



@EVSymposium29
#EVS29

Electric Vehicle Symposium & Exhibition

June 19-22, 2016 | du 19 au 22 juin 2016

Montréal, Québec, Canada

Organized by:



Hosted by:



In Collaboration with:



Platinum Sponsors:



DRIVE ELECTRIC INNOVATION
PROPULSER L'INNOVATION EN MOBILITÉ ÉLECTRIQUE

EVS29.ORG

Analysis of Manufacturer Plug-In Electric Vehicle Incentives

Russ Campbell

SRA International, a CSRA Company
Russ.Campbell@CSRA.com



Yan Zhou

Argonne National Laboratory
YZhou@ANL.gov



Zhenhong Lin

*National Transportation Research
Center, Oak Ridge National Laboratory*
LinZ@ORNL.gov



Jacob Ward

*Vehicle Technologies Office, U.S.
Department of Energy*
Jacob.Ward@ee.doe.gov



VEHICLE TECHNOLOGIES OFFICE



Introduction

- **Manufacturer Plug-In Electric Vehicle (PEV) Incentives-** offered in an attempt to encourage consumers to purchase or lease new vehicles
- **U.S. State and Federal Government Incentives-** offered to help build and maintain a market for PEVs.
- How do manufacturer, state and federal government PEV incentives compare by state by manufacturer, and by technology?
 - Understanding the magnitude and distribution of Manufacturer incentives
- How do manufacturer incentives compare between ZEV and non-ZEV states?
 - Apparent trends in manufacturer incentives in response to emissions standards
- What role have manufacturer incentives played in either stimulating or maintaining PEV sales?
 - Does an increase in incentive value result in an increase in vehicle sales?



Approach

- **Vehicle Selection- PEVs and Comparable Hybrid Electric (HEV) and Conventional Vehicles (CONV)**
 - 127 vehicle models from 22 manufacturers over 12 different size class / segments and luxury/non-luxury classifications.

Make/Model	Powertrain	Base MSRP (\$) ^a	Combined MPG ^b	Interior Volume (cu.ft.) ^b	Luggage Volume (cu.ft.) ^b	Power To Weight (hp/lb) ^c	Combined Range (miles) ^b
2015 Nissan LEAF	BEV	29,010	114*	92	24	0.033	84
2015 Nissan Sentra	CONV	16,480	33	96	15	0.045	435
2015 Chevrolet Volt	PHEV	35,170	98*	90	18	0.038	380
2015 Chevrolet Cruze	CONV	16,995	27	94	16	0.045	421
2015 Toyota Prius	HEV	24,200	50	94	22	0.044	595
2015 Toyota Prius Plug-In	PHEV	29,990	95*	94	22	0.042	540

^a MSRP Data Compiled from Vehicle Manufacturer Websites.

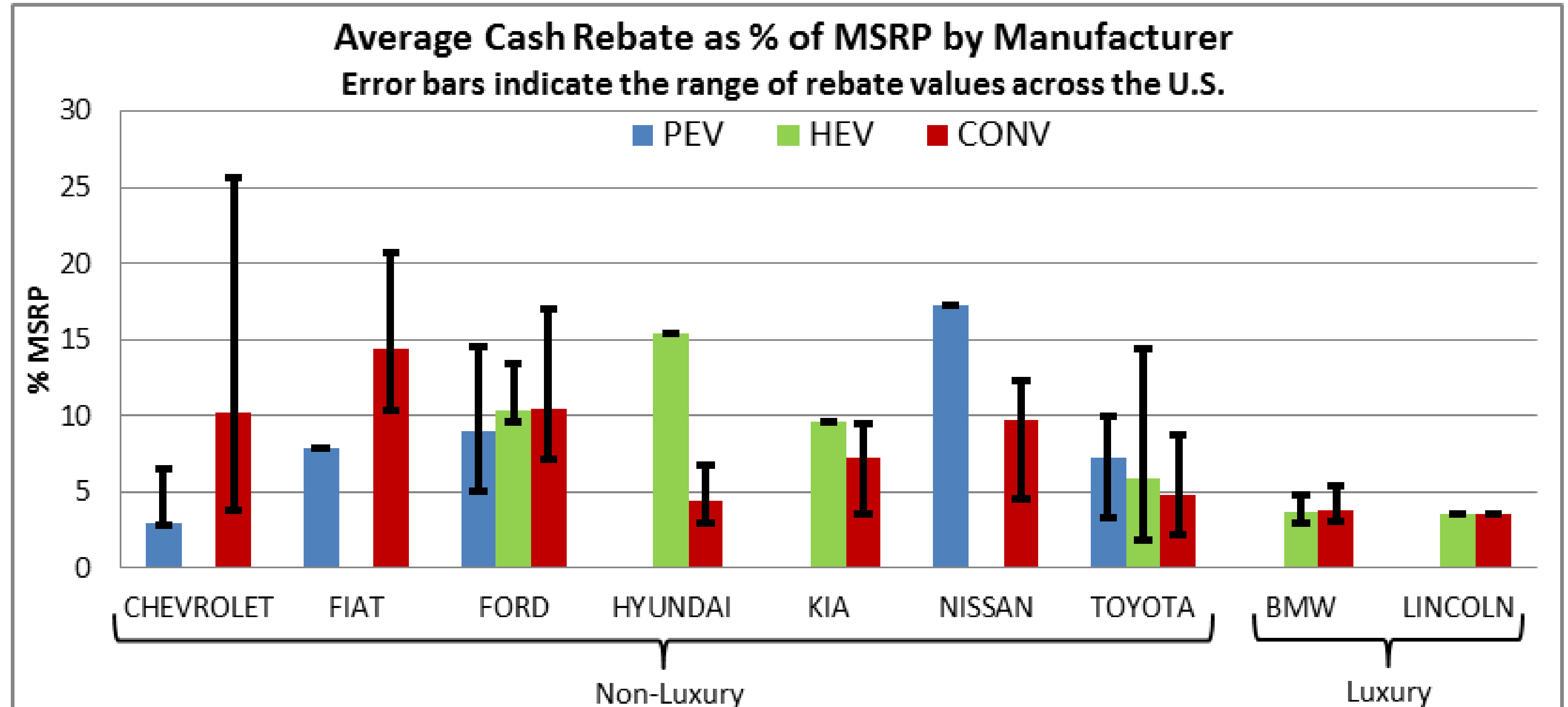
^b MPG, Interior/ Luggage Volume, and Range from www.fueleconomy.gov

^c Peak vehicle system power and curb weight from www.edmunds.com

* MPGe

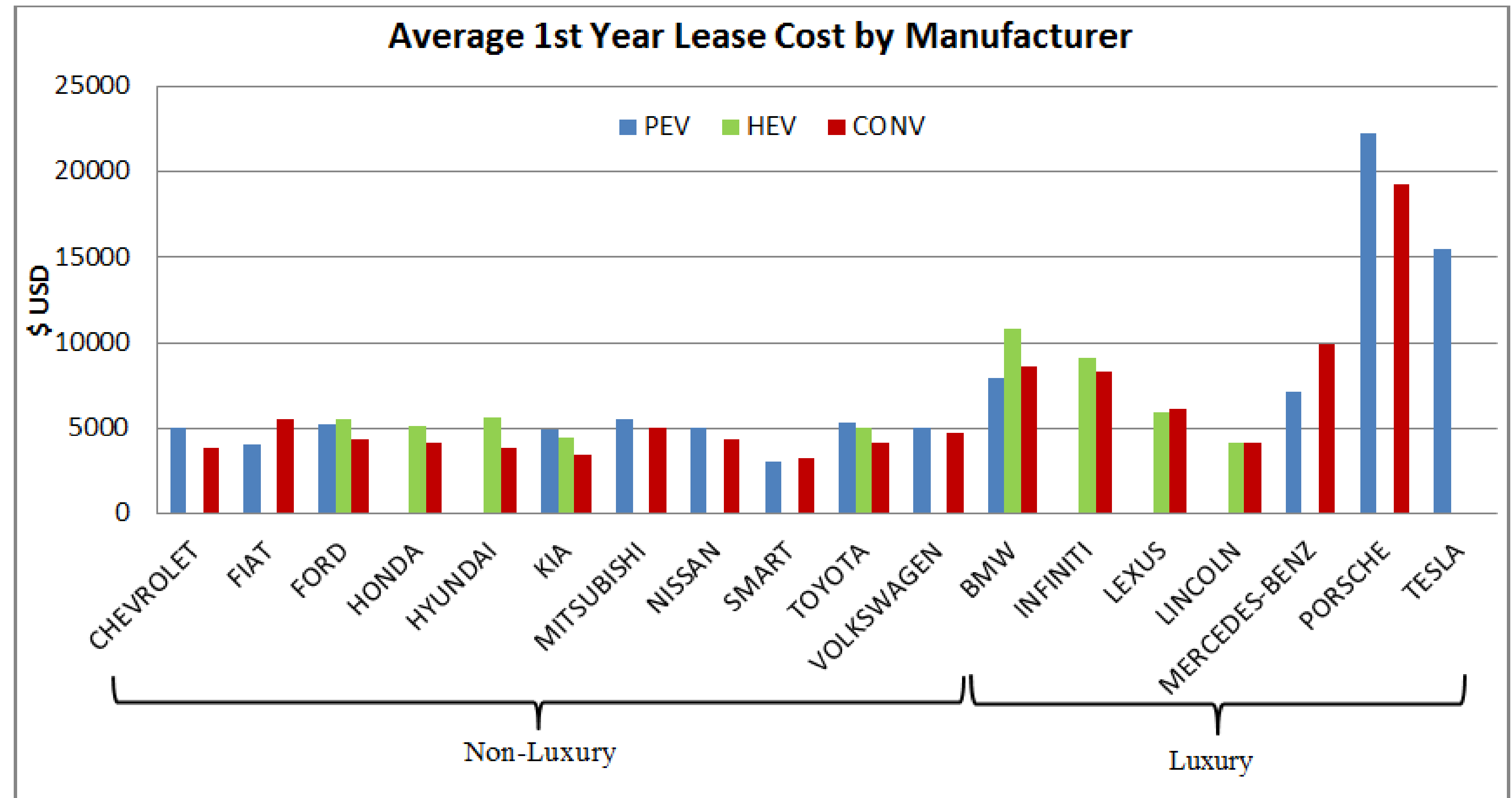
- **Understanding Manufacturer PEV Incentives**
 - ***“Current” Incentives***- To investigate PEV incentives at a regional or state level and to capture special lease offers, it was necessary to compile incentives directly from the vehicle manufacturers’ websites.
 - ***Cash Rebate Incentives over Time***- These incentives were compiled on a monthly basis for a period of one year beginning in August 2014 using Automotive News monthly consumer incentives summaries.

“Current” Cash Rebate Offers



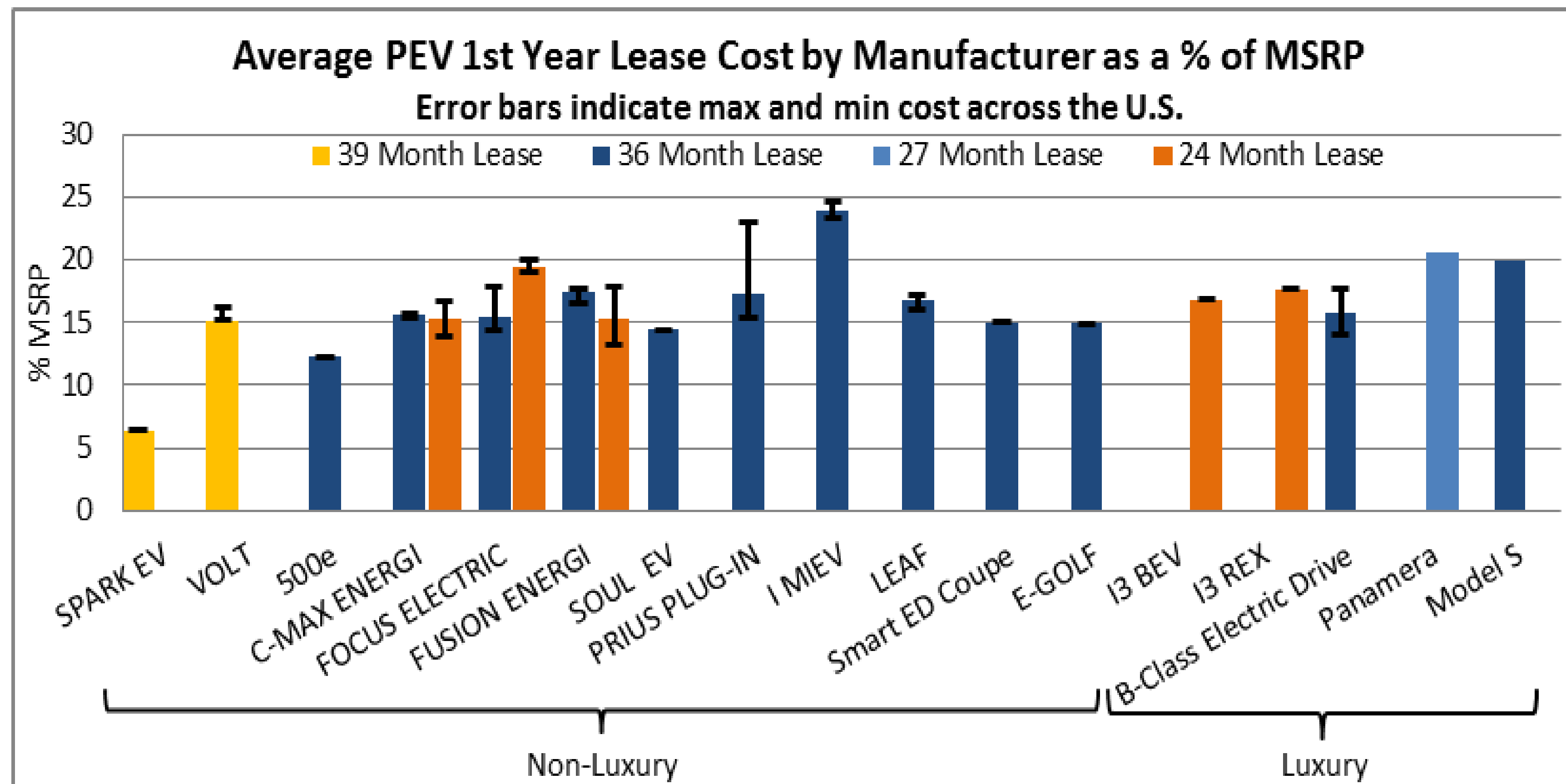
- These cash rebate offers illustrate several potential discount structures with differing levels of discrimination by vehicle technology:
 - No discrimination
 - Marginal discrimination
 - Clear discrimination
- The error bar ranges illustrate that manufacturers may target certain regions or states with rebate offers.

“Current” Lease Offers



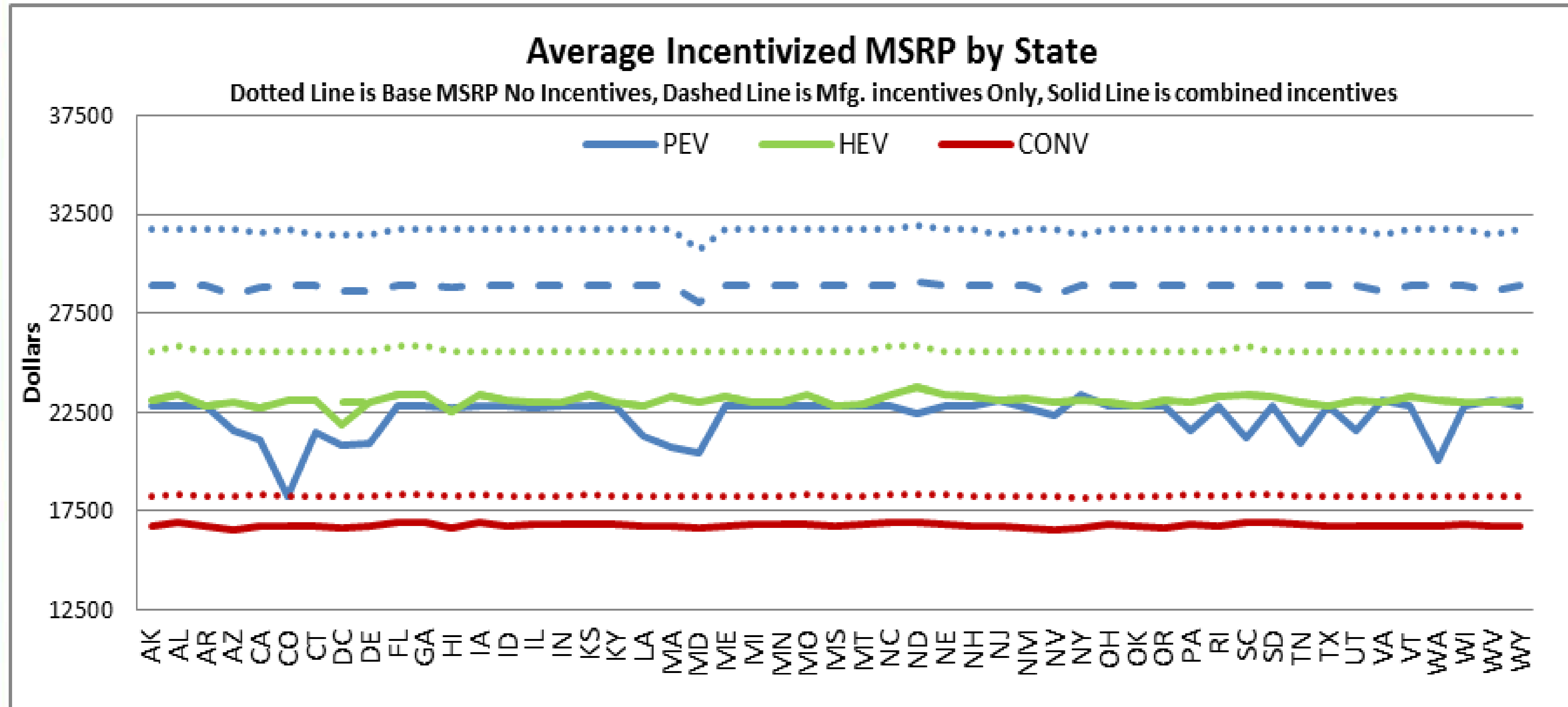
- Non-luxury vehicles appear to have a uniform first year lease cost of approximately five thousand dollars.
 - PEV’s first year lease cost appears to be slightly higher than that of their CONV counterparts
- The luxury PEV first year lease cost ranges from marginally higher than to three to four times the cost of a non-luxury vehicle.

“Current” PEV Lease Offers



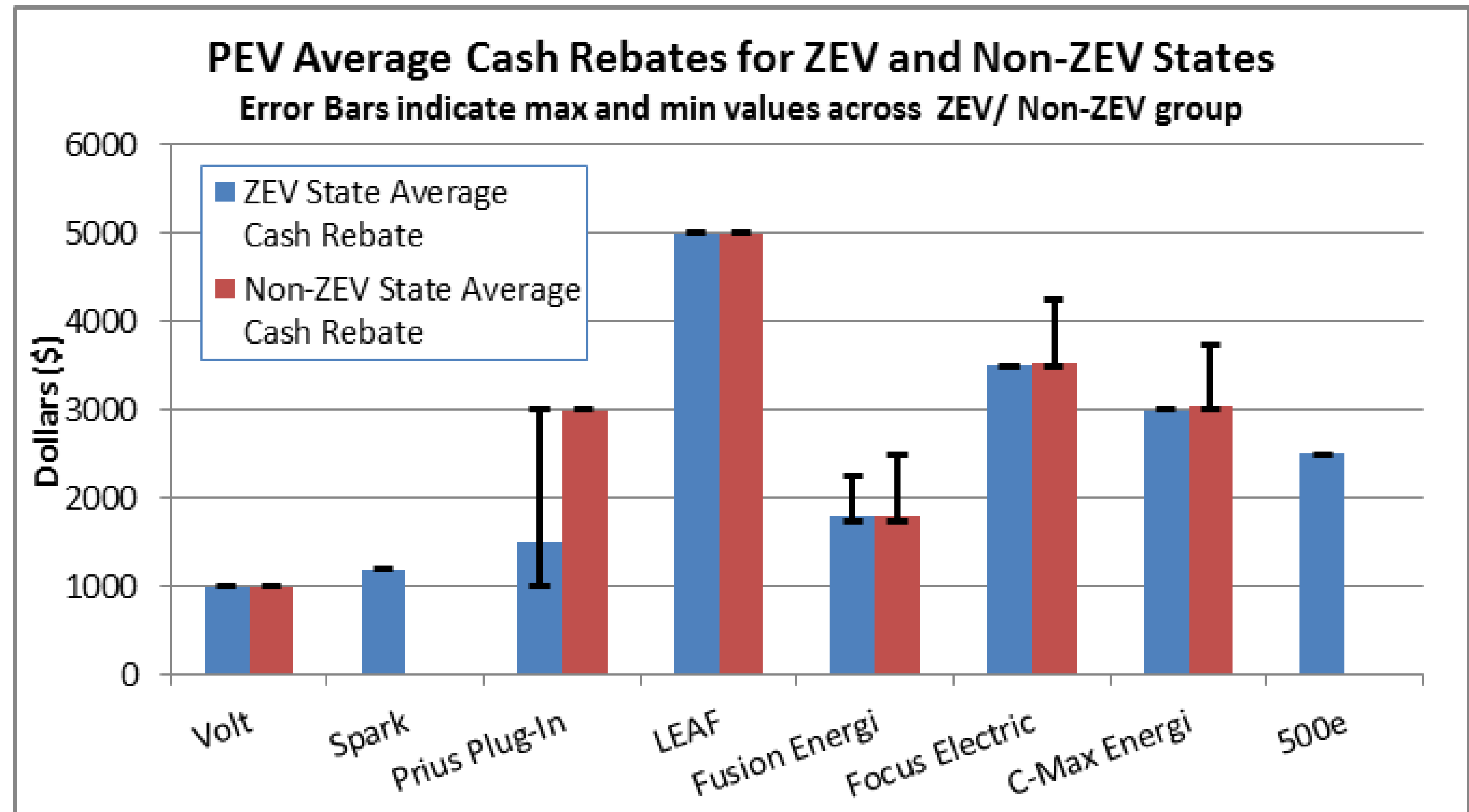
- For both luxury and non-luxury vehicles, the first year lease costs of a PEV typically fall into 10%-20% of its MSRP.
- First year lease cost can vary by up to 5% of the MSRP.

Comparison of Manufacturer and U.S. Government Incentives



- The incentivized price of PEVs is comparable with the incentivized price of HEVs
- With significant state government discounts, such as in Colorado, the incentivized PEV price becomes comparable with a non-incentivized CONV MSRP.
- On the whole there is no significant difference in Manufacturer PEV cash rebates between states.

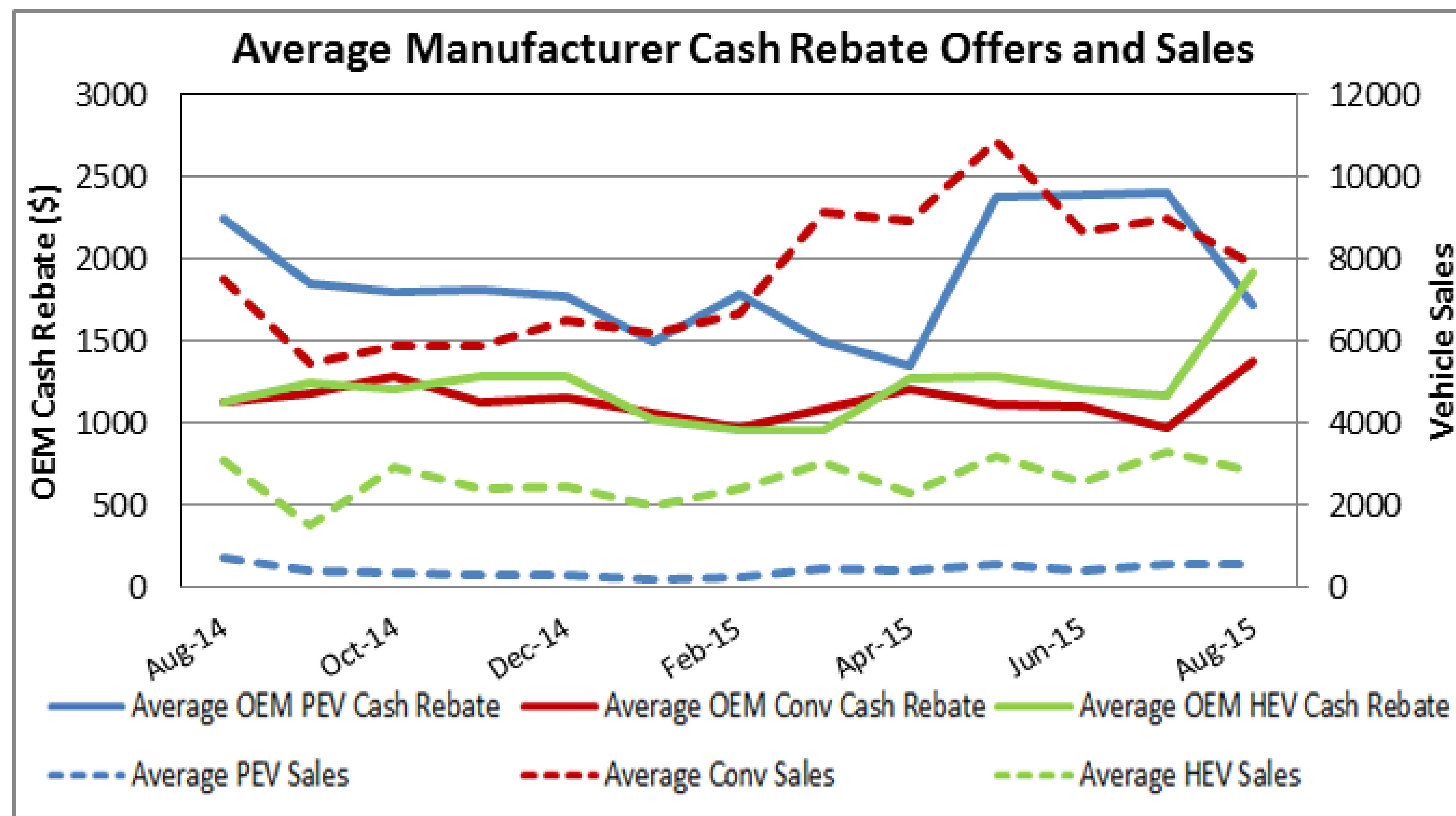
Comparison of PEV Incentives for ZEV vs. Non-ZEV states



- The Prius Plug-In cash rebates show the most significant difference with a greater average rebate value to non-ZEV states.
- Several vehicles exhibit a greater maximum rebate value for non-ZEV states as compared to ZEV states.
- On the average it does not appear that there is a trend of manufacturers targeting ZEV states with special cash rebate offers.



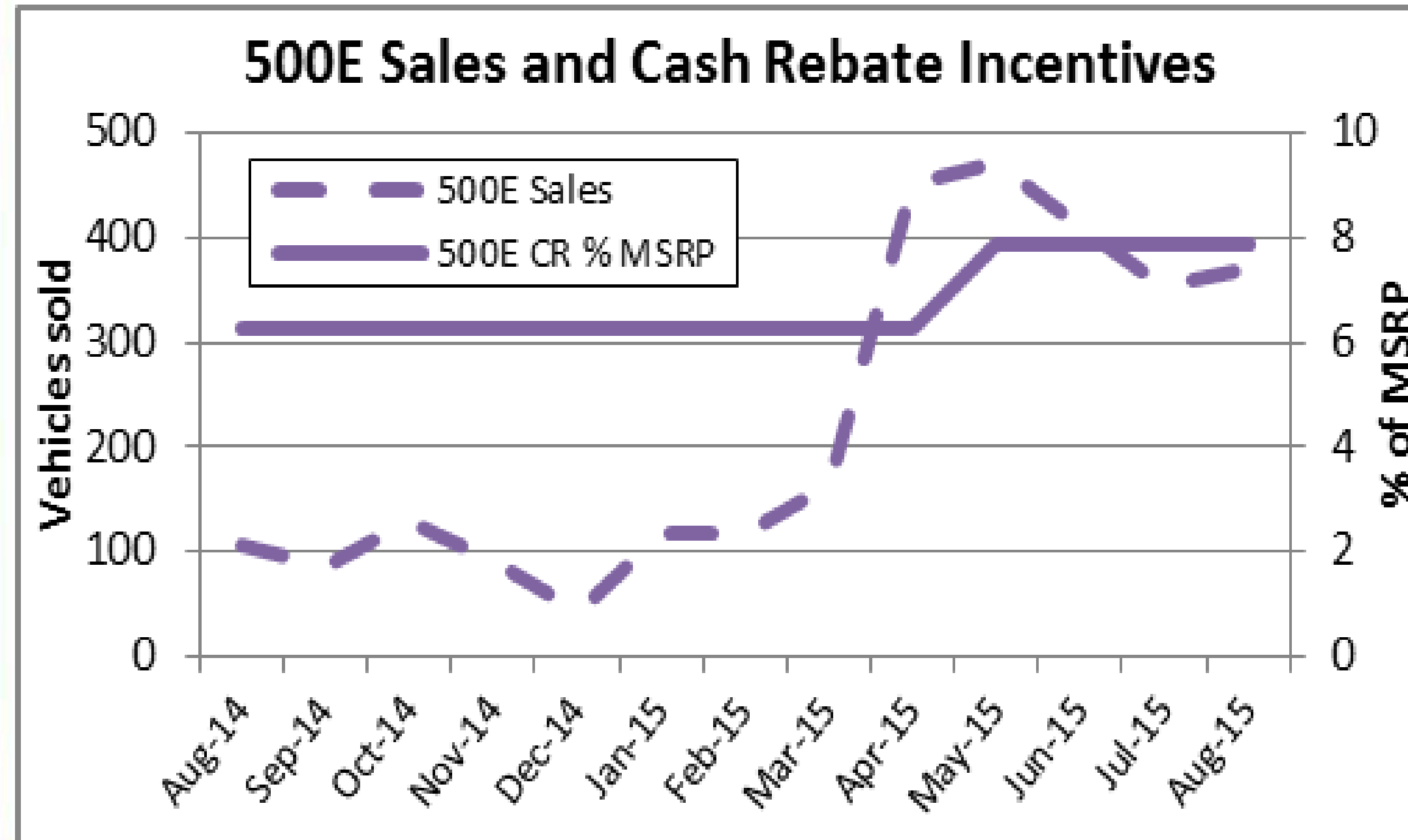
Average Manufacturer Cash Rebate Offers and Vehicle Sales



- There is a significant increase in the value of PEV cash rebate incentives from April to May 2015 with no corresponding increase in sales.
- This lack of relationship, on average, could lead to the conclusion that manufacturer cash rebate offers are not a primary factor in influencing vehicle sales.

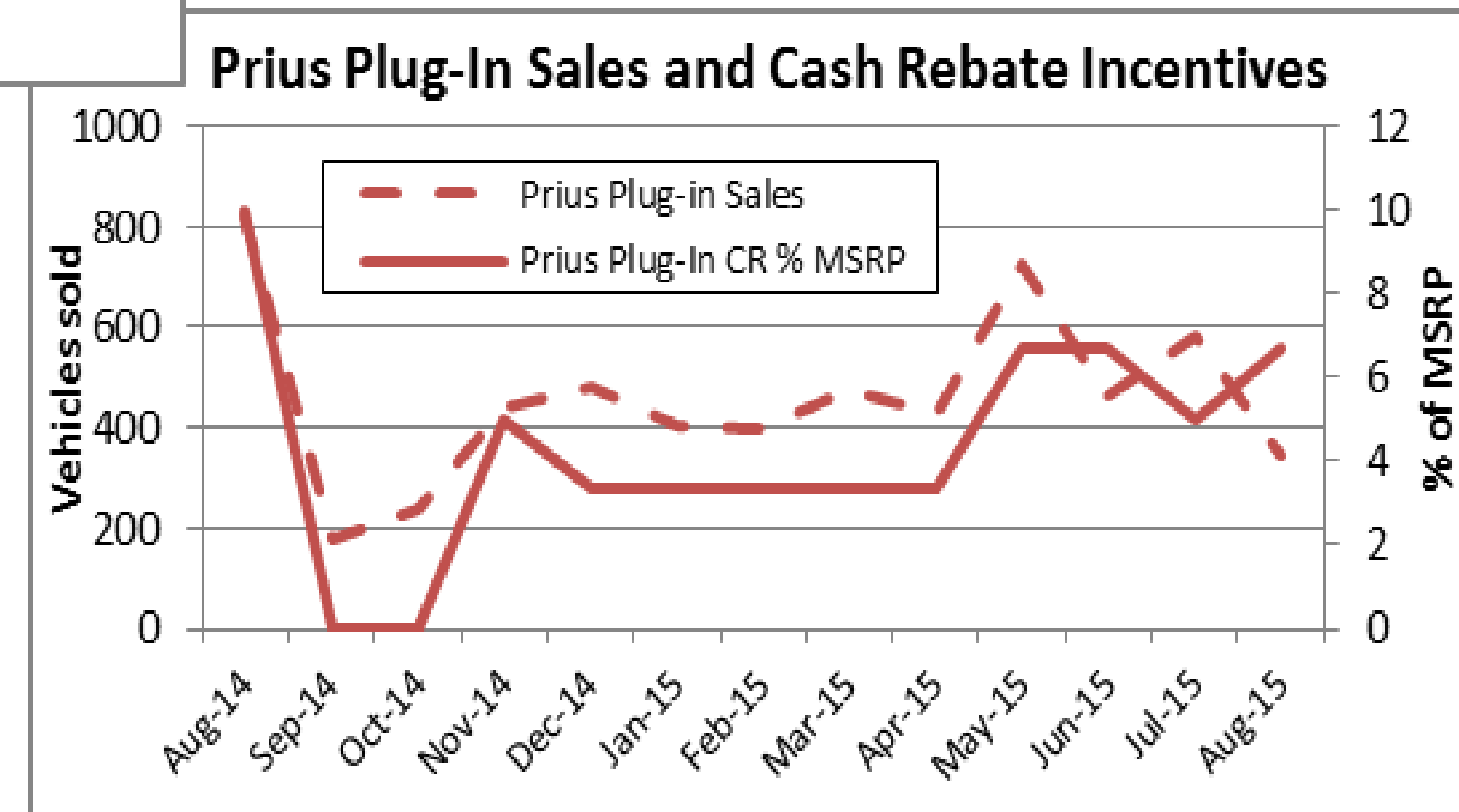


Model Level Manufacturer Cash Rebate Offers and Vehicle Sales



- The increase in 500E sales pre-dates the increase in cash rebate offers, which could be evidence that the rebates did not directly influence sales.

- Prius Plug-In sales are matched very closely by cash rebate offers, a high number of sales generally relates to a high cash rebate value.





Concluding Remarks

- **How does the incentivized PEV price, manufacturer, state and federal government incentives combined, compare by state, by manufacturer, and by technology?**
 - The incentivized price of PEVs are comparable with the incentivized price of HEVs.
 - The incentivized PEV price can be comparable with a non-incentivized conventional vehicle price.
 - On the whole there is no significant difference in Manufacturer PEV cash rebates between states.
- **What role have manufacturer incentives played in either stimulating or maintaining PEV sales?**
 - Of the seven PEVs in this analysis, two – the Prius Plug-In and 500E – have a strong positive correlation between sales and cash rebates.
 - These strong positive correlations could indicate that increasing the value of PEV cash rebates causes PEV sales to increase.
- **How does the manufacturer incentivized price compare between ZEV and non-ZEV states?**
 - The ZEV state average manufacturer PEV incentives are not significantly greater than the rest of the country therefore it is possible that manufacturer's cash rebate incentive strategies do not target ZEV states specifically.

Merci!

Russ Campbell

SRA International, a CSRA Company
Russ.Campbell@CSRA.com



Yan Zhou

Argonne National Laboratory
YZhou@ANL.gov



Zhenhong Lin

*National Transportation Research
 Center, Oak Ridge National Laboratory*
LinZ@ORNL.gov



Jacob Ward

*Vehicle Technologies Office, U.S.
 Department of Energy*
Jacob.Ward@ee.doe.gov



VEHICLE TECHNOLOGIES OFFICE