
ZEV Market Growth: California, China, and Clean Car States

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Important policy drivers for ZEV deployment

Table 2. Summary of government electric vehicle promotion actions in select

Area	Action	China	United States (excl. California)	California
Global market share	Vehicle sales in 2014 (million vehicles)	22	14	1.7
	Vehicle manufacturing in 2014 (million vehicles)	22	11	<0.1
	Percent of 2014 global electric vehicle sales	17%	19%	19%
Vehicle manufacturer	Research and development support	X	X	X
	Long-term efficiency standards	X	X	X
	Incentive provisions within efficiency regulations	X	X	
	Cumulative sales goal	X	X	X
	Vehicle deployment requirements			X
	Vehicle production subsidy	X		
Consumer purchase	Vehicle purchase subsidy (tax credit)		X	
	Vehicle purchase subsidy (rebate)	X		X
	Vehicle purchase tax exemption		/	
	Vehicle fee-bate scheme			
	Government fleet vehicle purchasing preferences		X	X
	High fuel price and greater fuel savings			
Consumer use	Annual vehicle fee exemption		/	
	Discounted/free electric charging		/	X
	Preferential lane (e.g., bus, HOV lane) access		/	X
	Reduced roadway tax or tolls			
	Preferential parking access		/	/
Fuel provider, infrastructure	Carbon pricing scheme	X	/	X
	Low carbon fuel incentive for electricity providers			X
	Public charging network funding	X	X	X
	Home charging equipment tax incentives		/	/
Consumer awareness	Public outreach activities to educate on consumer benefits	X	X	X

Based on IEA, 2015a; Jin et al., 2014; Mock & Yang, 2014; NRC, 2015; OECD, 2015; "X" denotes national program; "/" signifies smaller local or regional program

Vehicles:

- Long-term GHG tailpipe and efficiency standards
- **ZEV deployment requirements**

Consumers:

- Purchase incentives
- Non-monetary incentives (preferential access)

Fuel provider/infrastructure

- **Utility investments in transportation electrification**
- **Low carbon fuel incentive**

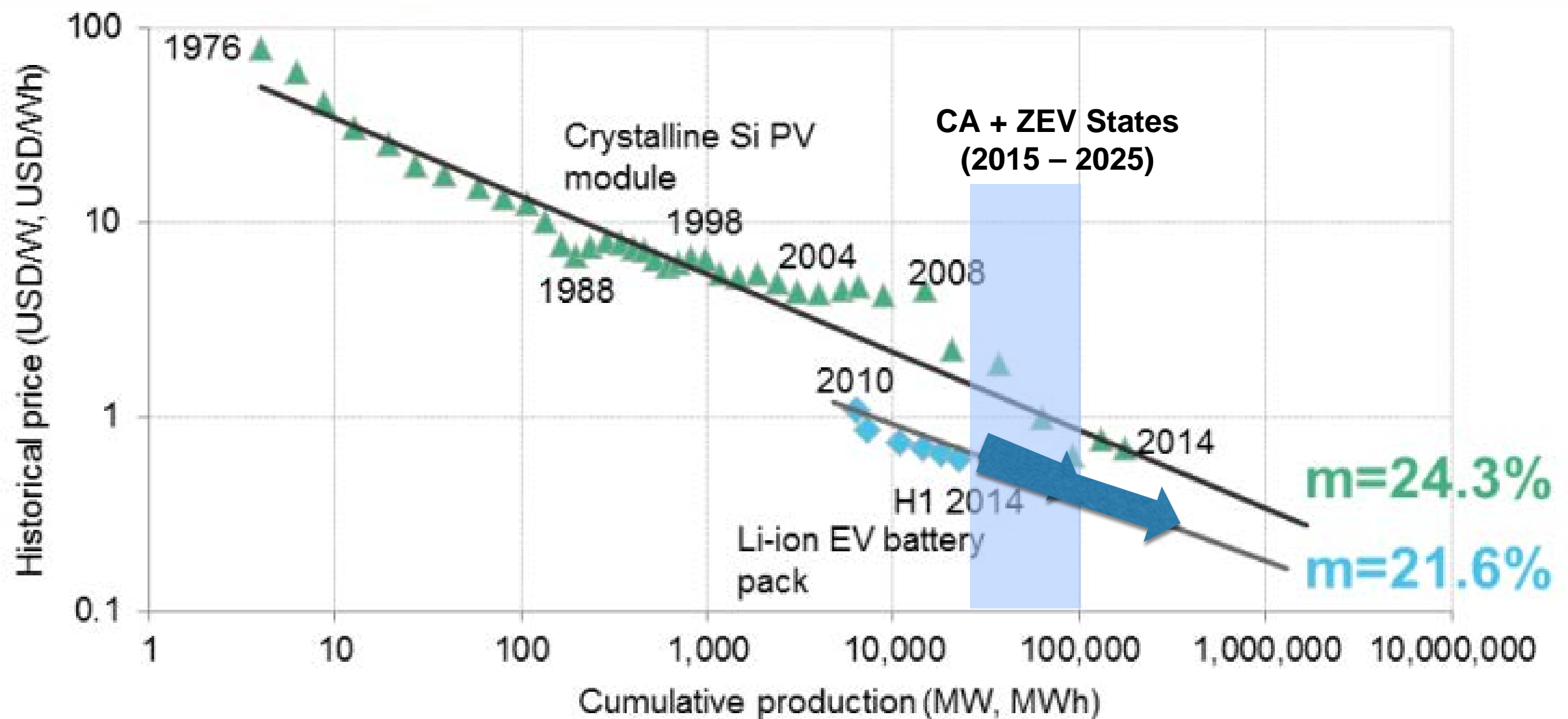


SCALE



LITHIUM-ION EV BATTERY EXPERIENCE CURVE COMPARED WITH SOLAR PV EXPERIENCE CURVE

Bloomberg
NEW ENERGY FINANCE



Note: Prices are in real (2014) USD.

Source: Bloomberg New Energy Finance, Maycock, Battery University, MIT

Michael Liebreich, New York, 14 April 2015

@MLiebreich

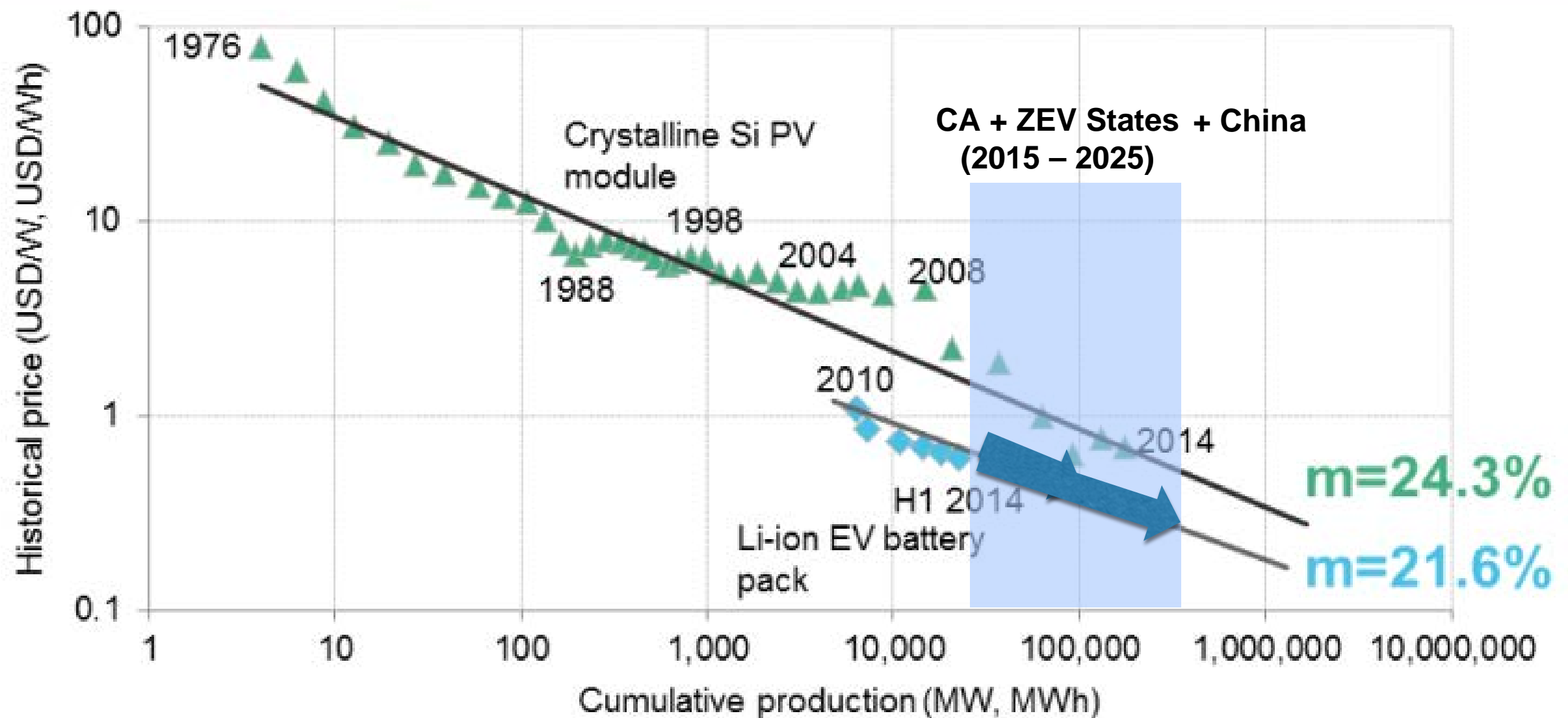
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Source: Bloomberg New Energy Finance, ZEV state and China estimates added for illustration

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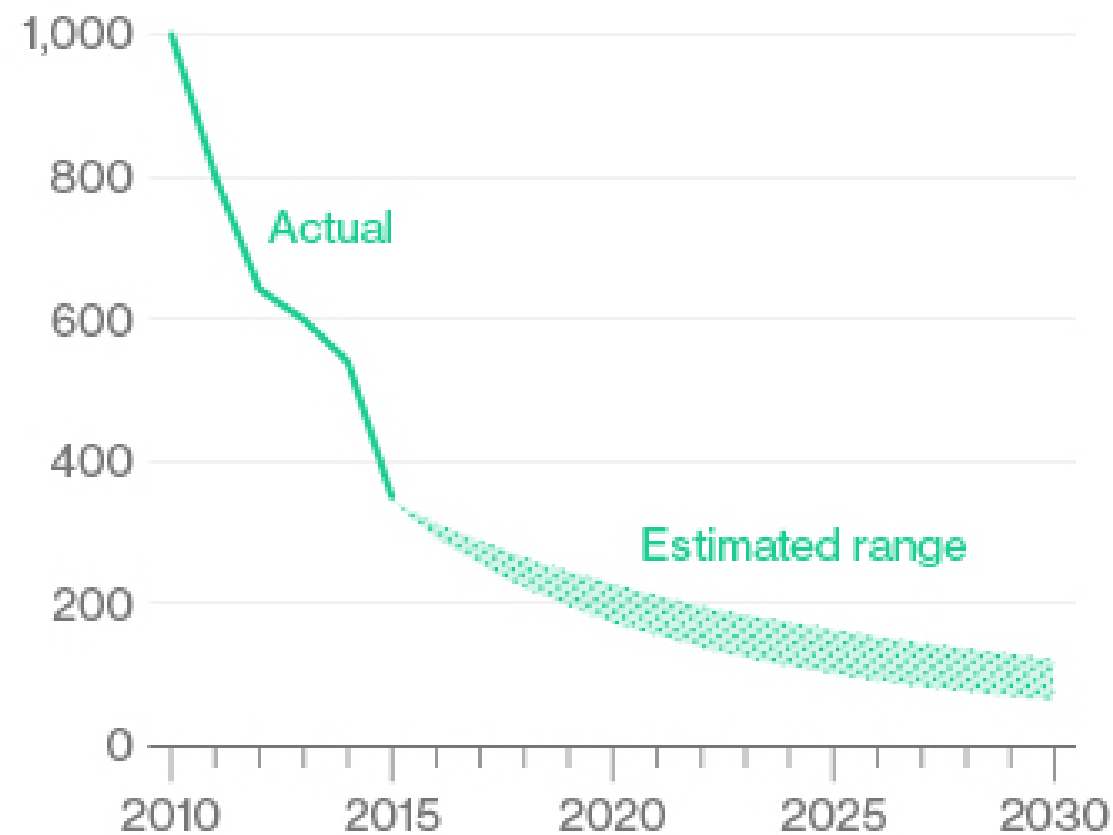
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Scale up of EV markets will help drive costs down

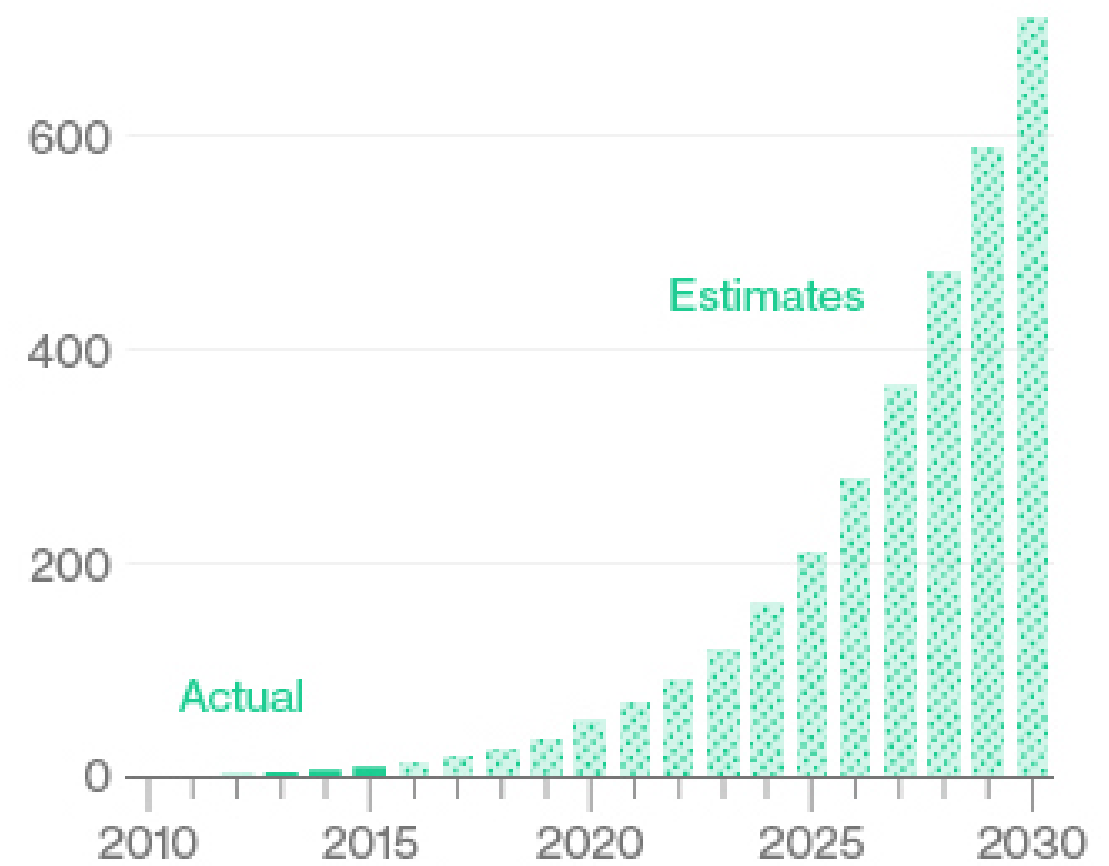
Cost for lithium-ion battery packs

\$1,200 per kilowatt hour



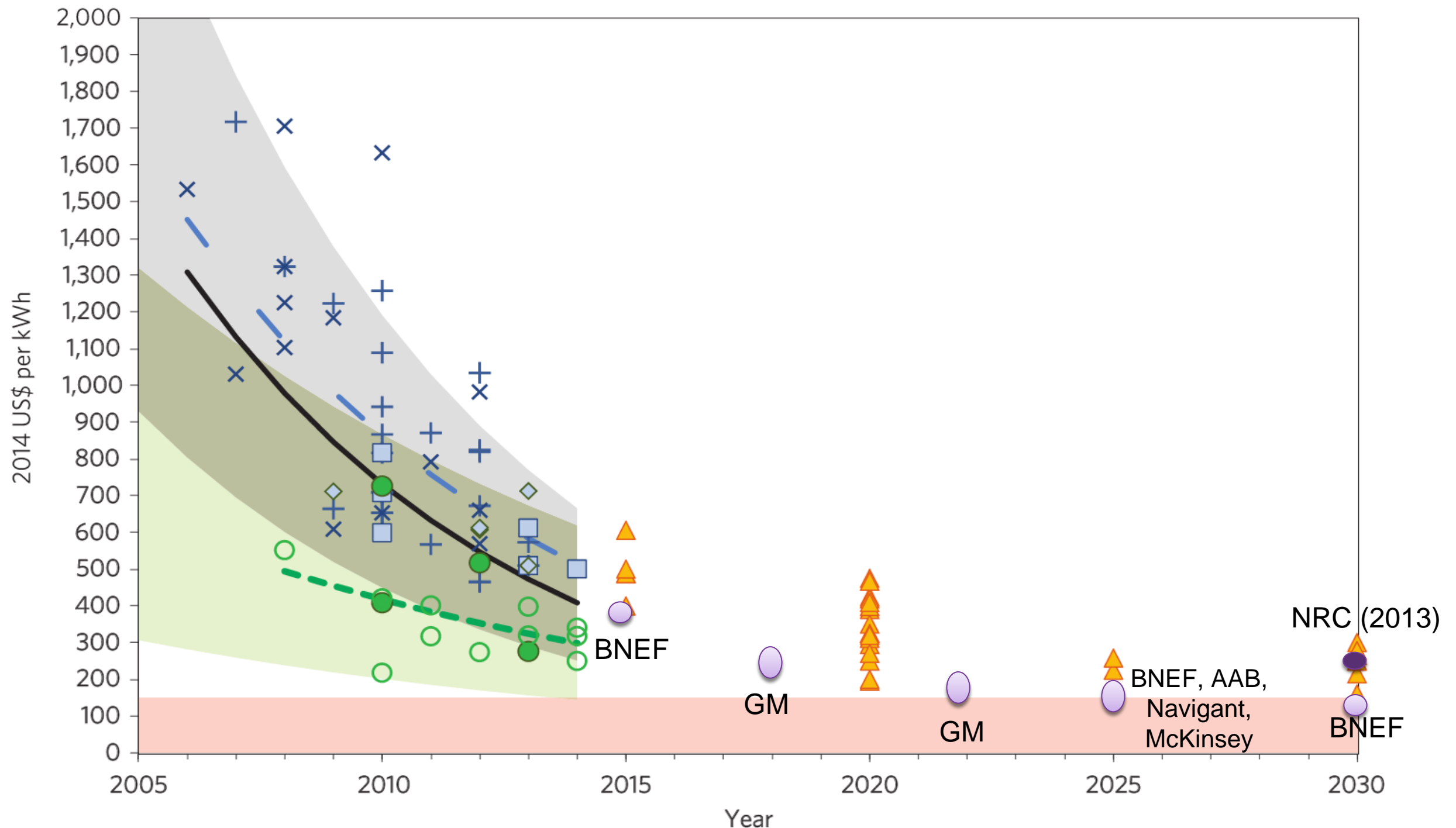
Yearly demand for EV battery power

800 gigawatt hours



Source: Data compiled by Bloomberg New Energy Finance

Most recent forecasts: even faster cost reductions



Source: Nykvist and Nilsson (2015), *Nature Climate Change*, **5**, 329-332.

More recent announcements and reports from GM, AAB, Navigant, and Bloomberg New Energy Finance added

TOTAL COSTS OF OWNERSHIP

Total cost of ownership: Utility EV rates important

eGallon: Compare the costs of **driving** with **electricity**

What is eGallon?

It is the cost of fueling a vehicle with electricity compared to a similar vehicle that runs on gasoline.

Did you know?

On average, it costs about half as much to drive an electric vehicle.

Find out how much it costs to fuel an electric vehicle in your state

California

regular gasoline

2.80

electric eGallon

1.61

Avg CA
17¢/kWh

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electric eGallon

0.91

PGE EV-A
Off-peak
10¢/kWh



UTILITY SCALE INVESTMENTS



CEC & PUC: Public Level 2 Charge Points *Existing and Proposed Actions*

Plug-in

Public

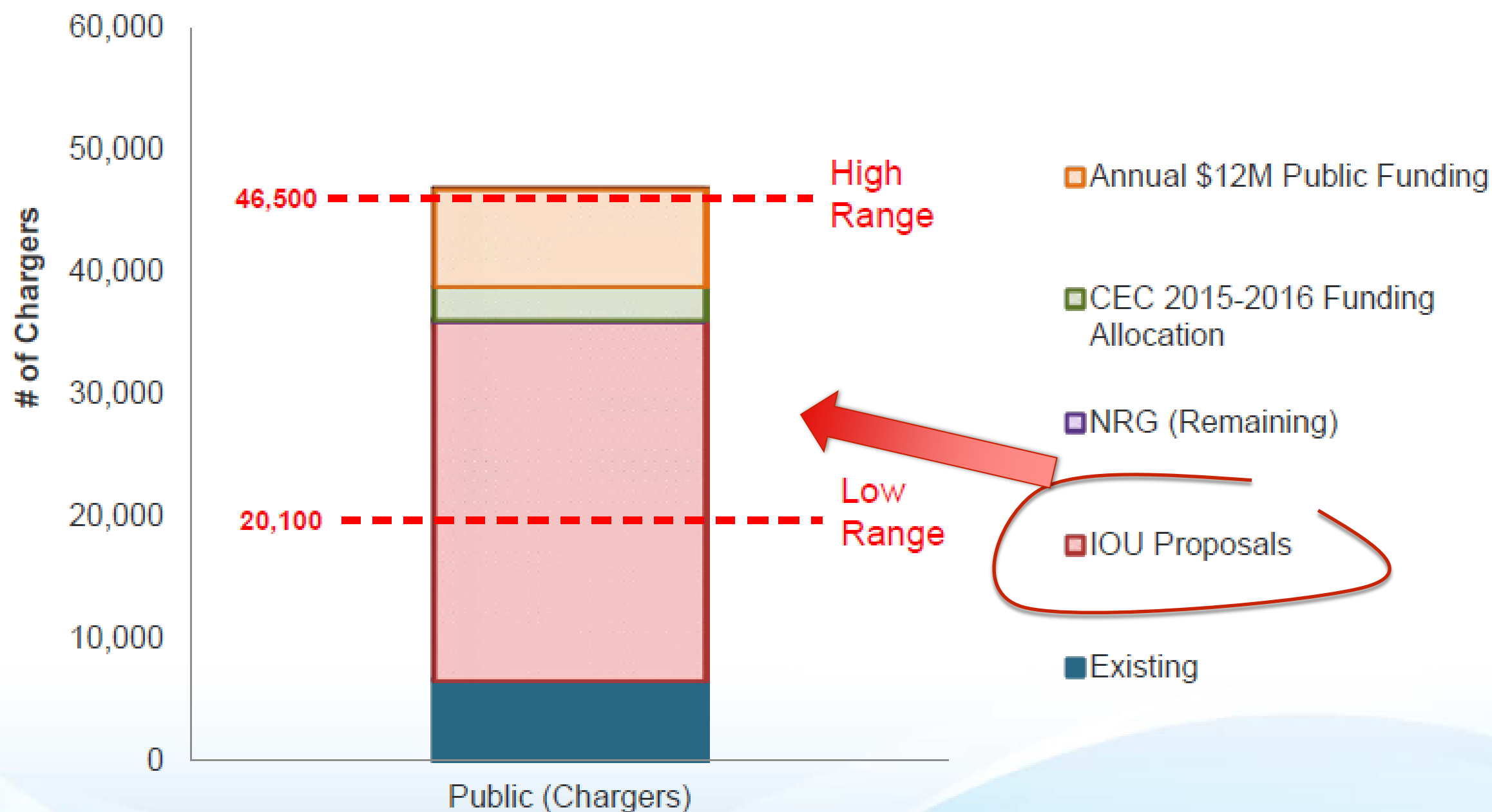


FIGURE 1: SDG&E COST OF SERVICE BEFORE AND AFTER WIDESPREAD ELECTRIC VEHICLE ADOPTION

[Adapted from Kintner-Myer et al., 2007]³⁹

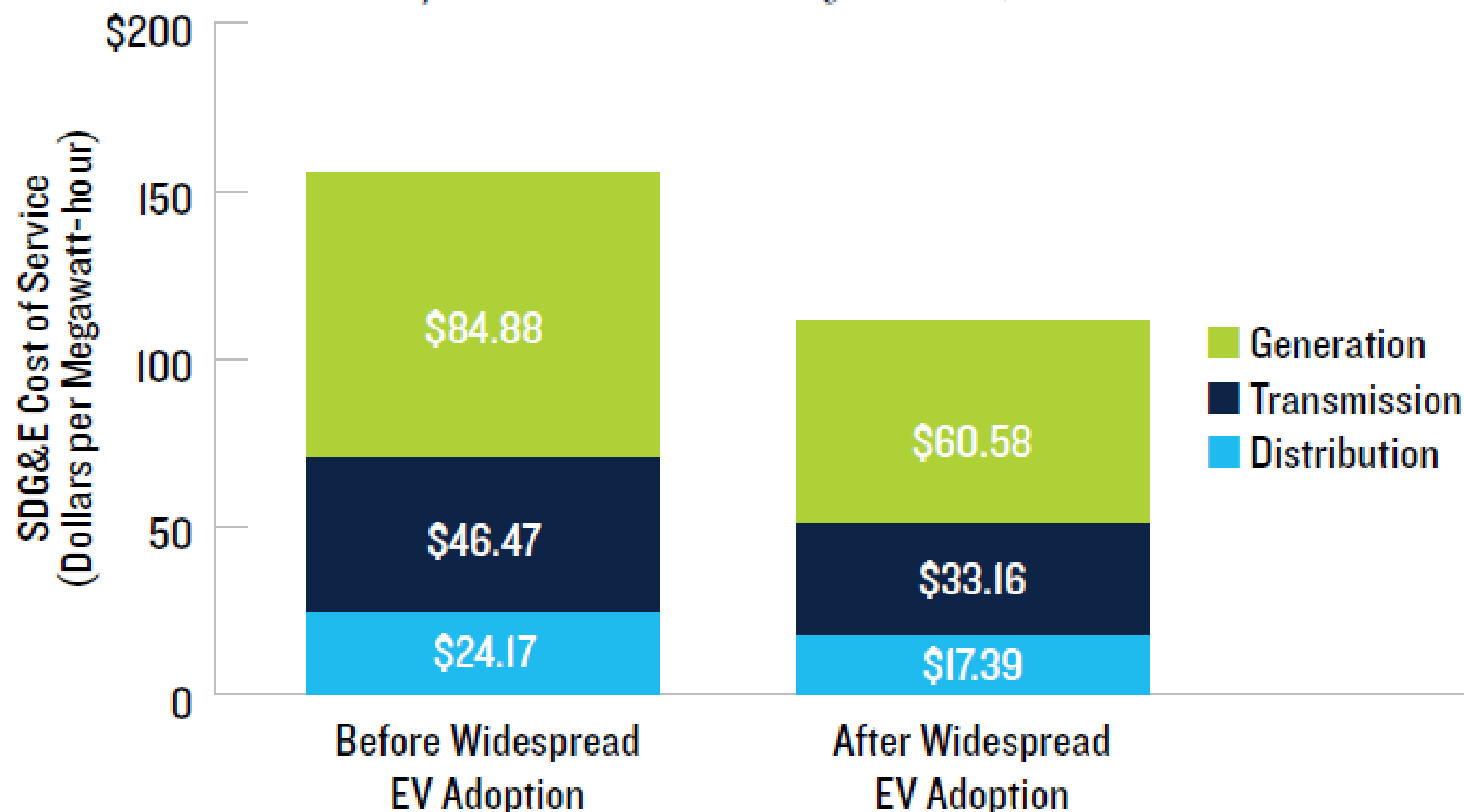
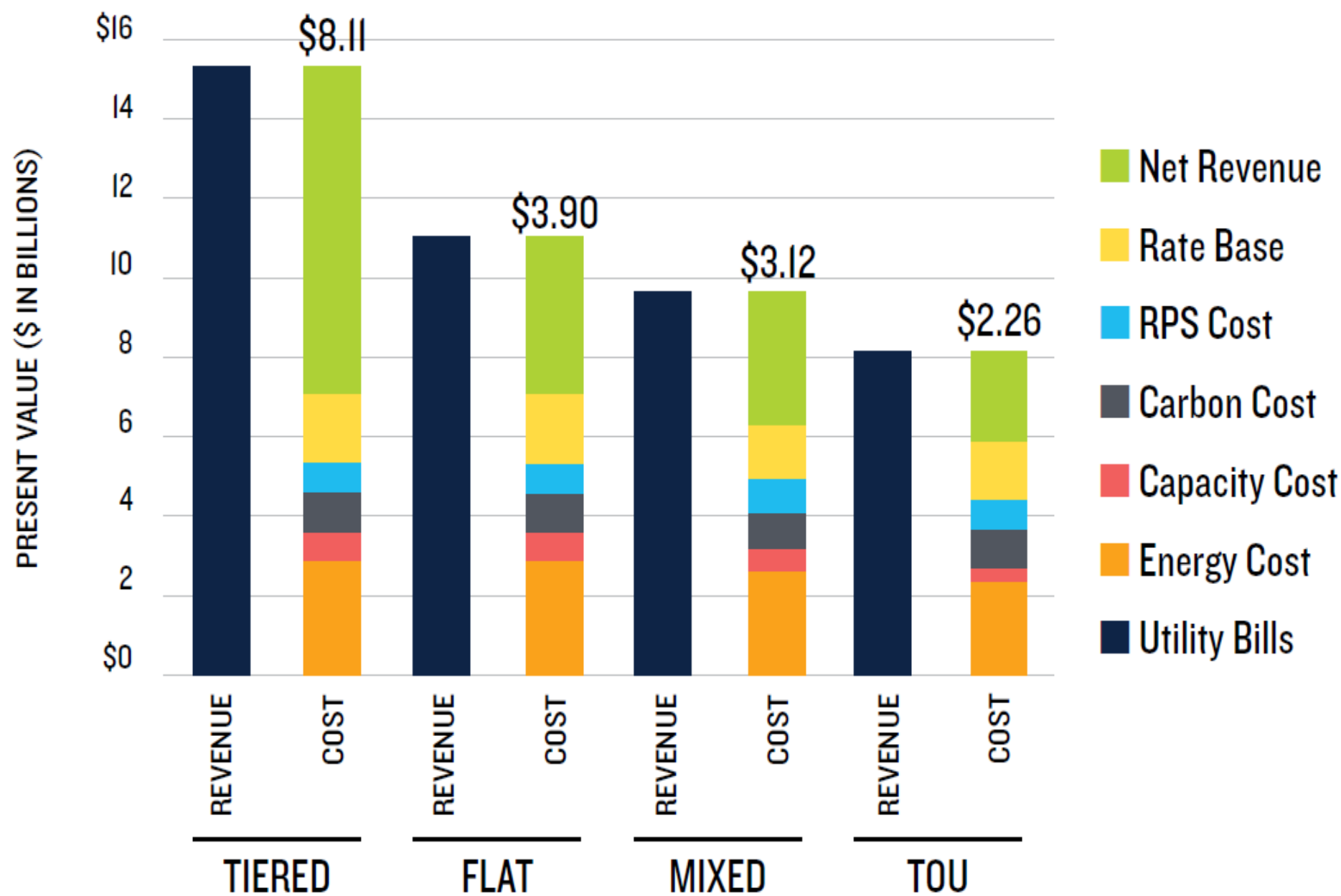


FIGURE 2: PRESENT VALUE OF EV ADOPTION IN CALIFORNIA THROUGH 2030 BY RATE SCENARIO

[Environmental and Energy Economics, California Transportation Electrification Assessment - Phase 2: Grid Impacts]⁴⁰



Notes: Based on California utility system, assuming charging occurs predominantly when the system is underutilized. Net revenues are positive under "Tiered," "Flat," and "TOU" (time-of-use) rate structures and a "Mixed" TOU/Tiered scenario. Under TOU rates, EV owners are rewarded for charging during hours of the day when the cost of energy is at its lowest, resulting in smaller, but still significant, net revenues.

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Thank You!



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