Exploring the Impact of Incentives on the PEV Market

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NEW CAR BUYERS AND PEV BUYERS: PEV BUYERS ARE COMING BACK FOR SECONDS



- 4% of the households are responsible for almost one third of the market over the last 3 years 2010-2012
- Up to 15% of PEV buyers are on their second PEV





Energy Efficiency & Renewable Energy

www.fueleconomy.gov

the official U.S. government source for fuel economy information

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Federal Tax Credits for Electric Vehicles Purchased in or after 2010

Federal Tax Credit Up To \$7,500!

Electric vehicles (EVs) purchased in or after 2010 may be eligible for a federal income tax credit of up to \$7,500. The credit amount will vary based on the capacity of the battery used to fuel the vehicle.

This credit replaces an earlier credit for EVs purchased in 2009.

Small neighborhood electric vehicles do not qualify for this credit, but they may qualify for another credit.



Office

Mobile

Federal Tax Credit

The credit is equal to \$2,500 plus, for at least 5 kilowatt hours of capacity, plus an additional \$417 for each kilowatt hour. The total amount of the credit allowed for a vehicle is limited to \$7,500.

Vehicle Choice Without the Federal Tax Credit



What is the cost of additional PEV?

	Cost of additional PEV	Cost for each PEV	Final Price
NISSAN LEAF	\$14,700	\$7,500	\$27,300
FORD C-MAX ENERGI	\$16,100	\$4,007	\$30,000
TOYOTA PRIUS PLUG-IN	\$16,400	\$2,500	\$29,800
CHEVROLET VOLT	\$17,500	\$7,500	\$31,900
FORD FUSION ENERGI	\$21,300	\$4,000	\$36,000
TESLA MODEL S	\$52,600	\$7,500	\$86,100

The Impact of \$1000 per vehicle Federal Tax Credit (Actual Incentive \$2,500-\$7,500)

	What is the Impact of \$1000 per vehicle Federal Incentive?		
	Additional PEV sales	Battery Capacity (kWh)	eVMT per year (miles)
NISSAN LEAF	0.068	1.6	658
FORD C-MAX ENERGI	0.062	0.5	252
TOYOTA PRIUS PLUG-IN	0.061	0.3	152
CHEVROLET VOLT	0.057	1.0	517
FORD FUSION ENERGI	0.047	0.4	204
TESLA MODEL S	0.019	1.6	240

2013 US Market by Segment and Price



The Impact of \$1000 price Change on the Potential Market



Interim Conclusions

- Almost half of the BEV 80 vehicle sales in the US can be attributed to the federal tax credit.
- The credit has a higher impact when applied at the maximum rate for both the Volt PHEV and the LEAF BEV (both in term of sales and in terms of additional eVMT).
- The impact on Tesla Model S sales is relatively low reflecting the share of the incentive of both the vehicle cost and the buyer's income.



Non Monetary Incentives

The Case of HOV access in California

Most Important Non Monetary Incentives in California



■ HOV lane access ■ Workplace Charging ■ Discounted Parking ■ Preferred Parking Location

Single Occupancy Vehicle HOV Access Permits in California

- 1. White stickers, available to an unlimited number of qualifying federal inherently-low-emission vehicles, which are mostly 100% battery electric vehicles (BEVs) and compressed natural gas vehicles and
- 2. Green stickers , available to the first 75,000 applicants that purchase or lease cars meeting California's transitional zero emission vehicle (TZEV) requirement, which are mostly plug-in hybrid electric vehicles (PHEVs).

- The expiration date for both the green and white stickers is 2019.
- HOV stickers save time and money (On bridge tolls, access tolls and HOT lanes)



HOV Usage for Commute



Daily Commute HOV miles

What Will a PHEV Driver Buy Without the Green Sticker?





BEV to PEV Ratio (N=100,211)



Policy Options

- Limit the stickers to vehicles with longer EV range or BEVs only
 - Up to 50% of the potential "sticker buyers" will go for a BEV (or a long range PHEV?)
 - Will they plug in more?
- Limit the sticker to three years instead of a fixed sunset date
 - Open question:
 - What is the cost of enforcing this system?
 - How it will influence the incentive?
 - What about two sunset terms instead of one?
- Reduce or Cancel monetary rebate (state rebate) for sticker takers

Non-Monetary Incentives

The Case of Commute Charging

Focus Groups: The Role of Public Infrastructure

- Group 1
 - 12 participants
- Group 2
 - 15 participants
- Vehicles
 - Tesla Model S, Honda Fit, Toyota RAV4, Nissan Leaf, Ford C-Max, Toyota Prius Plug-in, Fiat 500e, Chevy Volt, Mercedes B-Class, Ford Fusion, Chevy Spark

Topics

- What was the role of public infrastructure in the decision to buy the PEV?
- How does public infrastructure impact purchase and will it change PEV usage?
 - Location
 - Type
 - Willingness to pay for public charging
- Etiquette
- Future Vehicles



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The Role of Chargers in Buying PEV Focus Group Results:

- Nissan LEAF leased household:
 - The free workplace charging balanced out the lease cost, we would have stay with one car without it.
- Ford Fusion downtown household:
 - I couldn't charge at home, the free chargers a block from home are my main option, but now they are occupied even at night.
- Fiat 500 household:
 - We just stopped at the dealer to kick tires, we had no idea where we will plug it in when we drove it home.
- Nissan LEAF household:
 - There are no public chargers that I can use, the few available are always in use.
- Toyota Prius household:
 - I planed on using 120v at home and all the public chargers in Berkeley, but I'm not using it anymore.
- Toyota Prius household:
 - My next car will be a BEV, but I'm waiting for the electric highway to be finished.

How Important is it for Purchase?

3 = Extremely Important. -3 = Not at All Important



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65%-70% of Households Commute with PEV



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How Many PEVs Can Be Directly Attributed to Workplace Charging?

• If workplace charging were not available when buying my PEV (or any other plug-in vehicle) I would choose:



- Workplace Charging is not the number one non monetary incentive
- Non plug-in vehicle
- A plug-in vehicle
- Not to buy/lease a vehicle at all

Only about third of the respondents report a non-monetary incentive i.e. total sales that can be directly attributed to workplace chargers may be lower than 6.0%

Overlapping Incentives



Conclusions

- Monetary incentives work, but can be optimized based on sales price
- Non-monetary incentives work but may be correlated with less desired eVMT results.
- What is the measure for success? Green HOV stickers sell more PHEVs but white stickers may create more EVMT.
- Not all buyers need all incentives. Allow a selection of one incentives over the other (HOV access or CVRP for example) may reduce public cost with very low impact on sales.



Thank You Questions?