

The role of infrastructure in PEV adoption

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STEPS Workshop: Critical Barriers and Opportunities for
PEV Commercialization in California

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UCDAVIS

PLUG-IN HYBRID & ELECTRIC VEHICLE RESEARCH CENTER

of the Institute of Transportation Studies

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

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.*
- 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.*
- Toyota Prius household:
 - *My next car will be a BEV, but I'm waiting for the electric highway to be finished.*

Who buy new ICE cars and who can plug-in at home?

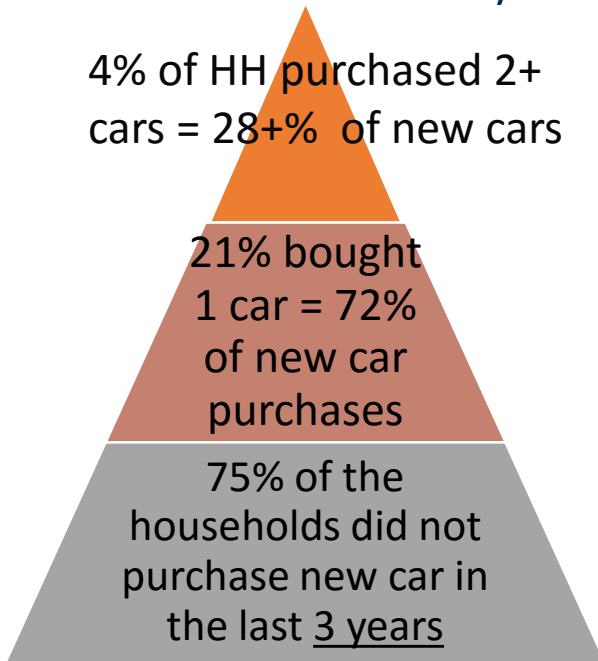
ICE Buyers

new car in the last 3 years

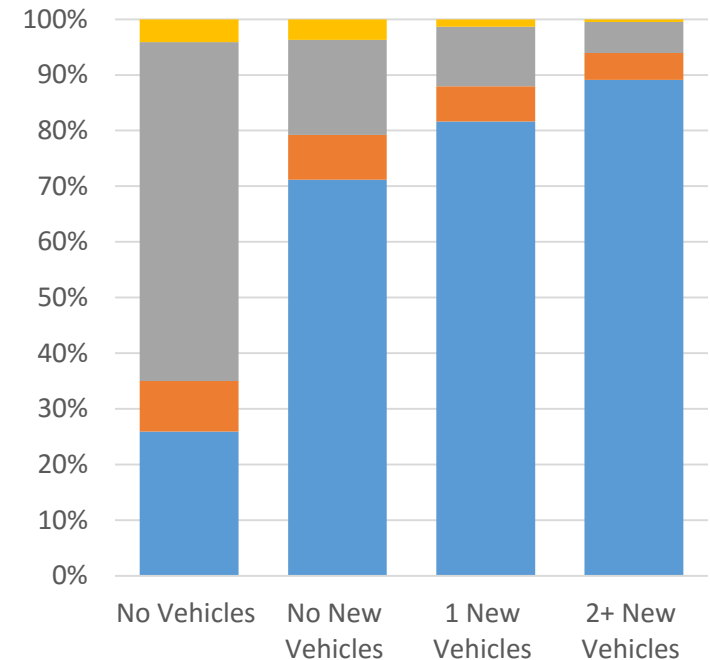
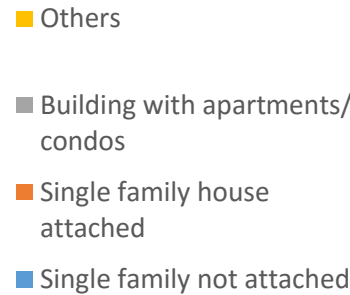
4% of HH purchased 2+ cars = 28+% of new cars

21% bought 1 car = 72% of new car purchases

75% of the households did not purchase new car in the last 3 years

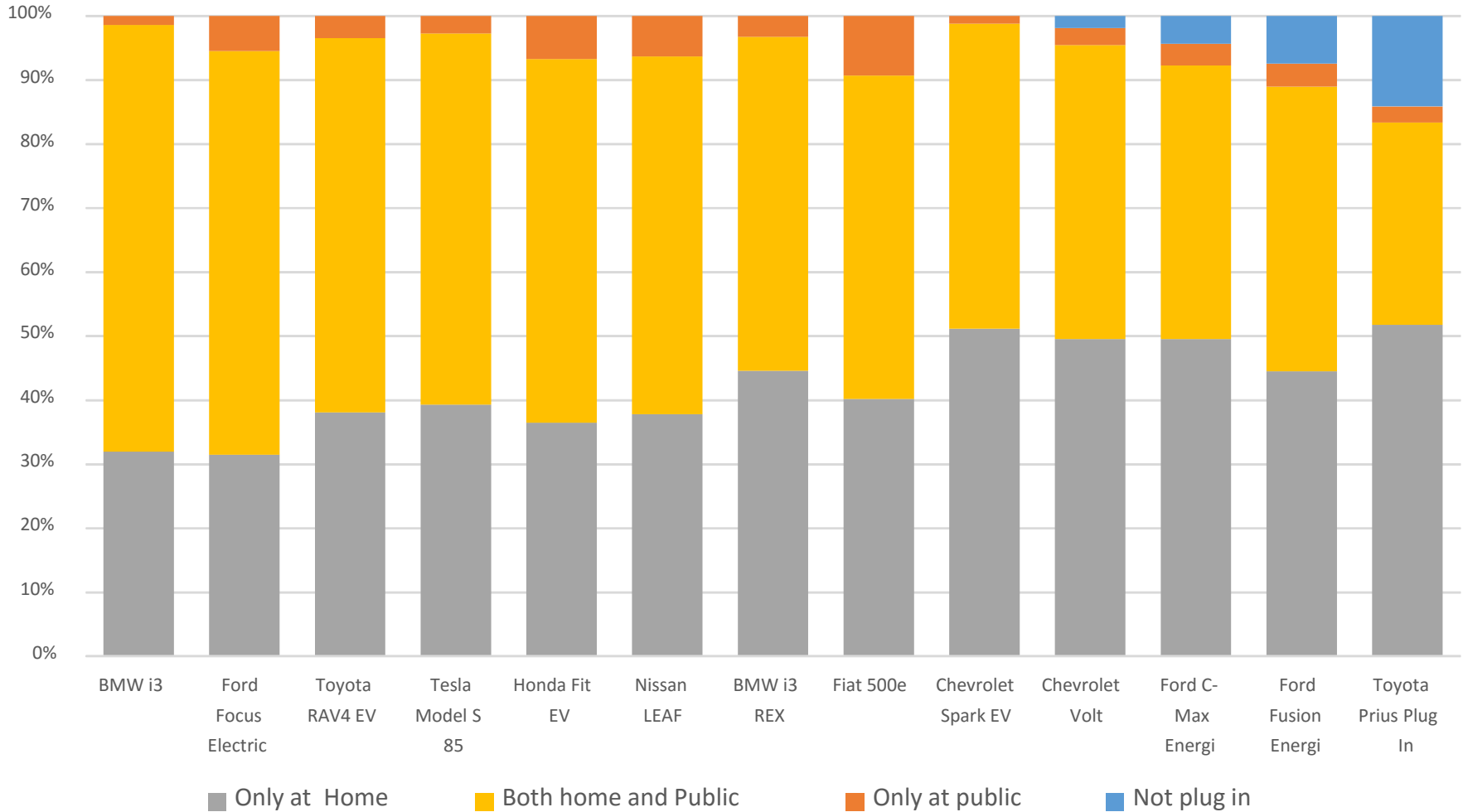


Housing Type



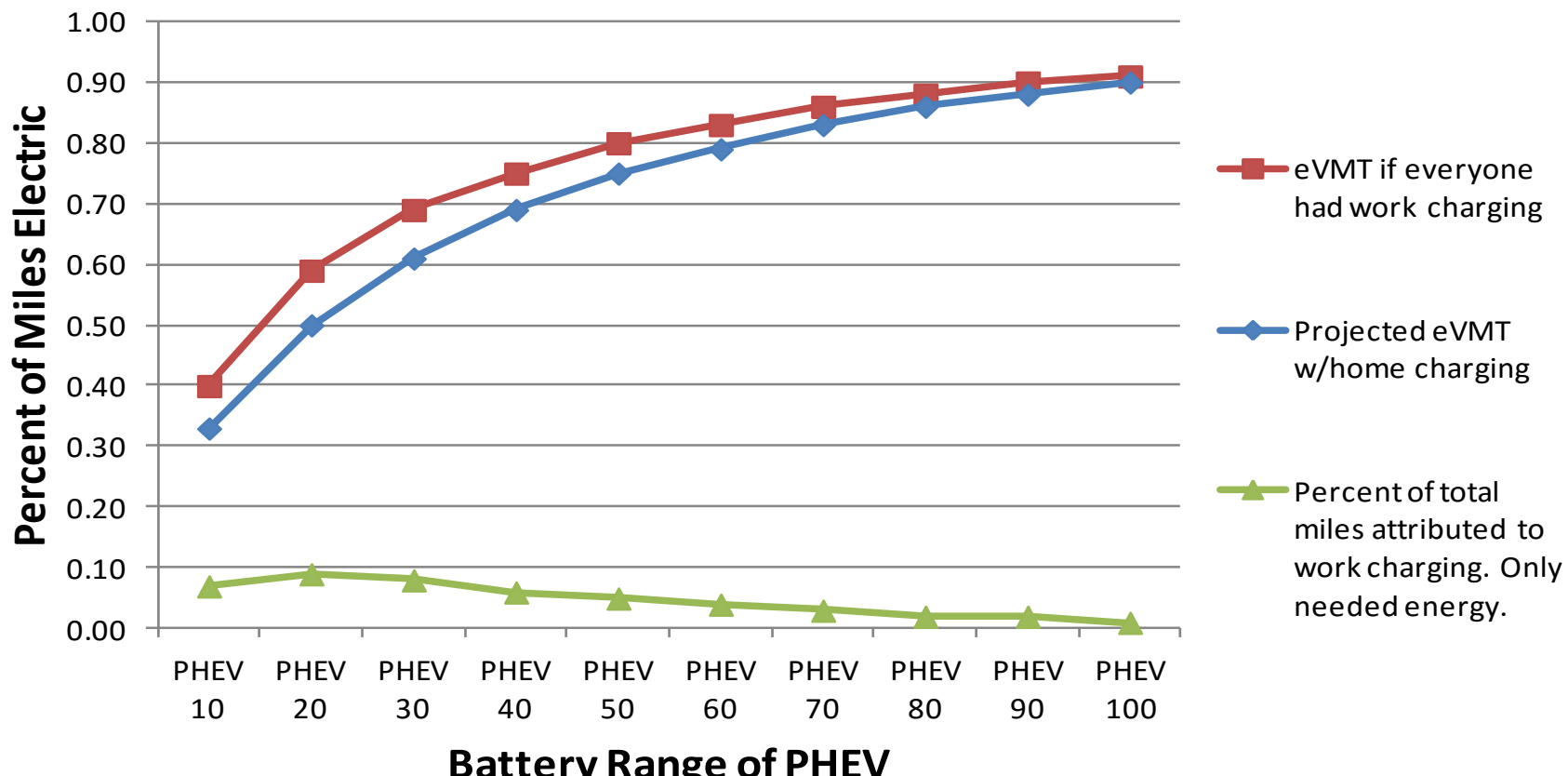
- In San Diego About 80% of the detached households can charge on level 1, about 40% can charge on level 2. the national average is about 55% for level 1 (Axsen and Kurani 2012)

Where/do they Charge?

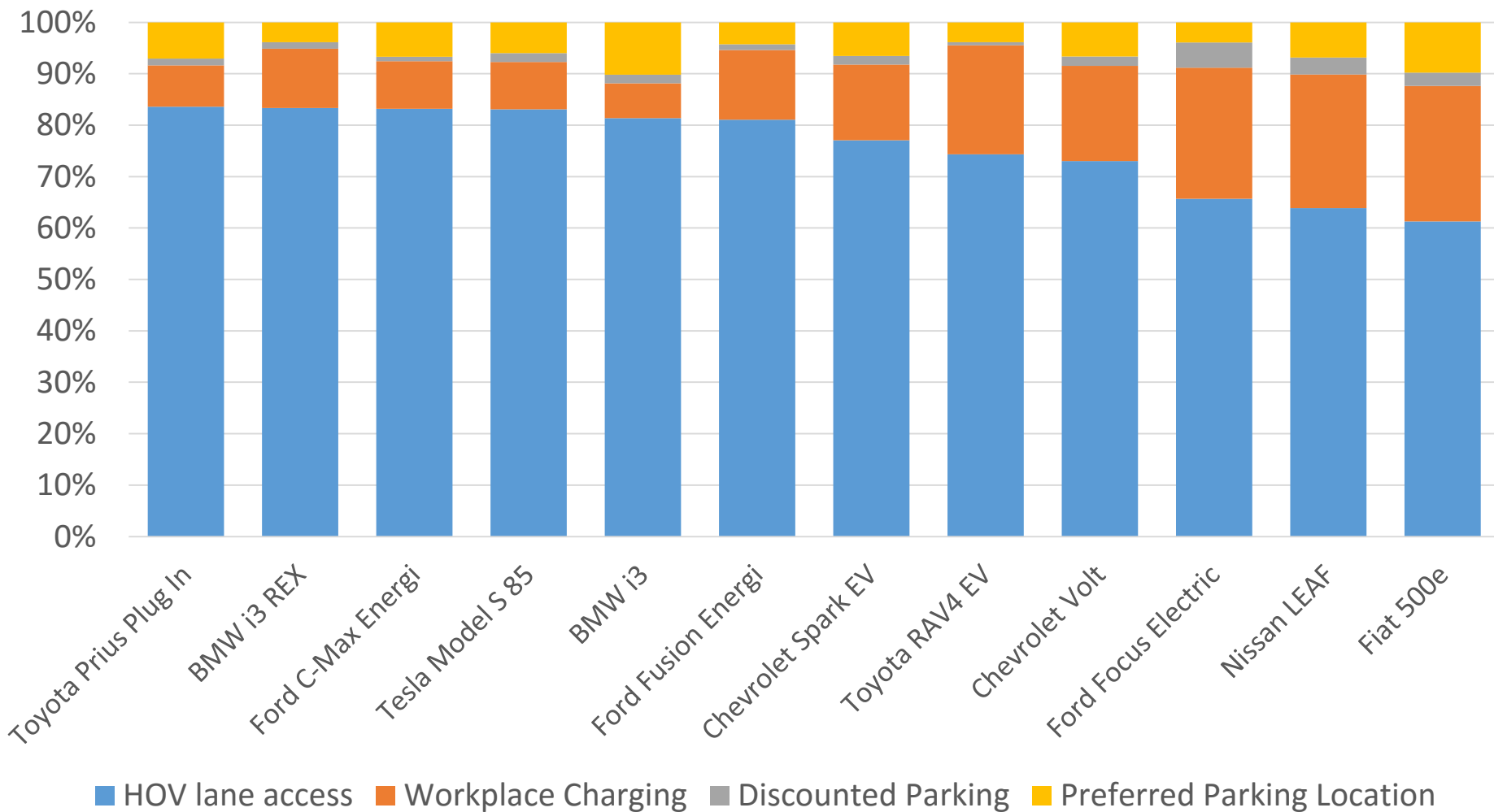


The Impact of Workplace Charging Drops With Longer Range PEVs

eVMT Projections W/Home Charging and Work Charging for PHEVs .

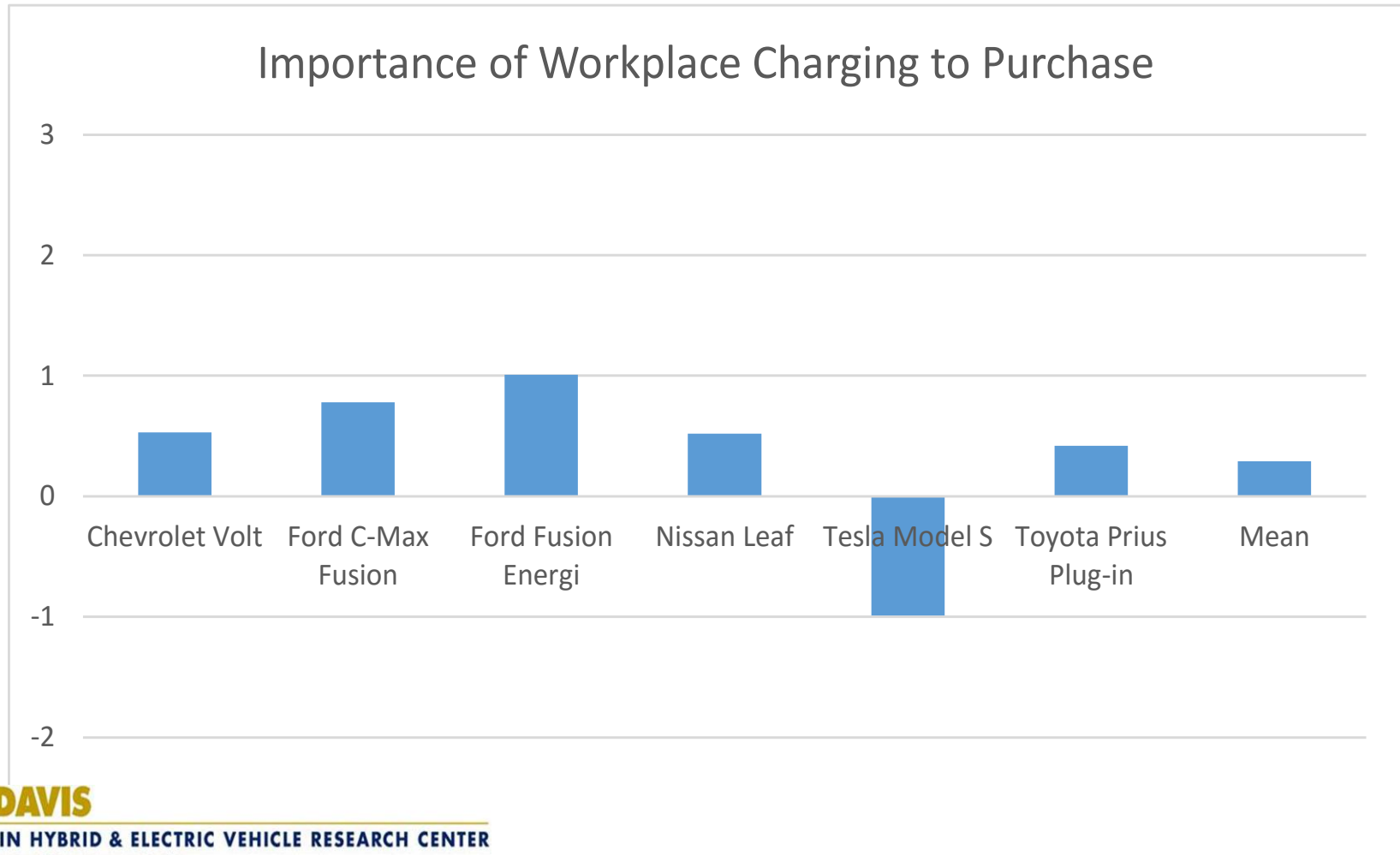


Most Important Non-Monetary Incentives



How Important is it for Purchase?

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

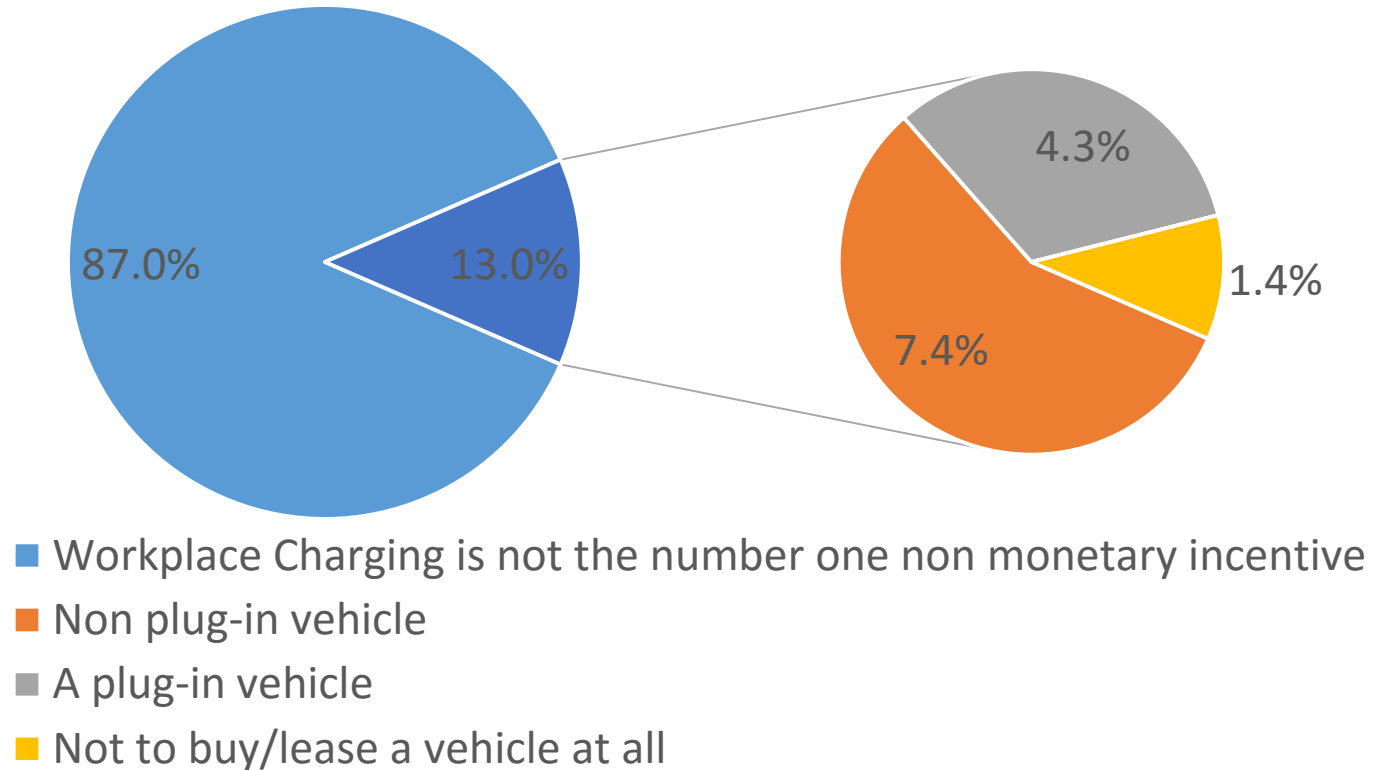


Analysis of all Incentives

	N	Federal Tax Credit		State Incentives		Local Incentives		Home Charger Subsidy		Workplace Charging		HOV Lane Access	
		Applicability	Importance	Applicability	Importance	Applicability	Importance	Applicability	Importance	Applicability	Importance	Applicability	Importance
Chevrolet Volt	2389	●91%	1.99	●54%	1.48	○29%	-0.29	●47%	0.56	●58%	0.59	●57%	0.58
Nissan Leaf	1894	●93%	2.09	●72%	1.97	○30%	0.14	●51%	0.60	●63%	0.75	●67%	0.43
Tesla Model S	1495	●97%	0.97	●60%	0.80	○25%	-1.05	○35%	-0.79	●52%	-0.84	●65%	0.24
Toyota Prius Plug-in	1240	●89%	1.53	●66%	1.29	○35%	-0.01	○35%	-0.60	●56%	0.32	●72%	1.44
Ford C-Max Energi	818	●90%	1.63	●56%	1.27	○29%	-0.13	●41%	0.23	●52%	0.76	●60%	0.91
Ford Fusion Energi	606	●88%	1.64	●60%	1.18	○36%	0.07	●44%	-0.07	●61%	0.77	●68%	1.34
Fiat 500e	315	●100%	2.04	●98%	2.00	○32%	0.62	●44%	0.28	●66%	1.16	●90%	1.01
Toyota RAV4 EV	204	●97%	1.77	●94%	1.59	●36%	-0.18	●51%	0.19	●69%	0.47	●96%	1.20
BMW i3	171	●97%	1.91	●88%	1.50	○26%	-1.02	●42%	-0.24	●58%	0.44	●92%	1.21
Ford Focus Electric	130	●98%	2.18	●95%	2.14	●37%	0.15	●45%	-0.14	●66%	1.19	●90%	0.96
Chevrolet Spark EV	87	●99%	2.05	●95%	1.98	○26%	-0.10	●62%	0.55	●56%	0.64	●90%	0.80
Honda Fit EV	74	●99%	-0.08	●74%	1.39	○32%	-0.66	●45%	1.32	●68%	1.44	●92%	1.28
All	9556	●92%	1.72	●65%	1.48	○30%	-0.18	●44%	0.17	●58%	0.45	●67%	0.78

How Many PEVs Can Be Directly Attributed to Workplace Charging?

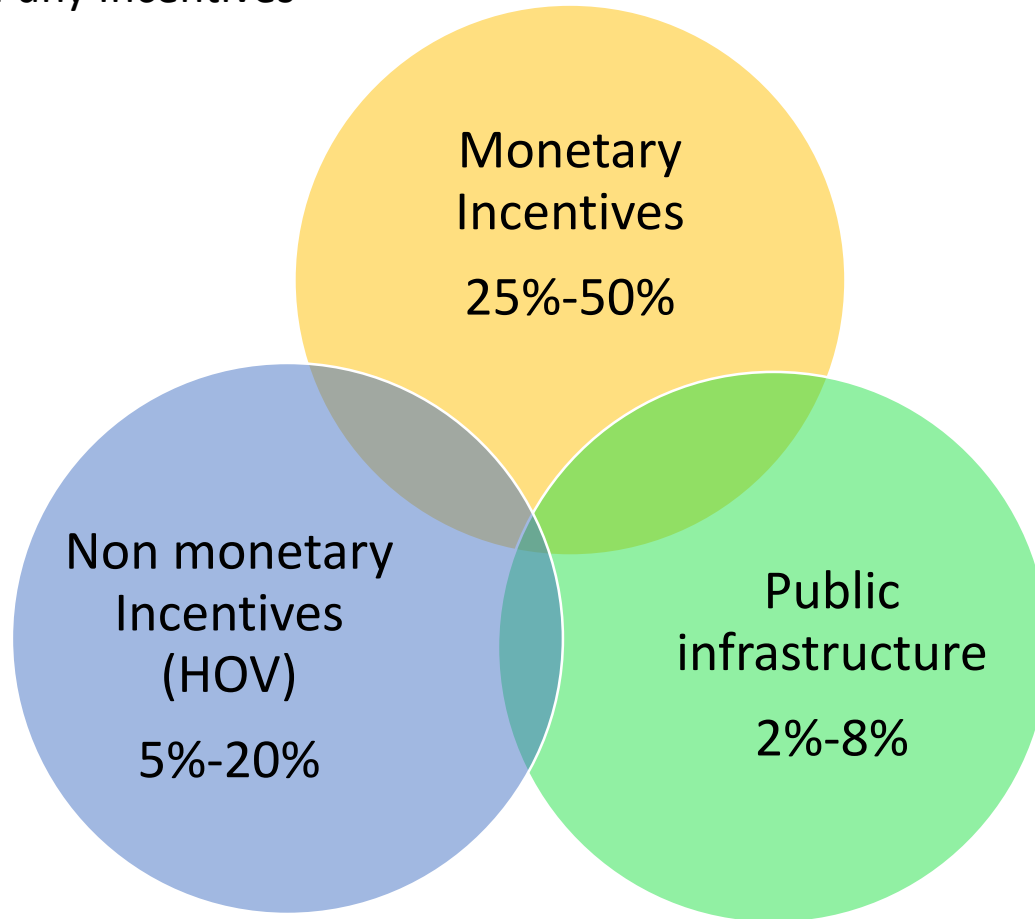
- If workplace charging were not available when buying my PEV (or any other plug-in vehicle) I would choose:



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 8.8%

Overlapping Incentives

No Need of any Incentives
22%-50%

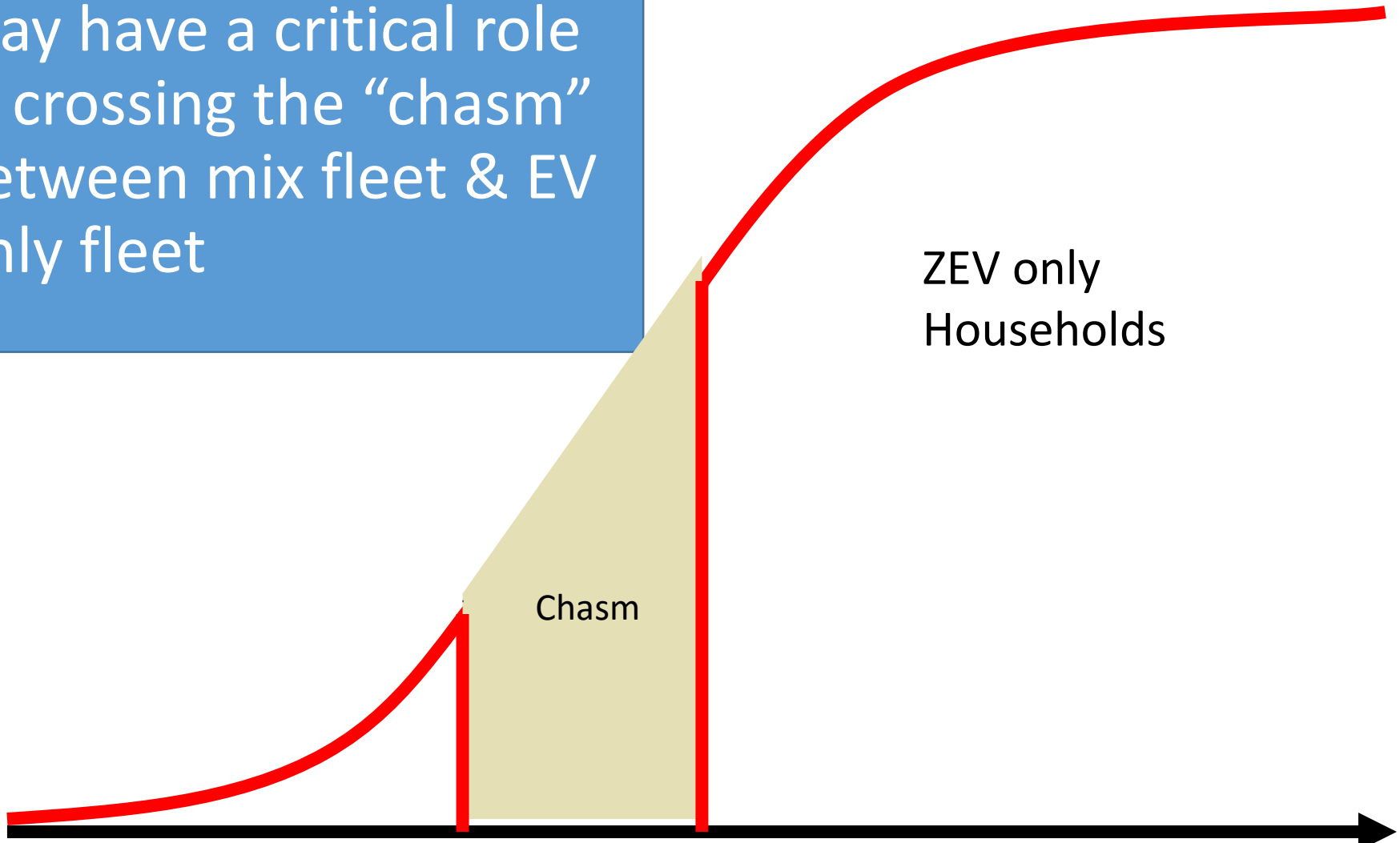


Conclusions Limitations

Policy Implications

- Public infrastructure sells PEV though most buyers will not use it regularly
- For up to 8.8% of our survey, workplace chargers where essential for the vehicle purchase (but it's highly correlated with free charging)
- Public chargers reduce the purchase barrier when home L2 is not an option
- But if most users will not need public infrastructure, how do we convey that it's not a barrier for purchasing?

Public Infrastructure
may have a critical role
in crossing the “chasm”
between mix fleet & EV
only fleet



ZEV only
Households

Chasm

PHEVs and second vehicles
in the households

Policy Question

How to build public infrastructure to:

- Support PEV usage
- Use the infrastructure to promote PEVs

And at the same time

Educate potential buyers that most users will not need it to fully enjoy the benefit of PEVs

Thank You

Questions?

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