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REPORT

DRIVING OUT POLLUTION:
How Utilities Can Accelerate the Market for Electric Vehicles

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EV ROADMAP 9

PORTLAND, OR

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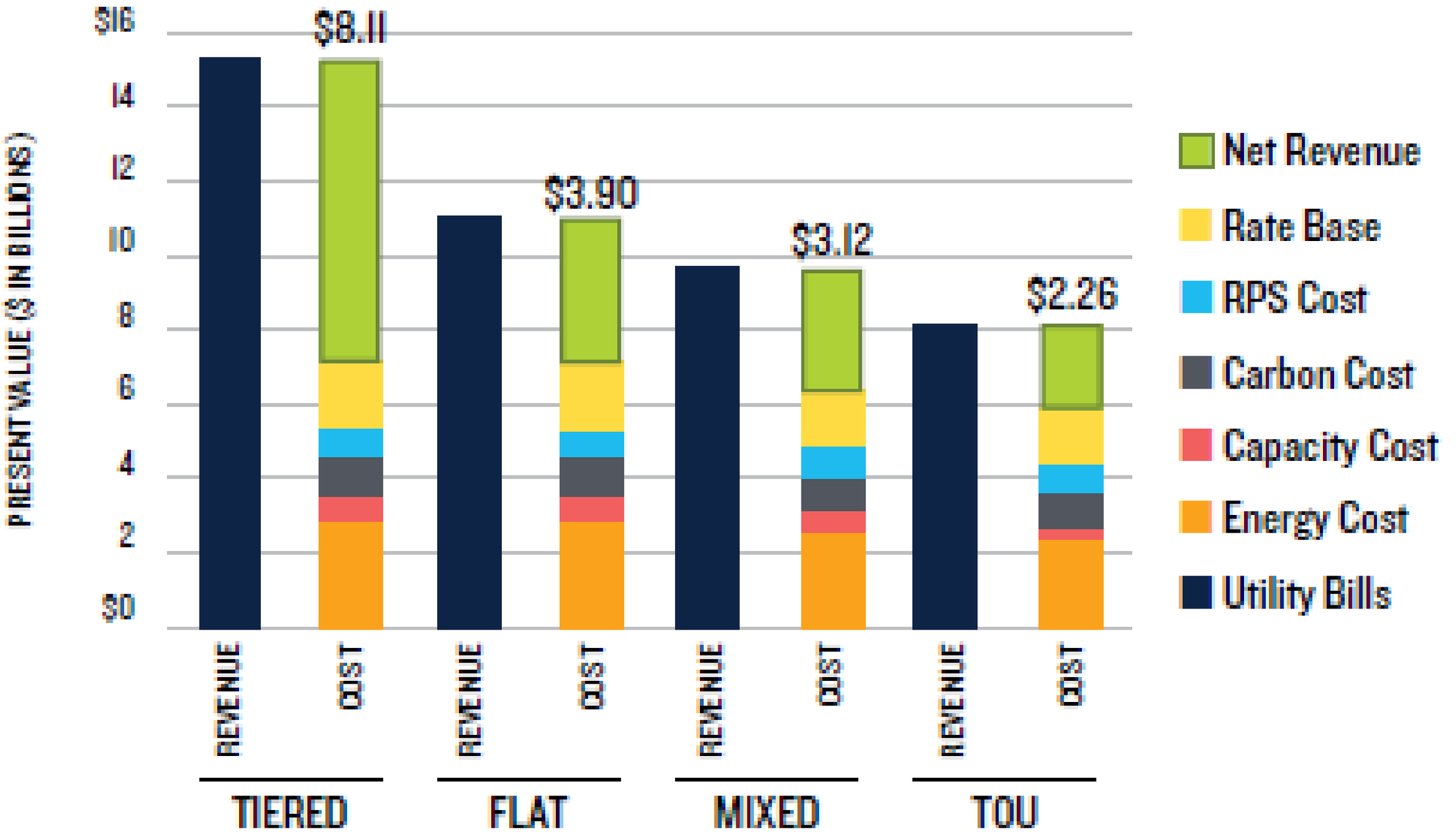
Broad Agreement on Critical Role of Utilities

- CPUC Phase 1 Decision Establishing Policy to Expand the Utilities Role in Development of Electric Vehicle Infrastructure", Decision 14-12-079, December 18, 2014.
  - *"…utilities should have an expanded role in EV infrastructure support and development in order to realize the potential benefits of widespread EV adoption."*
- National Academies of Science 2015 Final Report: *Overcoming Barriers to Electric Vehicle Deployment*
  - *"Finding: Utilities that can capture the entire residential electricity consumption of PEV owners appear to have a viable business model for investing in public charging infrastructure."* (p 94)

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



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(Environmental and Energy Economics, *California Transportation Electrification Assessment—Phase 2: Grid Impacts*)[40]

THE THREE PHASES OF UTILITY ELECTRIC VEHICLE MARKET-ACCELERATION
1. Removing Barriers to Adoption, Ensuring Grid Reliability, And Maximizing Fuel Cost Savings
Clarify that electric vehicle charging companies will not be regulated as utilities
Inform distribution system planning
Provide consistent and fair treatment of electric vehicle load
Adopt appropriate rates to maximize fuel savings and manage charging
Target customer eductation and outreach programs
2. Closing the Charging Infrastructure Gap and Promoting Equity
Utility-facilitated deployment of charging infrastructure
Increase access to electricity as transportortation fuel in disadvantaged communities
Promote broader awareness through mass-market education and outreach
3. Capturing the Value of Grid Service and Integrating Renewable Energy
Implement traditional demand response prorgams for electric vehicle customers
Implement advanced demand response programs for electric vehicle customers
Integrate V2G and battery second life programs into wholesale and retail markets

Grid Services Critical to Unlocking Future Value

TABLE I: GRID SERVICES THAT ELECTRIC VEHICLES COULD POTENTIALLY PROVIDE, BY GRID SEGMENT

Electric Vehicle Function	Potential Grid Services, by Grid Segment	
	Transmission	Distribution
Traditional Demand Response: Powering charging down or off	Day-ahead resource, spinning reserve	Grid upgrade deferral, demand charge mitigation
Advanced Demand Response: Powering charging down, off, on, or up	Day-ahead resource, spinning reserve, frequency regulation, one-way energy storage	Grid upgrade deferral, demand charge mitigation, energy arbitrage
Vehicle-to-Grid ("V2G"): Discharging energy stored in EVs back to the grid	Day-ahead resource, spinning reserve, frequency regulation, two-way energy storage	Grid upgrade deferral, power quality, demand charge mitigation, energy arbitrage
Battery Second Life: Deploying used EV batteries as stationary energy storage	Day-ahead resource, spinning reserve, frequency regulation, two-way energy storage	Grid upgrade deferral, power quality, demand charge mitigation, energy arbitrage

Emerging Areas of Agreement

- There is a critical role for utility intervention in the EV market
- Transportation electrification can benefit the entire grid and complement grid modernization efforts
- No single model; utilities should have flexibility in design
- Common program design features:
  - Incorporate mechanisms for positive feedback loops
  - Address underserved markets and improving equity
  - Allow site host choice of vendors for equipment & services
  - Requirement for load management programs
  - Requirement that stations are maintained and remain operational

Programs Share Many Common Elements

IOU EV Program Comparison

	SDG&E Approved Decision	PG&E Settlement Agreement	SCE Approved Decision
Scope	Up to 3,500 L1 & L2 at 350 sites (60% of original 5,500) 3 years	7,500 L2 (30% of original) 100 DCFC (100% of original) 3 years	1,500 L1 & L2 (5% in Phase 1) At least 12 months
Cost	$45M (40% of original $103M)	$160M (24% of original $654M)	$22M (6% of total $355M)
Charger Ownership, O&M	SDG&E owned	PG&E owned	Site host owned
Equipment & Services Choice	Site host choice of pre-qualified service providers	Site host choice of pre-qualified service providers	Site host purchase of pre-qualified service providers
Participation Fee	Participation fee TBD with advisory council	10% of EVSE cost for MUDs, 20% for private businesses; Fee waived for Disadv. Communities, gov't, and non-profit sites	Site host buys equipment 25-50% rebate from SCE
Rates/Pricing	Choice of VGI rate to driver or to site host	Choice of commercial TOU rate (e.g. A6) to driver or to site host	Site host pays commercial rate, sets pricing

Different models

SDG&E is developing a special "VGI" rate

Programs Share Many Common Elements

IOU EV Program Comparison

	SDG&E Approved Decision	PG&E Settlement Agreement	SCE Approved Decision
Target Markets	Target 50% MUD / 50% Workplace	Workplace, MUD (target 50%), public/retail	Workplace, MUD, Public/Retail (no specific allocation)
Phasing	Semi-annual progress reports Phase 2 would be filed separately	Quarterly progress reports for Phase 1 Separate application for Phase 2, with one year "Bridge" funding until decision	After 12-24 months, SCE to serve pilot report and Phase 2 application
Load Management	VGI rate reflects grid conditions; if site host takes rate, must submit load management tactics	TOU rate reflects grid conditions; if site host takes rate, must submit load management tactics Develop DR program within 3 years	Evaluate load management strategies in Pilot Develop DR program within 3 years
Disadvantaged Communities	10% commitment; CARE customers excused from rate-base of program	15% commitment with 20% stretch goal; $5M for vehicle equity programs	10% commitment; 100% rebate for charger costs in DACs
Site Host Recruitment	SDG&E + 3rd party partners	PG&E + 3rd party partners	SCE + 3rd party partners
Advisory Committee	Yes	Yes	Yes

SDG&E has greatest emphasis on managed charging from the beginning

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How Utilities Can Accelerate the Market for Electric Vehicles

https://www.nrdc.org/resources/driving-out-pollution-how-utilities-can-accelerate-market-electric-vehicles