

More than Just Toys for the Rich

Designing EV Programs to Serve Low-Income Customers

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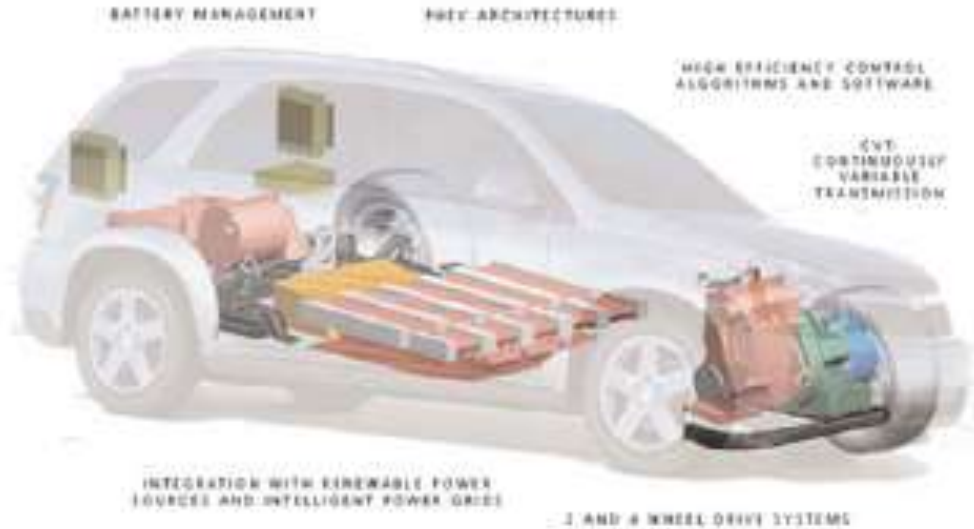


EST.
1986

EVs: Our great green hope???



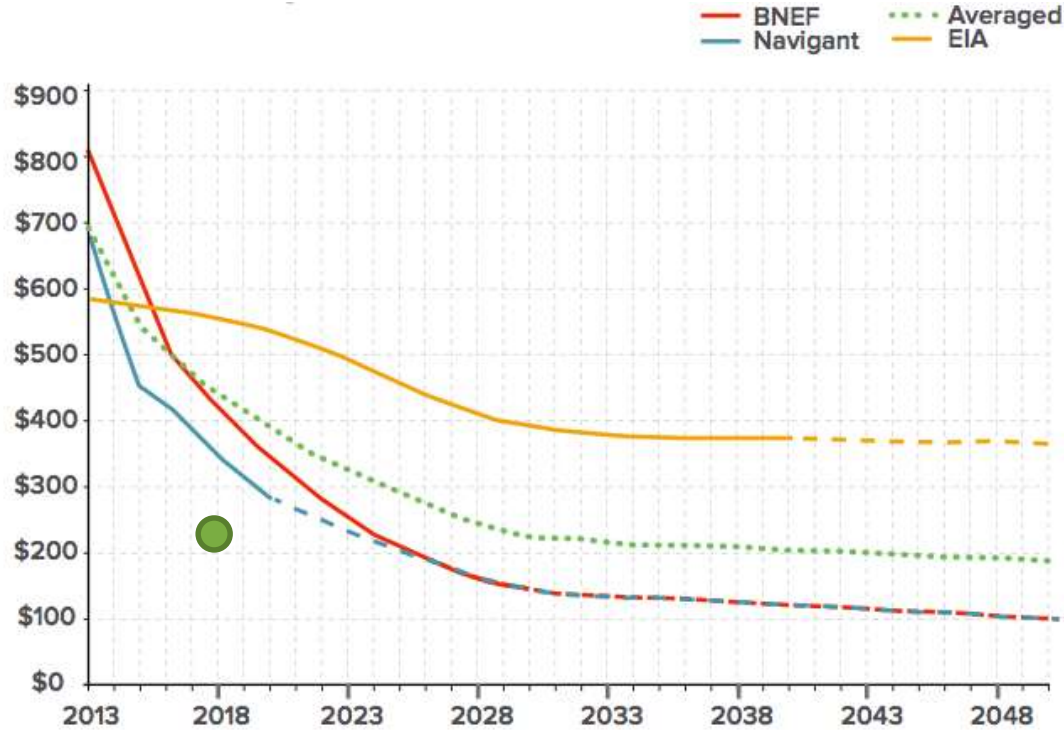
The beginning of EV commercialization



Source: Jungers, 2009

We all overestimated battery costs

**Green dot =
Actual Nissan
Leaf battery
pack retail price
(\$5,500 + install)**



(DASHED LINES REPRESENT EXTRAPOLATIONS)

Source: Clean Technica

EVs are becoming “global megatrend”



**10 battery
gigafactories**

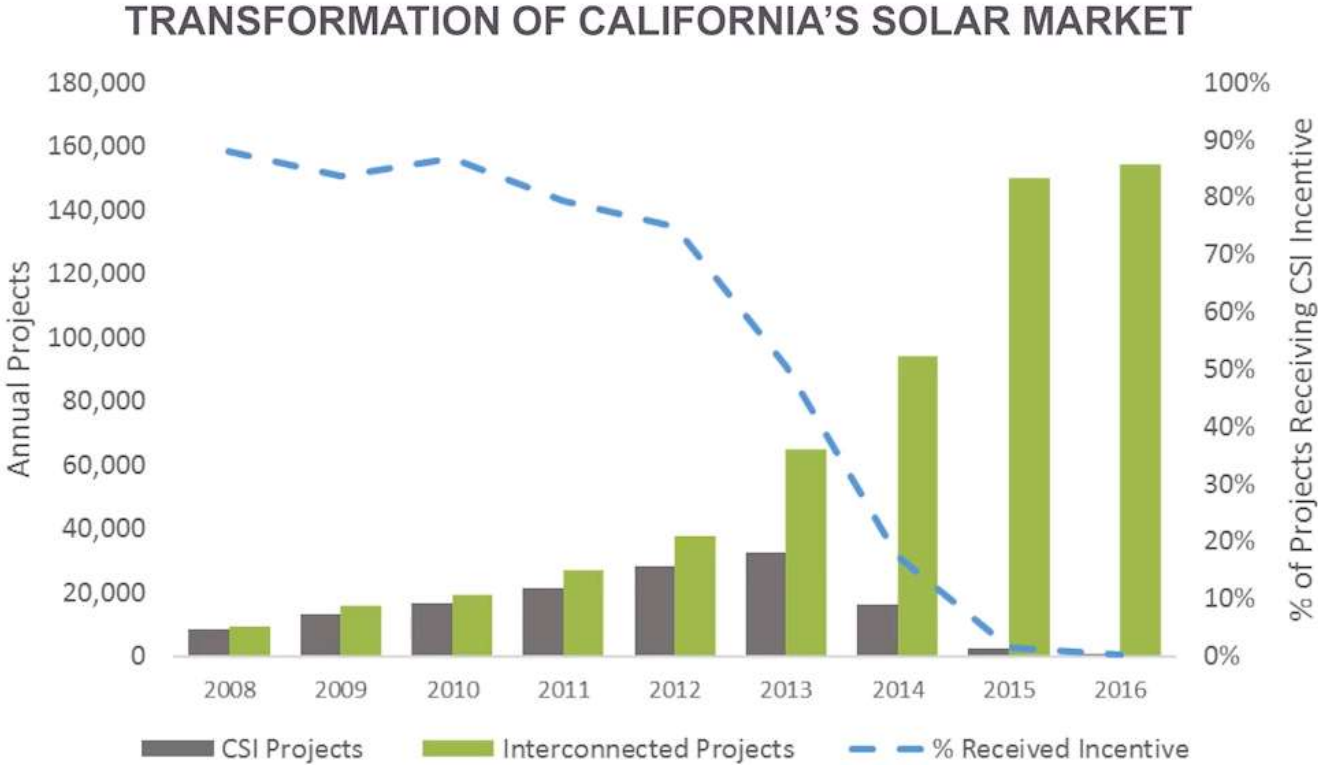


**EV sales growth
in US and China**



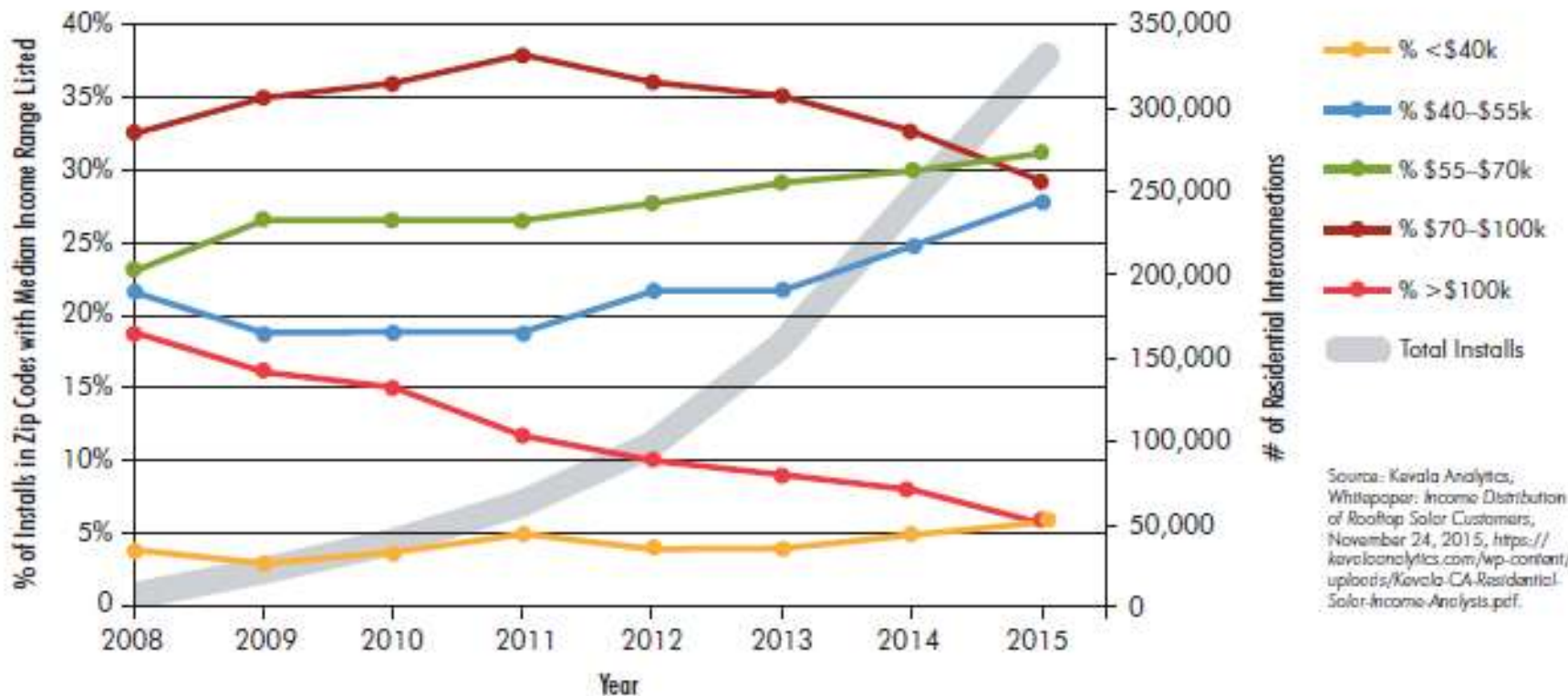
**Resource
constraints**

Incentives can help transform markets



© E Source; from Brian Barnacle, Energy Solutions; [Incorporating Emerging Technologies into Your Programs](#)

Not all customers benefit equally

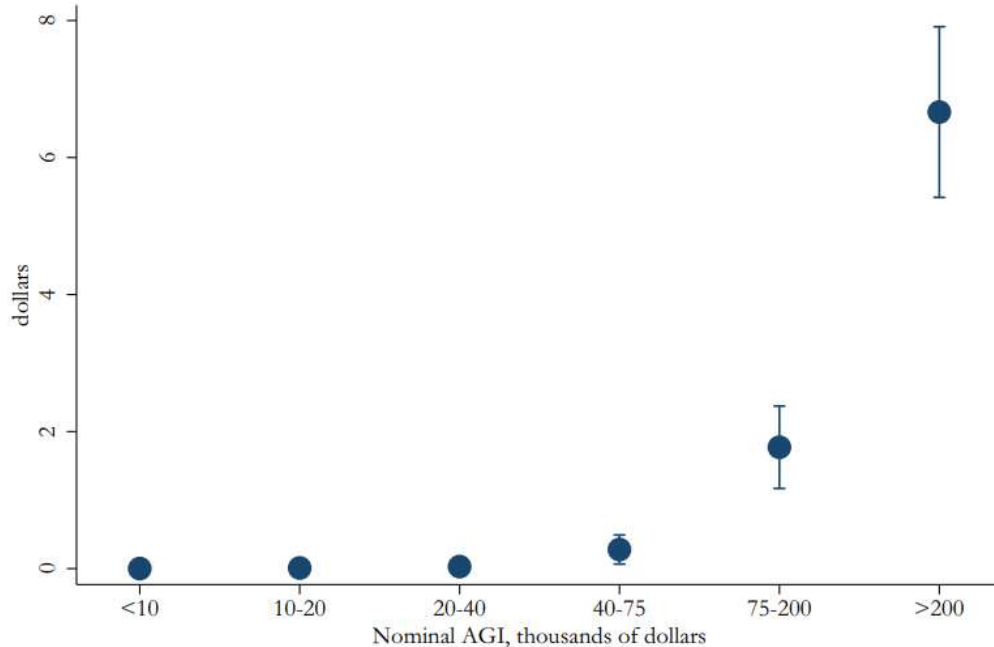


Source: Kaval Analytics, Whitepaper: Income Distribution of Rooftop Solar Customers, November 24, 2015, <https://kavalanalytics.com/wp-content/uploads/Kaval-CA-Residential-Solar-Income-Analysis.pdf>.

Source: Clean Energy State Alliance; [Bringing the Benefits of Solar Energy to Low-Income Customers](#)

EV incentives don't benefit poor people

C: Qualified Plug-in Electric Drive Motor Vehicle Credit, 2009-2012



*“Taxpayers with AGI in excess of \$75,000 have received about 60% of all credit dollars aimed at energy-efficiency, residential solar, and hybrid vehicles, and **about 90% of all credit dollars aimed at electric cars.** Thus while there may well be political or other rationales to prefer this approach to first-best policies, it would seem to be difficult to argue for these policies on distributional grounds.” (emphasis added)*

Source: UC Berkeley, Energy Institute at Haas. [The Distributional Effects of U.S. Clean Energy Tax Credits](#)

“EV incentives are highly regressive!”

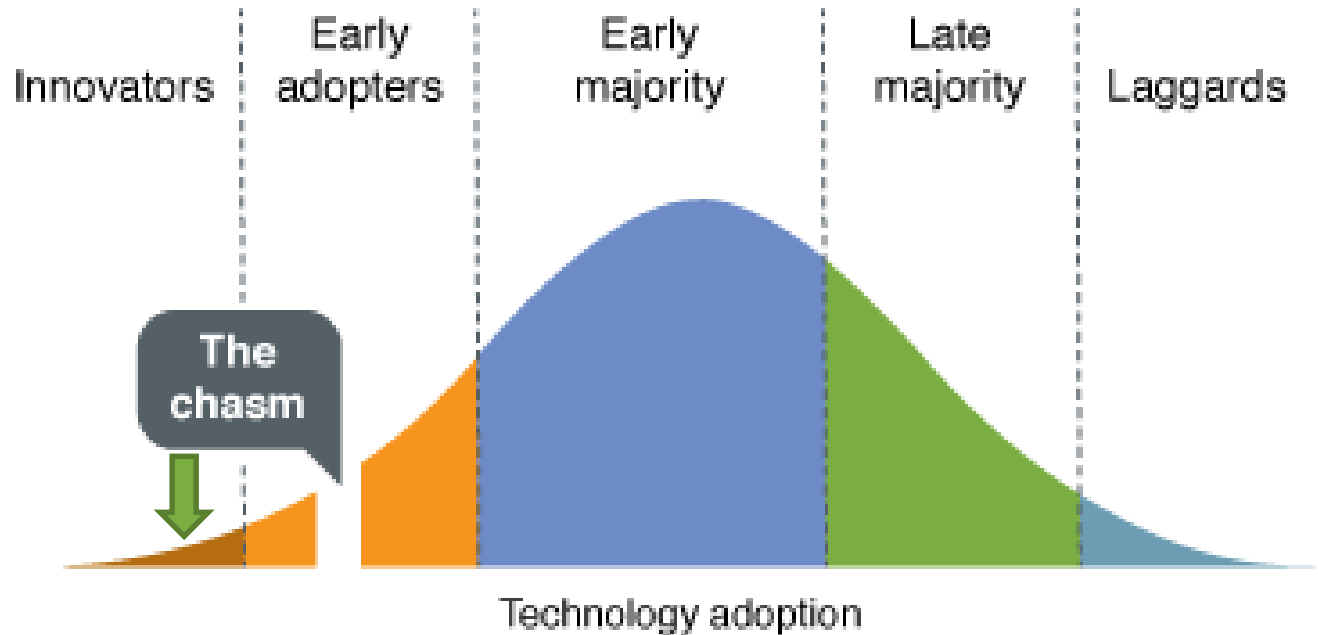
State	Start date	End date	Approximate cost to May 2017 or expiration
California	7/2/2010	Ongoing	\$456,824,706
Connecticut	5/19/2015	Ongoing	\$3,741,750
Delaware	7/15/2015	Ongoing	\$401,800
Massachusetts	6/1/2014	Ongoing	\$5,820,000
Colorado	1/1/2010	Ongoing	\$23,910,200
Louisiana	7/1/2009	Ongoing	\$850,500
Maryland	7/1/2014	Ongoing	\$6,025,700 to \$7,233,000
New York	1/1/2017	Ongoing	\$674,900 to \$794,000
Rhode Island	1/1/2016	7/10/2017	\$612,500
Utah	1/1/2009	12/31/2016	\$2,203,360
Tennessee	9/9/2010	4/15/2016	\$2,500,000
Georgia	1/1/2011	7/1/2015	\$97,970,000 to \$146,955,000
Hawaii	8/1/2010	5/3/2012	\$2,025,000

- *Who buys new cars?*
- *Who buys costlier cars?*
- *Who buys multiple cars?*
- *Who pays for tax credits?*
- *Who claims full tax credit?*

Source: Strata, [THE CURRENT STATE OF ELECTRIC VEHICLE SUBSIDIES: ECONOMIC, ENVIRONMENTAL, AND DISTRIBUTIONAL IMPACTS](#)

“Isn’t this a late majority problem?”

Some argue we don’t need to address inequality problems around EVs yet; we can address that part of the market when we get there...

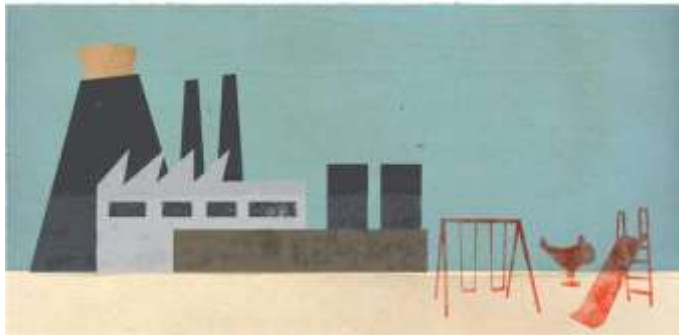


© E Source

Vulnerable populations bear the burden

*“This is a study of unprecedented statistical power because of the massive size of the study population. These findings suggest that lowering the NAAQS for fine particulate matter will produce important public health benefits, **especially among self-identified racial minorities and people with low incomes.**” (emphasis added)*

— Francesca Dominici, Harvard Data Science Initiative



Source: Ensia

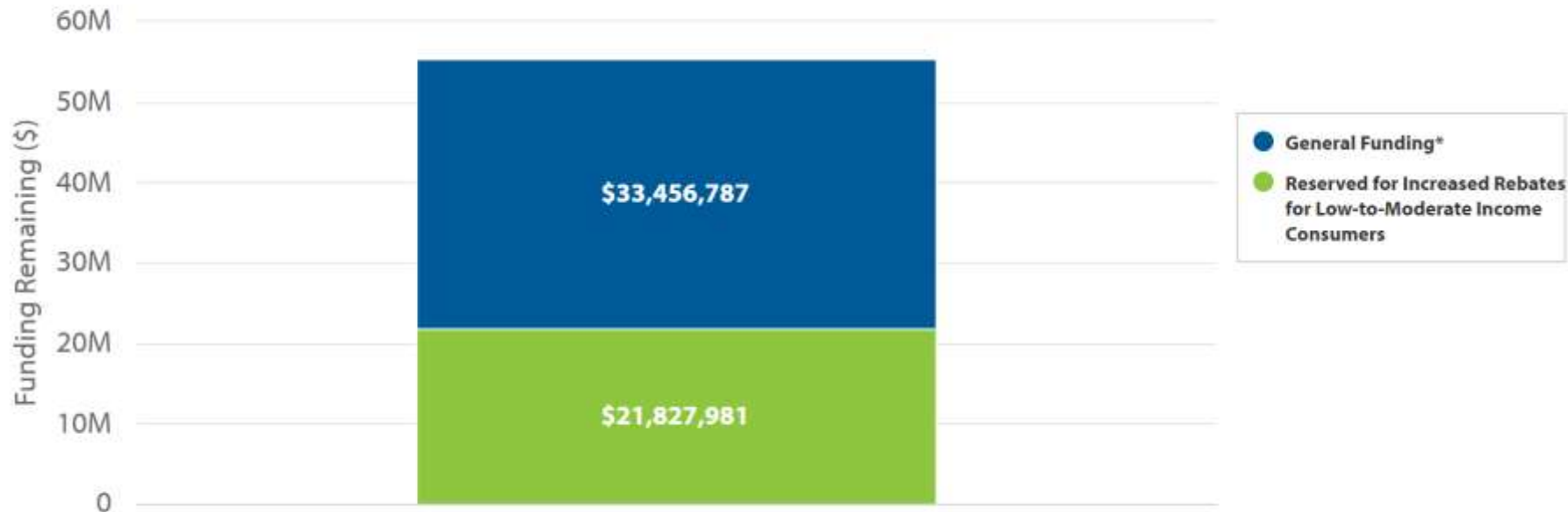


Source: Grist

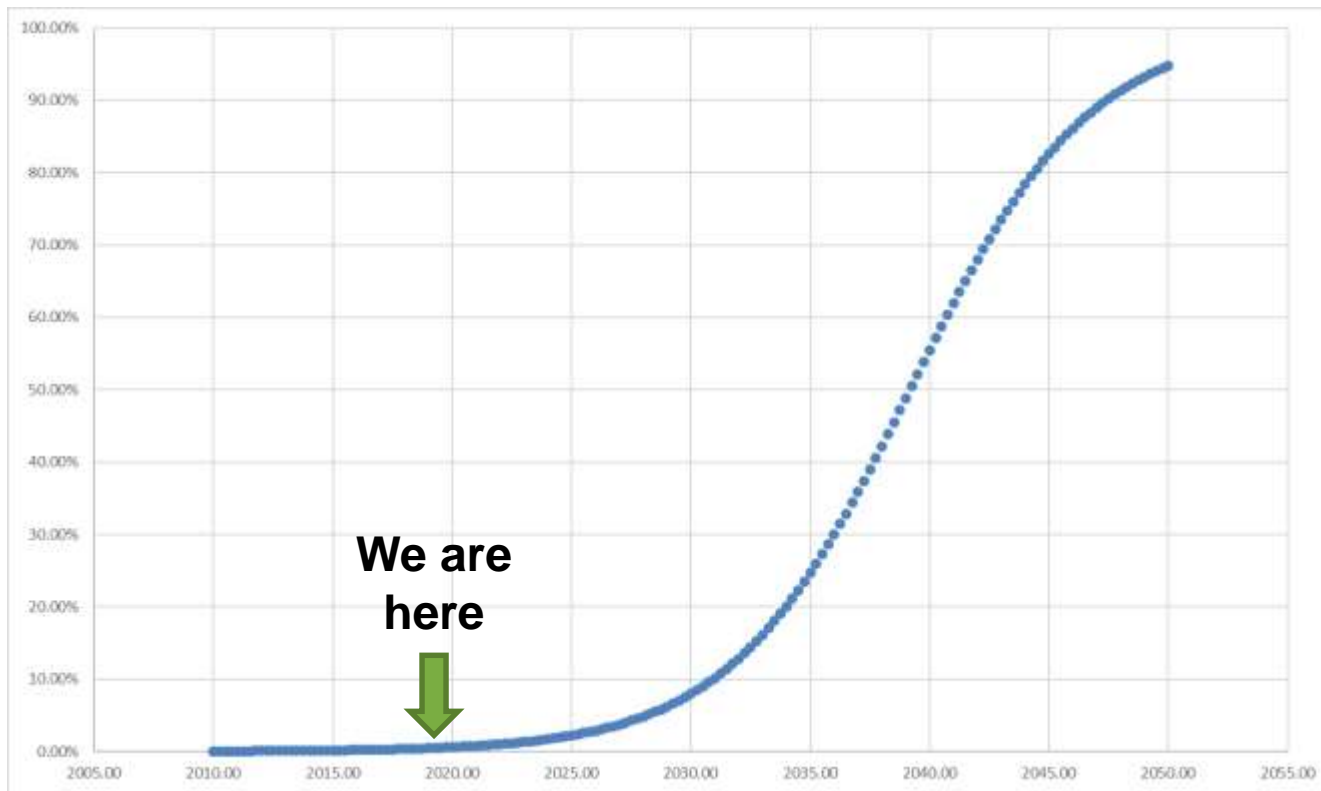
CARB restructures its incentives

Available Funding

Based on real-time data



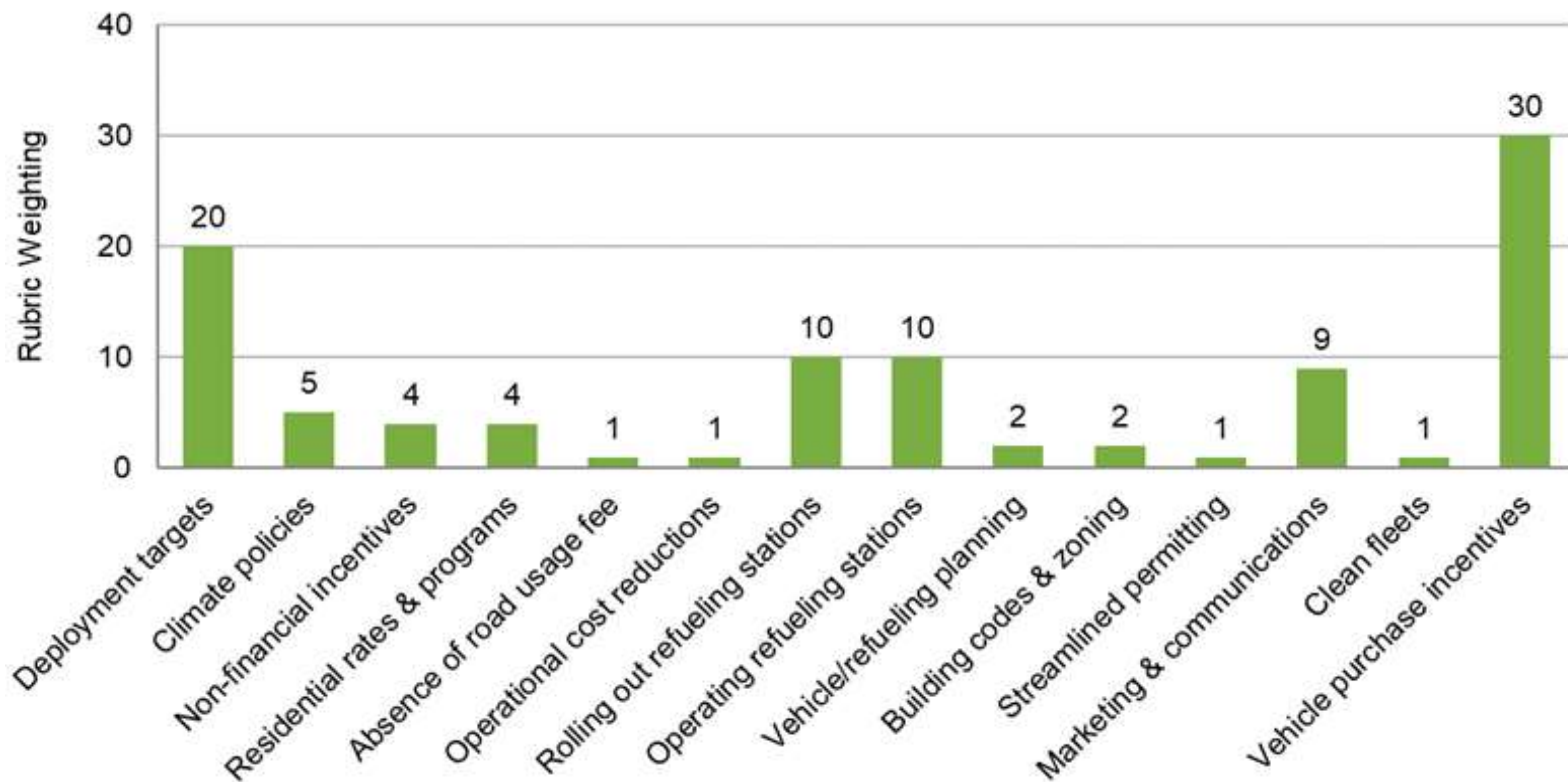
Scale is essential to unlocking benefits



© E Source



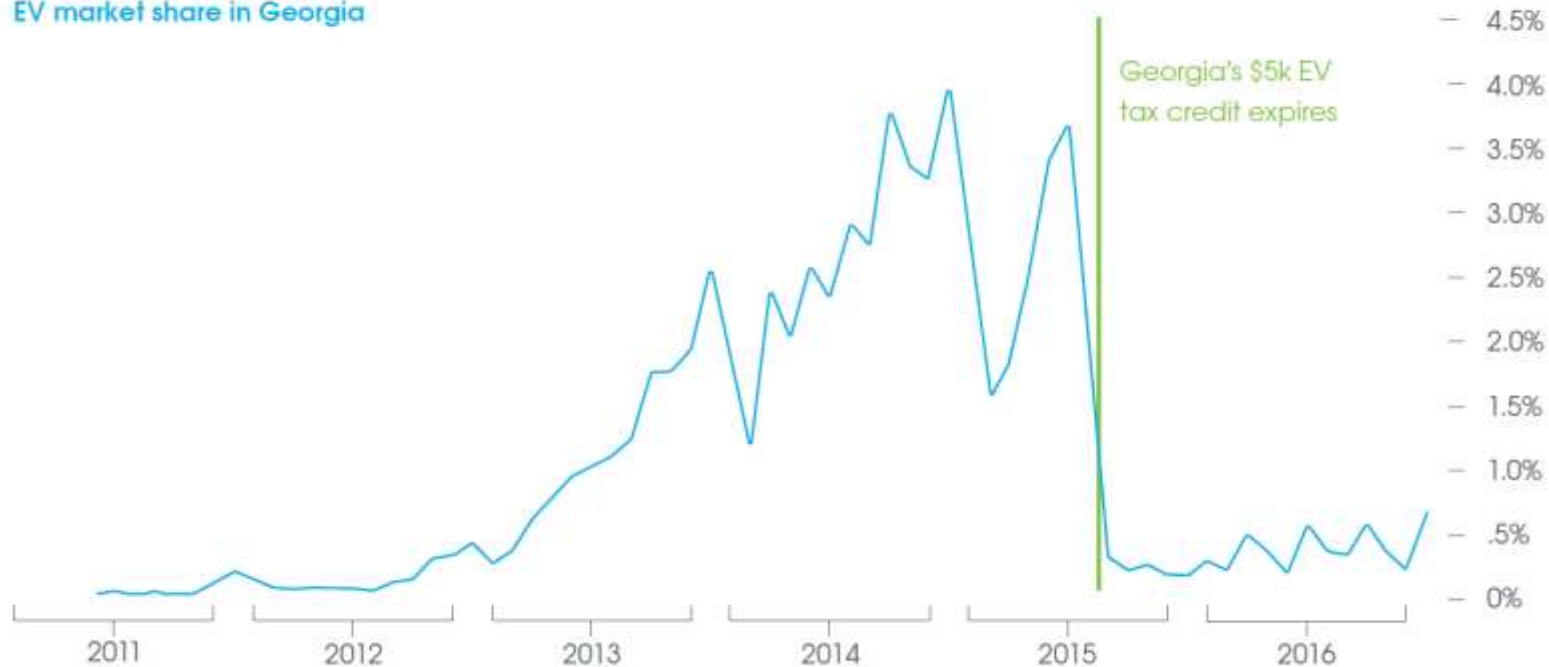
Purchase incentives dominate policy



Source: NASEO and Cadmus, [PEV Policy Evaluation Rubric](#)

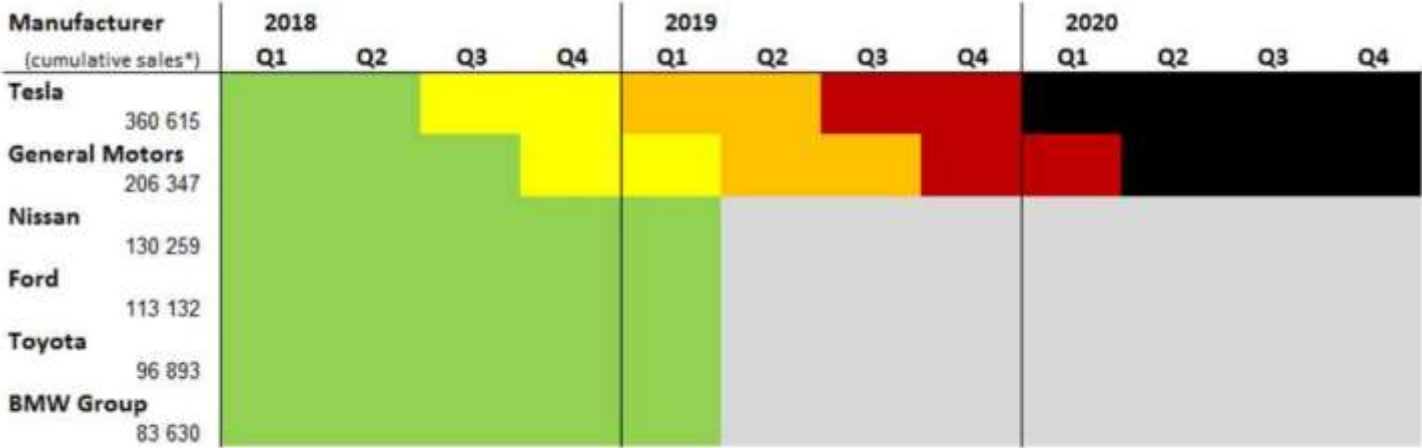
What happens when credits disappear?

EV market share in Georgia



Source: IHS Markit

Federal tax credits are phasing out



Available amount of federal tax credit:

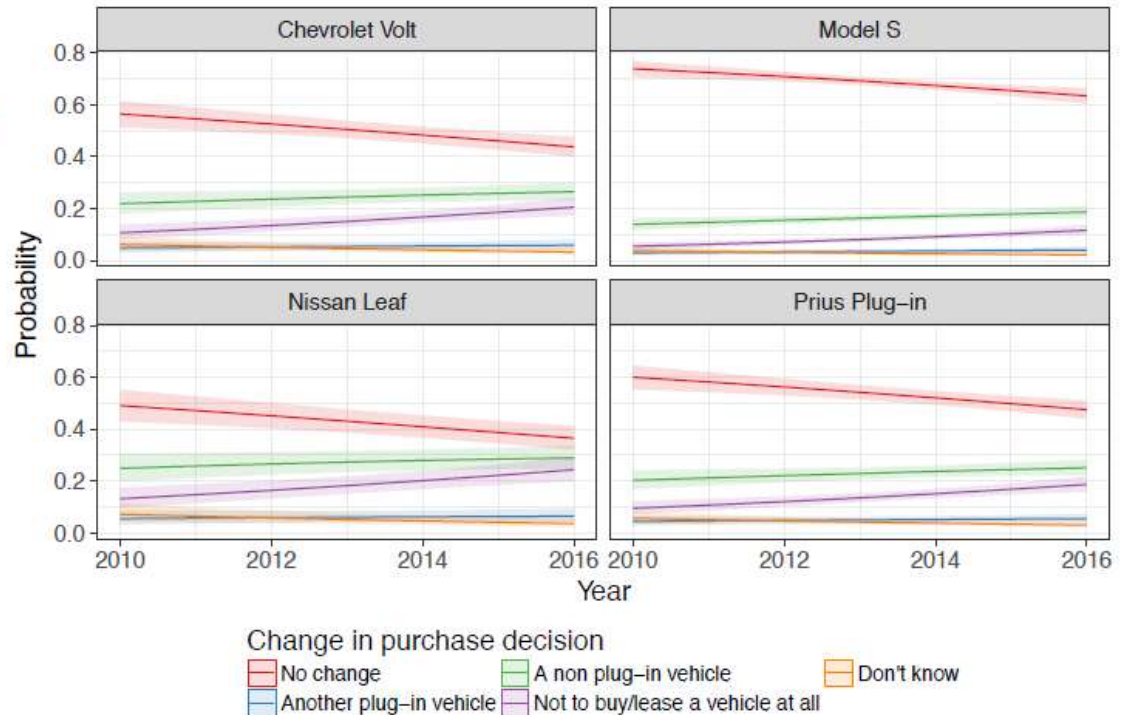
Full amount is available until hitting 200,000 plug-in car sales limit	\$ 7 500
The last two quarters with 100% of the amount	\$ 7 500
Two quarters with 50% of the amount	\$ 3 750
Two quarters with 25% of the amount	\$ 1 875
no credit	
N/A	no data

*Cumulative sales by the end of January 2019, some data estimated

Source: Mark Kane, InsideEVs

Credits grow in importance over time

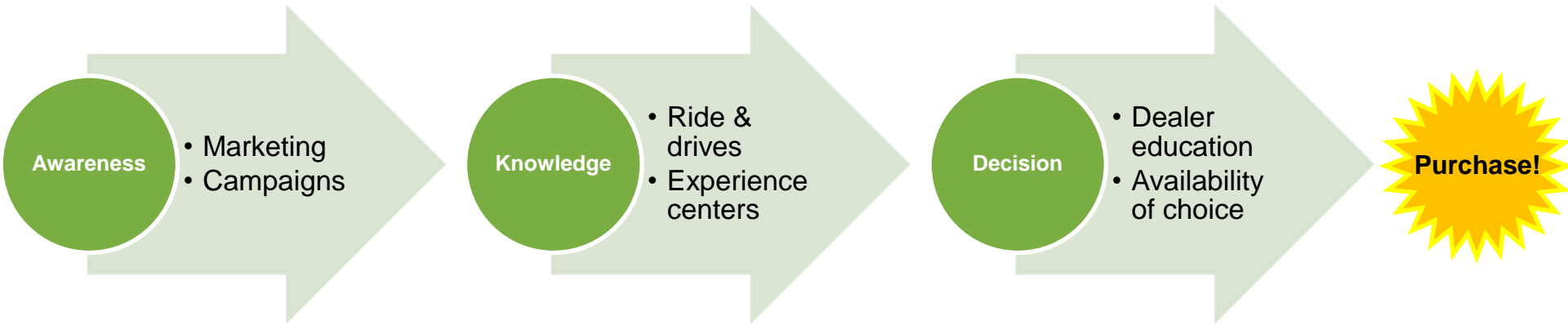
- Q: *If the federal tax credit were not available how would this impact your decision to buy your PEV?*
- “No change” means they will still buy their PEV.



Jenn, Hardman, Lee, & Tal 2018

Source: Gil Tal, UC Davis PH&EV Research Center

Consumer engagement is lagging



© E Source; adapted from Gil Tal, UC Davis PH&EV Research Center

EV drivers are young, “upwardly mobile”



The #1 hurdle to EV adoption is price

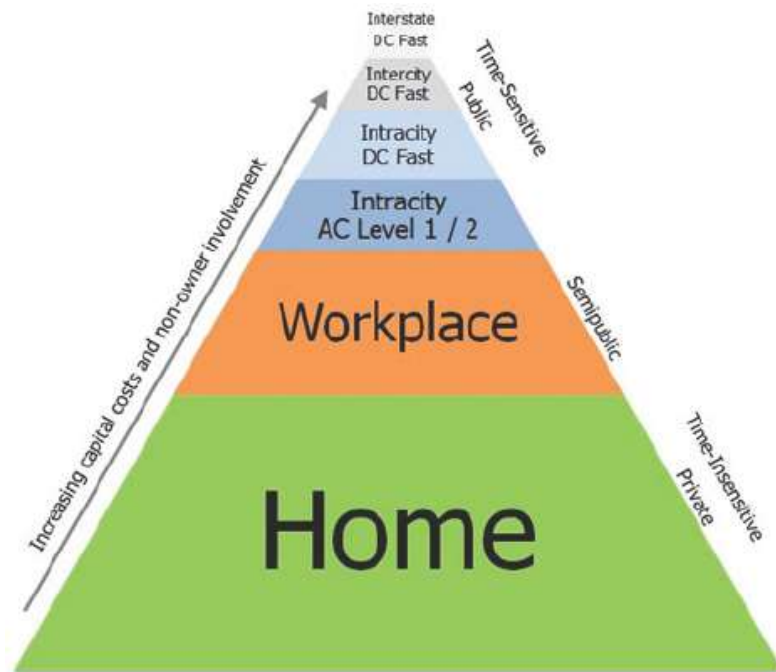
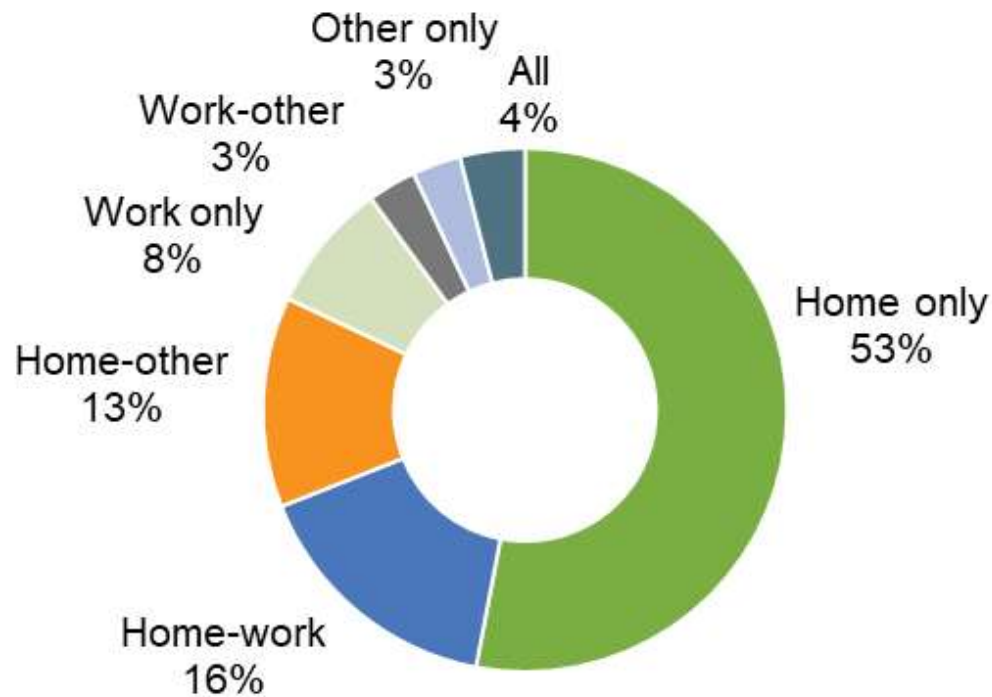
Perceived residential customer barriers to EV and hybrid vehicles



Base: n = 7,207. Question S4_4: What are the primary reasons that would prevent/would have prevented you from purchasing or leasing a plug-in electric or hybrid vehicle? Select all that apply Note: EV = electric vehicle.

© E Source (2018 DER Residential Customer Market Research)

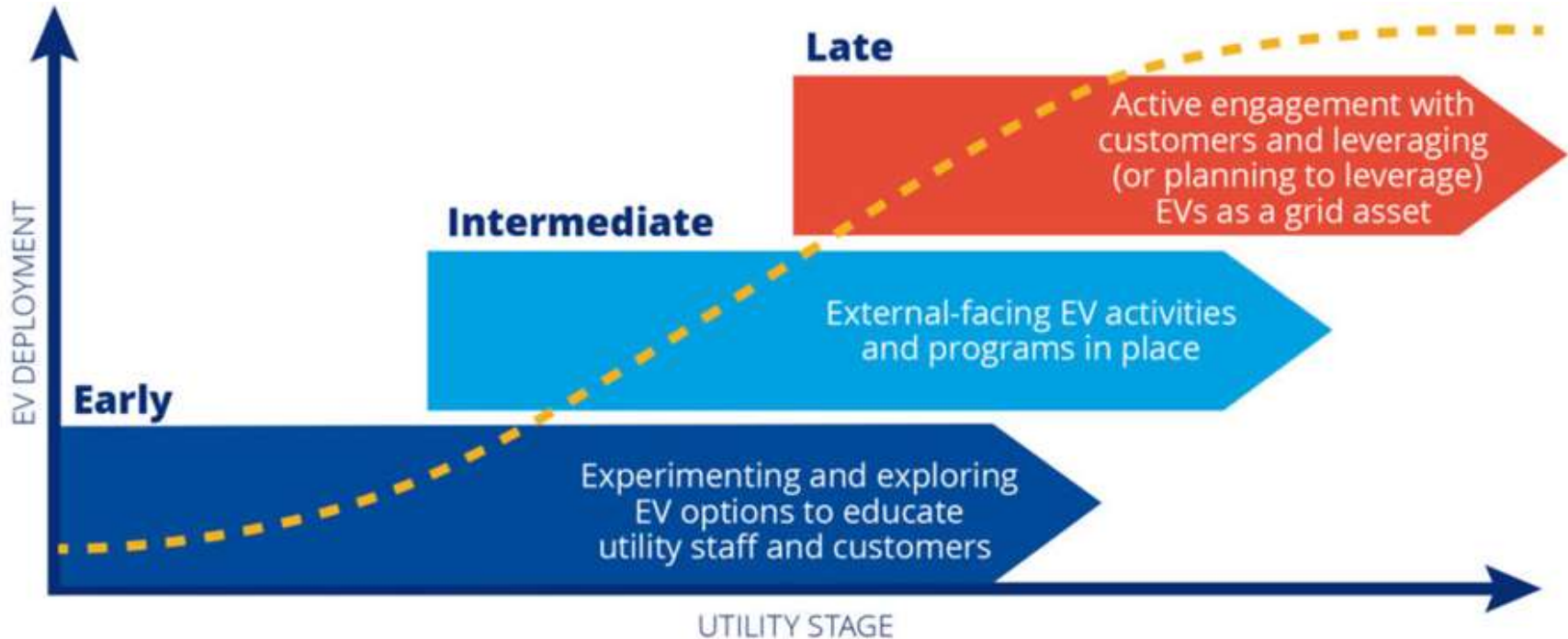
Not having a place to charge is big, too



© E Source; data courtesy of Gil Tal, UC Davis PH&EV Research Center

Source: National Academies, [Overcoming Barriers to Deployment of Plug-in Electric Vehicles](#)

Utility programs are not very mature



Source: Smart Electric Power Alliance

EV programs for low-income customers



clean vehicle
assistance program

FleetCarma: A low-cost smart charging



Source: ChargePoint



Source: FleetCarma

- Low-cost option = \$700+
- Not needed to charge EV
 - Many EV customers don't use them (~ 50%)
- Only monitoring at 1 location

- Low equipment cost (< \$100)
- Stays with the vehicle always
- Can track all charging events
- Proven in insurance industry

First EV car-sharing programs



Source: Our Community CarShare

Sacramento program has been viewed as very successful so far

- 8 vehicles, 100 residents
- 3 MUD communities
- Funded by CARB
- Partnered w/ Zipcar

Blue LA is coming to Los Angeles

- 100 vehicles, 200 chargers
- Available to anyone
- Also state funded
- Private company (Bolloré)

How successful was this program?



Source: Our Community CarShare

- Funded by CARB, at \$2.36 million in total (Phases 1 & 2)
- Hailed as first-of-its-kind and widely considered a successful low-income pilot program
- More lessons learned than best practices, so far
 - Contracting took a long time
 - Major language barriers
 - Major mobility barriers
 - Major cost-share barriers
 - Significant technical issues

Key Takeaways

- New technologies are always expensive; we have to get creative to effectively serve limited-income customers
- We may think we're "transforming the market" but it's important to carefully consider those being left behind
- Low-income programs for EVs won't work if we continue to use cookie-cutter rebate or credit models used elsewhere
- It is possible to leverage emerging trends, like the "sharing economy," to help customers and meet program goals

Thank you! Questions?



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