/12 Nonattainment
- 5/12 Sec. 177 (CALEV)

Average PEV shares by group, with number of states in group
Three Market Influences

Incentives and/or planning aided PEVs generally. BEV shares were hurt by cold climate (BEV range penalty), aided by incentives (mostly states in air quality nonattainment)

Average PEV shares by group
ICCT: Carpool lane access and emission exemptions contributed as significantly to BEV sales as subsidies.

ICCT compared the effectiveness of different types of incentive in driving BEV sales

Monetary benefits to BEV owners is significantly positively correlated to BEV sales, while PHEV benefits are not correlated to PHEV sales

Annual BEV-specific fees have a negative impact on BEV sales

Source: Evaluation of State-Level U.S. Electric Vehicle Incentives, ICCT, October 2014
ICCT: Not all generous $ led to high PEV share
Not all states with high PEV share offered generous $
Greatest fuel savings/day potential of electric drive technologies varies for intra- and inter-metro use

- HEV savings are highest in metro core (Fusion and Camry HEVs) or about the same regardless of speed and location (Prius, Accord HEVs).

- PHEV savings are always high in metro core (Fusion PHEV), can be highest in suburbs only if range is extended by larger batteries and/or workplace charging (2014 Volt EREV).

- Large batteries enabling range of 40+ miles in either PHEVs (Volt EREV) or range extenders (BMW i3 REX) cause steep declines in fuel savings when operating on gasoline instead of electricity (inter-metro issue).

- Fuel savings benefits of BEVs, like diesel, increase sharply with average speed, making low density suburbia attractive – range anxiety increases. Though PHEV savings can approach BEV savings, BEVs are always better.

- Expectations: consistent, reliable BEV range of over 100 miles (150+ EPA rated) will sell and serve everyday intra-metro driving well. PHEV with 20-30 mi. range and workplace charging will also electrify many miles, as will “BEVx (REX) with 50-70 mi range without workplace charging.
Which emerging technical options should be provided incentives and/or planning support?

- What is the best way to provide everyday PEV range assurance?
  - Public infrastructure to support < 100 mile BEVs (current approach)
  - Multiple charges per day with PHEVs up to 50 mi. EV range & workplace charging (current approach)
  - Bigger batteries in BEVs (rated 150+ mi. BEVs) (more coming)
  - BEVs 50-100 mi. range with range extension via gasoline (looks good)

- Are “all of the above” needed for mass market success?

- Which of these options can survive with the least incentive $?
Appendix:
Charts supporting statements about varying intra- and inter-metro fuel savings
PHEVs nearly match the daily fuel savings of BEVs in urban driving, but in high speed driving BEV savings pull away (but then most BEVs run out of range).

PHEV range & workplace charges can give BEV-like $ savings.
In everyday use 200+ mi. range in high performance market saves much more fuel vs. competitors; has miles to spare

High performance BEVs save much more than PHEVs

- BEV models in left chart are compared with their comparable gasoline vehicle. Eg. Focus EV vs. Focus 1.5 Turbo
- Assumed 1.5 hrs day of use and 1 charge/day
- Fuel efficiency comes from fueleconomy.gov
The range extender approach can allow BEV savings to be realized in low density, high mph suburbia without range anxiety.