



Summary of CPUC Actions to Support Zero-Emission Vehicle Adoption

The CPUC plays a critical role in the state's transition to zero-emission vehicles (ZEVs).¹ As regulators of the state's electric investor-owned utilities (IOUs),² the CPUC applies its expertise in electric rate design, electric system infrastructure deployment, grid management, and safety to accelerate ZEV deployment. The CPUC also works closely with other state agencies to ensure electric IOU investments to support ZEVs are strategically coordinated and in the interest of ratepayers. CPUC's activities fall into four main categories as described below:

- Electricity rates and costs of fueling
- Vehicle-grid integration policy and pilots
- Charging infrastructure deployment and incentives
- Program evaluation and interagency coordination

In December 2018, the CPUC launched an Order Instituting Rulemaking to Continue the Development of Rates and Infrastructure for Vehicle Electrification (R.18-12-006) to refocus its efforts related to transportation electrification (TE), nearly a decade after opening its first rulemaking related to alternative-fueled vehicles in 2009.³ The CPUC's current ZEV rulemaking implements directives from the legislature⁴ and the Governor's office⁵ to develop IOU programs that accelerate the adoption of ZEVs and increase access to ZEV fueling stations.

The ZEV projects deployed by the IOUs are authorized through the CPUC's public rulemaking process. IOUs first propose ZEV programs or projects to the CPUC for review. After stakeholders submit comments on the IOU proposal(s), CPUC Energy Division (ED) staff evaluates the proposals based on their merits and their alignment with state policies and environmental targets. Staff also analyzes whether the proposed budgets are appropriate, and whether the investments are in the interest of ratepayers, using information collected through the CPUC's public processes. Staff makes policy

¹ California considers plug-in hybrid electric, full battery electric, hydrogen, and fuel cell vehicles to be zero-emission vehicles because they can have no greenhouse gas or air pollutant emissions from their tailpipes.

² The CPUC regulates six IOUs: Pacific Gas and Electric (PG&E), Southern California Edison (SCE), San Diego Gas & Electric (SDG&E), Liberty Utilities, PacifiCorp, and Bear Valley Electric Service.

³ The CPUC opened R.09-08-009 to support the widespread deployment and use of alternative fueled vehicles. That proceeding was folded into R.13-11-007 in 2013.

⁴ Public Utilities Code §740.12 directs the CPUC to work with the California Energy Commission and the California Air Resources Board to direct the electric IOUs to develop proposals to accelerate widespread TE, which the law defines as "the use of electricity from external sources of electrical power, including the electrical grid, for all or part of vehicles, vessels, trains, boats, or other equipment that are mobile sources of air pollution and greenhouse gases and the related programs and charging and propulsion infrastructure investments to enable and encourage this use of electricity."

⁵ Governor Jerry Brown in January 2018 signed Executive Order B-48-18 setting a state target of having 5 million ZEVs on California roads by 2030 and deploying 250,000 charging stations, including 10,000 fast-charging stations, by 2025.



recommendations based on this analysis to Administrative Law Judges, who draft Proposed Decisions to be voted on by the CPUC Commissioners. The Commissioners' votes determine whether the utility programs, budget and implementation details are approved.

R.18-12-006 directs ED staff to use the same type of public processes to propose a new Transportation Electrification Framework that, if adopted by the CPUC, will provide guidance to the IOUs and third-party market participants about the IOUs' role in meeting the state's ZEV goals.

Electricity Rates and Costs of Fueling

Existing

Electricity rates for EV drivers

The CPUC has approved time-of-use (TOU) energy rates for residential customers of PG&E, SCE, SDG&E, Bear Valley, and Liberty Utilities that drive electric vehicles (EVs) and charge at home. TOU rates are designed to provide price signals to customers about when it is better to use electricity to optimize the use of grid resources and to maintain reasonable rates and reliability. The rates and TOU periods vary by utility, but generally, the rates are lowest overnight, allowing drivers enough time to charge their EVs while they are at home. These "off-peak" rates allow EV drivers to fuel their vehicle for less than the equivalent cost of gasoline. Appendix A of this document includes details of the currently-available EV rates offered by California IOUs.

Low Carbon Fuel Standard Rebates

In 2016, PG&E, SCE, and SDG&E began providing rebates to EV drivers through the state's Low Carbon Fuel Standard (LCFS).⁶ EV drivers generate LCFS credits by using low-carbon fuel (electricity), and the utilities receive credits on behalf of their customers.⁷ When the utilities sell the credits, they use the revenues to distribute rebates and on-bill credits to their residential customers that drive an EV, effectively lowering a driver's cost to purchase or operate the EV. Rebate amounts for 2019 are proposed to be \$800 and \$1,000 for PG&E and SCE customers respectively, and SDG&E has proposed to provide customers an annual electric bill credit of between \$450 to \$550 per EV.⁸

New & Ongoing

In January 2018, the CPUC issued Decision (D.) 18-01-024,⁹ approving the first round of transportation electrification proposals filed pursuant to SB 350 with a total budget of \$42 million. This Decision also authorized SDG&E to develop a "public grid integration rate" for limited use as part of its Green Shuttle Pilot described in the infrastructure section below. It also approved an SDG&E Dealership Incentives

⁶ Additional information on the CPUC's implementation of Low Carbon Fuel Standard rebates is available here: <http://www.cpuc.ca.gov/zev/#Rebates>.

⁷ The California Air Resources Board calculates the number of credits generated and allocates the LCFS credits.

⁸ The IOUs' LCFS rebates vary each year based on the number of LCFS credits generated by residential EV customers in each utility service territory and the price the utilities can charge for the LCFS credits they are selling.

⁹ Available here: <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M204/K670/204670548.PDF>.



pilot for SDG&E to train car dealerships and provide them incentives if customers purchase an EV and sign up for an SDG&E EV rate.

In June 2018, the CPUC issued D.18-05-040¹⁰ approving four new EV-specific rates:

- SDG&E’s “residential grid integration rate” for participants of its residential charging rebate program to choose to be on this dynamic rate, which varies daily based on pricing from the California Independent System Operator (CAISO) day-ahead electricity markets.
- SCE’s three new commercial EV rates that offer a five-year holiday from monthly demand charges for commercial customers that have adopted electric vehicles or that host charging stations for other end-users to utilize. Demand charges are used to recover the IOU’s costs associated with the infrastructure needed to meet a customer’s maximum monthly demand and are in addition to charges for the electricity itself. Demand charges can increase significantly when customers start charging electric vehicles and thus increase their demand. The five-year holiday period is intended to offer customers time to develop load management plans to mitigate demand charges, which SCE will phase back in over five years starting in year six of the rate’s availability. These three new rates, once implemented, will replace SCE’s existing commercial EV TOU rates.

In September 2018, the CPUC in D.18-09-034 approved Bear Valley’s EV TOU Pilot Rate that will be available to participants of its make-ready rebate program for destination centers as well as residential customers.

Future

In November 2018, PG&E proposed a new commercial EV rate (A.18-11-003)¹¹ that would offer customers the option to enroll in a subscription-based rate using the total load associated with EV charging to set a monthly charge. This subscription charge would replace demand charges and would be paired with a TOU volumetric energy rate that offers lower prices for off-peak charging. The CPUC is currently reviewing PG&E’s application through its public process.

R.18-12-006 directs the six IOUs to jointly propose new ZEV rates that specifically address demand charges associated with hosting direct-current fast charging (DCFC)¹² stations or deploying fleets of ZEVs including electric transit buses or other commercial vehicle fleets.

¹⁰ Available here: <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M215/K783/215783846.PDF>.

¹¹ The docket for A.18-11-003 is available at https://apps.cpuc.ca.gov/apex/f?p=401:56:0::NO:RP,57,RIR:P5_PROCEEDING_SELECT:A1811003

¹² DCFC stations directly provide a high-power DC current (typically 120kW or more) to a vehicle’s battery without converting the power to AC. Sites hosting DCFC face high demand charges associated with the infrastructure needed to service the high-power associated with their charging stations, and are often unable to fully recover their demand charge costs due to low utilization of the DCFC.



The CPUC will also consider rate designs to support the production of hydrogen for ZEV fueling, and additional rate designs proposed by the IOUs to support customers that are adopting electric vehicles while ensuring their charging behavior is beneficial to the grid.

Infrastructure Deployment and Incentives

Existing

Electric IOU charging infrastructure pilots to support light-duty¹³ EVs

The CPUC in 2014 decided that it would review proposed programs from the IOUs to use ratepayer funding to invest in transportation electrification (TE) infrastructure on a case-by-case basis.¹⁴ The three largest IOUs – PG&E, SCE, and SDG&E – filed applications in 2014 for investment programs to install light-duty electric vehicle charging stations at workplaces, apartment buildings, and some destination centers such as community colleges, and golf courses. The utilities' programs were approved in 2016¹⁵ and are currently under implementation. The three electric IOU pilots will install the infrastructure to support up to 12,500 charging stations (mostly Level 2¹⁶) with a combined budget of up to \$197 million. Details about the light-duty infrastructure programs and their status are available in Appendix B of this document.

Each electric IOU convenes a program advisory council (PAC) comprised of representatives from state agencies, ratepayer advocates, environmental justice groups, technology providers, automakers, and others to provide feedback and guidance on pilot design and implementation. On December 13, 2018, the CPUC authorized SCE to spend an additional \$22 million on its light-duty infrastructure pilot program, Charge Ready,¹⁷ while the Commission reviews SCE's application for Charge Ready Phase 2, which was filed in June 2018.¹⁸

NRG Settlement

¹³ Light-duty electric vehicles are passenger vehicles typically used by residential customers and fleets operated by workplaces, government agencies or transportation network companies.

¹⁴ CPUC Decision (D.)14-12-079 available at <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M143/K682/143682372.PDF>

¹⁵ D.16-01-023 approved \$22 million for SCE's Charge Ready program to install infrastructure and provide rebates for up to 1,500 charging stations at multi-unit dwellings, workplaces, and destination centers; D.16-01-045 approved \$45 million for SDG&E's Power Your Drive program to install, own, and operate up to 3,500 charging stations at multi-unit dwellings and workplaces; and D.16-12-065 approved \$130 million for PG&E's EV Charge Network program to install infrastructure and provide rebates for up to 7,500 charging stations at multi-unit dwellings and workplaces. PG&E is authorized to own and operate up to 35 percent of the charging states installed through EV Charge Network.

¹⁶ Level 1 charging is plugging the EV into a standard 110-volt outlet to recharge the battery. Level 2 charging stations are connected to a 240-volt outlet and provide a faster charging option than Level 1.

¹⁷ D.18-12-006 granted SCE's request for \$22 million in bridge funding to continue implementing Phase 1 of its Charge Ready program, with modifications directing targeted investments in Multi-Unit Dwellings. D.18-12-006 is available at <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M252/K522/252522607.PDF>.

¹⁸ Documents and information about Charge Ready Phase 2 Application 18-06-015 are available at https://apps.cpuc.ca.gov/apex/f?p=401:56:0::NO:RP,57,RIR:P5_PROCEEDING_SELECT:A1806015



The CPUC entered into a legal settlement agreement with NRG Energy to settle outstanding legal issues regarding the California energy crisis. EVgo is currently implementing the settlement requirements on behalf of NRG. The settlement requires NRG to invest \$102.5 million in EV charging infrastructure in California:

- \$50.5 million for 200 public DCFC stations¹⁹
- \$27.5 million to \$40 million for approximately 6,875 make-ready stubs²⁰ \$12.5 million for at least 10 fast charging plazas²¹
- \$5 million for research and development pilots
- \$4 million to support programs in underserved communities

New & Ongoing

In January 2018, CPUC approved twelve new electric IOU infrastructure pilots pursuant to SB 350 with budgets totaling \$43 million.²² Many of these pilots focus on deploying TE infrastructure:

- **SDG&E Airport Ground Support Equipment:** develop a plan to install charging infrastructure for various ground support equipment and integrate charging with onsite solar generation.
- **SDG&E Electrify Local Highways:** install and own 88 charge points: 20 Level 2 charging stations and two DCFC at four Park-and-Ride locations.
- **SDG&E Port Electrification:** install and own approximately 30 charging stations and supporting infrastructure.
- **SDG&E Fleet Delivery Services:** install and own charging infrastructure to support 90 delivery trucks.
- **SDG&E Green Shuttle:** install and own Level 2 or DCFC to meet shuttle needs.
- **SCE Residential Make-Ready Rebate:** provide up to 5,000 rebates for residential customers to cover the infrastructure upgrades needed to install Level 2 charging stations.
- **SCE Urban DCFC Clusters:** install up to 50 new DCFC ports to offer options for drivers without access to home charging
- **SCE Electric Transit Bus Make-Ready:** install make-ready charging infrastructure and provide rebates for charging stations.
- **SCE Port of Long Beach Pilots:** install make-ready charging infrastructure to support port equipment.
- **PG&E Medium/Heavy-Duty Fleet Customer Demonstration:** install make-ready infrastructure and provide technical assistance to a transit agency.

¹⁹ Each of the required 200 Freedom Stations must have at least 1 DCFC and 1 Level 2 charger, or 2 DCFCs.

²⁰ The original target for make-readies, prior to the Second Amendment to the Settlement, was 10,000 make ready stubs at 1,000 facilities. A portion of this budget was reallocated to the Charging Plazas.

²¹ Each charging plaza must have at least three DCFCs and must be located in areas of high multi-unit dwelling concentration.

²² Project summaries and budgets are available here:

<http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442455977>.



- **PG&E Electric School Bus Renewables Integration:** install make-ready infrastructure for 2 to 5 school buses and provide incentives to charge buses at times of day with excess renewable energy generation.
- **PG&E Idle Reduction Technology:** develop a plan to demonstrate idle-reduction technologies for truck stop electrification or transport refrigeration units.

As part of this decision, CPUC's Safety and Enforcement Division drafted a Safety Checklist²³ for the electric IOUs to ensure their projects meet certain standards. This checklist will evolve overtime as the CPUC develops lessons learned and identifies additional safety needs.

In May 2018, the CPUC adopted D.18-05-040, authorizing another \$738 million in IOU infrastructure investments pursuant to SB 350²⁴. The Decision authorized PG&E and SCE to spend \$210 million and \$343 million, respectively, to install infrastructure to support medium- and heavy-duty electric vehicles such as semi-trucks, transit and school buses, fleet delivery trucks, and port equipment. PG&E is also authorized to spend up to \$22.4 million to install infrastructure for 234 DCFC ports that will offer faster public charging options. SDG&E was approved to spend \$137 million to offer rebates to residential customers that install charging stations at their homes.

In September 2018, the CPUC issued D.18-09-034, authorizing the three smaller IOUs to spend about \$7.3 million on TE programs related to infrastructure deployment:

- **Bear Valley EV TOU Pilot Rate:** install make-ready infrastructure for residential and commercial EV customers to take service on a new TOU rate.
- **Bear Valley Destination Make-Ready rebate (\$607,500):** provide rebates for the make-ready infrastructure for Level 2 charging at public destinations.
- **Liberty Utilities DC Fast Charger Project (\$4 million):** deploy and operate DCFC stations.
- **Liberty Utilities Residential Make-Ready Rebate (\$1.6 million):** offer rebates for residential customers installing Level 2 charging stations.
- **Liberty Utilities Small Business Make-Ready Rebate (\$300,000):** offer rebates for small-business customers installing Level 2 charging stations.
- **Liberty Utilities Bus Infrastructure Program (\$223,000):** install and operate charging equipment for Tahoe Transit District electric buses.
- **PacifiCorp Demonstration & Development Grant Program (\$170,000):** provide grants for non-residential charging installations.

For the programs approved under SB 350 to date, the three large IOUs are required to continue utilizing the PACs that are already providing guidance on the implementation of their light-duty infrastructure programs. The smaller IOUs are required to host meetings with stakeholders, especially small businesses, to ensure the programs do not exclude participation due to customer size.

²³ The Safety Checklist is available at www.cpuc.ca.gov/sb350te

²⁴ More information about the programs approved in D.18-05-040 is available at <http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442457607>.



The costs of the IOUs' TE programs (except those funded by LCFS revenues) are collected through electric distribution rates paid by all electric ratepayers in the utility's territory.

Future Work

SB 350 Implementation

In January 2018, SDG&E filed an additional application (A.18-01-012) to support electrification of the medium- and heavy-duty transportation sectors.²⁵ The CPUC began its review of this application in spring of 2018, and in November 2018, SDG&E and 15 parties to the proceeding filed a settlement for CPUC consideration.

In July 2018, PG&E filed an additional application (A.18-07-021) to provide rebates to low- and moderate-income residential customers that install Level 2 charging stations at home.²⁶

Assembly Bills 1082 and 1083 (Burke, Chapter 637 & 638, Statutes of 2017)

Assembly Bills 1082 and 1083 allow, but do not require, the electric IOUs to file applications to support charging infrastructure at schools and state parks and beaches, respectively. The bills required the electric IOUs to submit applications by July 30, 2018. The CPUC issued formal guidance to the electric IOUs regarding any applications they elect to submit pursuant to the bills and on July 30, 2018, received applications for programs with budgets totaling \$55.5 million from four IOUs: Liberty, PG&E, SCE, and SDG&E. The four IOUs' applications have been consolidated into one proceeding, A.18-07-020 et al.²⁷

Vehicle-Grid Integration Policy and Pilots

Existing

The CPUC, in collaboration with other state agencies, is developing policies that support vehicle-grid integration (VGI). VGI helps align EV charging with the needs of the electric system. To do this, EVs must have capabilities to manage charging or support two-way interaction between vehicles and the grid. In 2014, CPUC Energy Division staff issued a VGI Whitepaper, and supported CAISO's development of the state's VGI Roadmap.

The CPUC has also overseen several electric IOU pilots to explore VGI applications, including demand response pilots using EVs to shift or curtail load.²⁸

New & Ongoing

In 2017, CPUC Energy Division staff initiated a public working group to assess whether the adoption of a communication protocol is necessary to enable VGI resources to more economically participate in

²⁵ Documents and information associated with A.18-01-012 are available at https://apps.cpuc.ca.gov/apex/f?p=401:56:0::NO:RP,57,RIR:P5_PROCEEDING_SELECT:A1801012

²⁶ Documents and information associated with A.18-07-021 are available at https://apps.cpuc.ca.gov/apex/f?p=401:56:0::NO:RP,57,RIR:P5_PROCEEDING_SELECT:A1807021

²⁷ Documents and information about A.18-07-020 et al. are available at https://apps.cpuc.ca.gov/apex/f?p=401:56:0::NO:RP,57,RIR:P5_PROCEEDING_SELECT:A1807020

²⁸ Additional pilot summaries are available here: http://www.cpuc.ca.gov/zev/#Pilot_Programs.



electricity markets at scale.²⁹ More than 130 international experts participated in the working group process, which consisted of 15 facilitator-led meetings throughout 2017. The final Working Group report and staff recommendations were included as an appendix to R.18-12-006.³⁰

Future Work

CPUC will continue to support VGI efforts by participating in the VGI Roadmap update process, which the California Energy Commission (CEC) is leading as part of its 2017 Integrated Energy Policy Report. The CEC is working with the CPUC, the CAISO, the California Air Resources Board (CARB), and other stakeholders to complete the VGI Roadmap update.

Once the state's VGI Roadmap is updated, CPUC Energy Division staff will lead a new VGI working group designed to better identify the costs and benefits associated with VGI use cases. The new working group, which R.18-12-006 directs ED to launch no later than July 31, 2019, will aim to build off the 2017 working group deliverables to identify (1) which VGI use cases provide the most value, (2) how that value can be captured, and (3) what new policies or procedures are needed for VGI to provide value at scale.³¹

Program Evaluation and Interagency Coordination

The utilities are required to provide reports on their light-duty infrastructure investments described above on a quarterly or bi-annual basis. Reports include metrics like number of ports and sites installed and customers served by the installations, such as those shown in Figure 1:

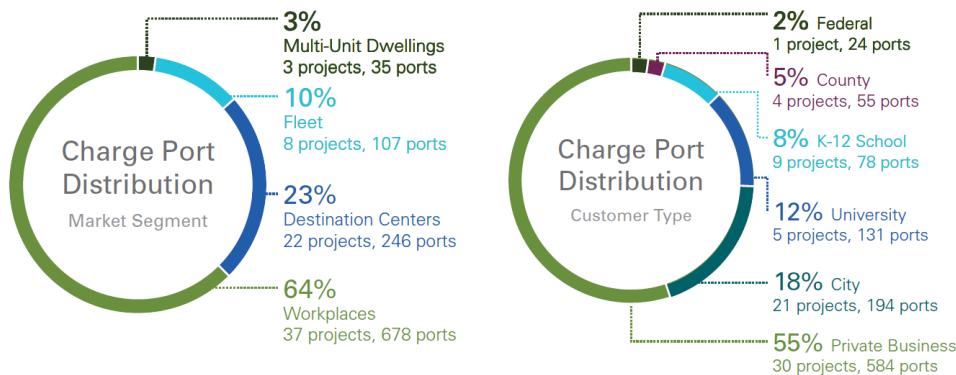
²⁹ Information about and deliverables from the working group are available at <http://www.cpuc.ca.gov/vgi/>.

³⁰ The final Energy Division Staff Report on the VGI Communication Protocols Standards Working Group is Appendix C, available at <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M252/K033/252033222.pdf>

³¹ The new interagency VGI working group is ordered within R.18-12-006, and the three large IOUs are required to work with Energy Division staff to develop the work plan and kick off the working group no later than July 31, 2019.



Figure 1.



Source: SCE Charge Ready Phase 1 Final Report³²

The decisions approving the SB 350 programs adopted standardized data collection and reporting templates.³³ The data and information collected through these templates will be reviewed by an independent third-party evaluator. The metrics collected on the more recently-adopted programs will also include charging station utilization rates; number of EVs adopted as a result of the program; avoided petroleum usage; and criteria air pollutant reductions.

CPUC ED staff also coordinates with various internal and external groups on ZEV policies.

State Agency Coordination

CPUC Energy Division staff regularly engage with staff from CARB, CAISO, the CEC, and the Governor’s Office of Business Development (GO-Biz) to discuss ZEV initiatives. Coordination activities include regular meetings to discuss each agency’s policies and programs to support ZEV charging infrastructure, forecasts of vehicle adoption, data collection efforts, and discussions of measuring the emissions reductions associated with state ZEV policies.

Meetings with other California state agencies deploying complementary ZEV policies and regulations are also ongoing to help coordinate data collection and reporting efforts as well as compliance deadlines.

In 2018, California state agencies collaboratively updated the California ZEV Action Plan to clearly identify priorities for advancing the ZEV market and serve as a “to-do” list for the governor’s office and agency staff.³⁴

Internal CPUC coordination

³² Available at https://www.sce.com/wps/wcm/connect/48270afc-aa77-4e4c-9cb1-bb2dcb8b5f66/5227_SCE_ChargeReadyReportSummary_r4-AA.pdf?MOD=AJPERES&attachment=false&id=1525298577774

³³ Data collection and reporting templates for the SB 350 programs are available at www.cpuc.ca.gov/sb350te

³⁴ The 2018 ZEV Action Plan is available at <http://business.ca.gov/Portals/0/ZEV/2018-ZEV-Action-Plan-Priorities-Update.pdf>.



CPUC staff working on ZEV issues regularly interact with other CPUC teams to ensure ZEV policies are integrated into the CPUC's larger electricity sector planning frameworks and align with CPUC priorities for the transportation sector:

- Electric Rate Design
- Integrated Resource Planning
- Distribution Resource Planning
- Distributed Energy Resources Action Plan
- Transportation Network Companies (TNCs)
- Autonomous Vehicles
- Safety and Enforcement



Appendix A: Existing EV Rate Structures

PG&E Existing EV Rates (Residential)

EV-A

Residential

Whole-House: Must be eligible for E-1 and have a registered BEV or PHEV

On-Peak	Hour	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	2 p.m.	\$
	End	9 p.m.	0.47334
Part-Peak	Start	7 a.m.	\$
	End	2 p.m.	0.25994
Part-Peak	Start	9 p.m.	\$
	End	11 p.m.	0.25994
Off-Peak	Start	11 p.m.	\$
	End	7 a.m.	0.12753

Demand Charge: N/A

Customer Charge: N/A (Minimum bill amount: \$10/month)

Note: Weekend & holiday peak hours are 3 p.m. to 7 p.m., with off-peak all other hours.

EV-B

Residential

Separately metered - EV charging only

On-Peak	Hour	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	2 p.m.	\$
	End	9 p.m.	0.46665
Part-Peak	Start	7 a.m.	\$
	End	2 p.m.	0.25659
Part-Peak	Start	9 p.m.	\$
	End	11 p.m.	0.25659
Off-Peak	Start	11 p.m.	\$
	End	7 a.m.	0.12705

Demand Charge: N/A

Customer Charge: \$1.50/month

Note: Weekend & holiday peak hours are 3 p.m. to 7 p.m., with off-peak all other hours.



SCE Existing EV Rates

TOU-EV-3-A Rate Schedule

Commercial

EV-Only

On-Peak	Hour	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	0.36	0.16
	End	6:00PM	
Mid-Peak			
	8:00am-noon	0.17	0.14
	6:00pm-11:00pm		
Off-Peak			
	All other hours	0.09	0.10

Customer Charge (cents/day) 0.836

TOU-EV-3-B Rate Schedule

Commercial up to 20kW/month

EV-Only

On-Peak	Hour	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	0.33	0.12
	End	6:00PM	
Mid-Peak			
	8:00am-noon	0.14	0.11
	6:00pm-11:00pm		
Off-Peak			
	All other hours	0.06	0.07

Customer Charge (cents/day) 0.836

Demand Charge (\$/kW/month) \$7.23



SCE Existing EV Rates (continued)

TOU-EV-4 Rate Schedule

Commercial 20kW-500kW/month

EV-Only

On-Peak	Hour	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	Noon	0.29
	End	6:00PM	
Mid-Peak			
	8:00am-noon	0.12	0.09
	6:00pm-11:00pm		
Off-Peak			
	All other hours	0.05	0.06
Demand Charge (\$/kW/month)		\$13.20	
Customer Charge (\$/month)		\$198.79	

TOU-EV-1 Rate Schedule

Residential

EV-Only

On-Peak	Hour	(\$/kWh)
	Start	Noon
	End	9:00PM
Off-Peak		
	All other hours	0.13
Monthly Meter Charge (\$/month)		\$2.76



SDG&E's Existing EV Rates

EV-TOU						
Residential						
EV Only						
Rates effective as of 1/1/18 - AL 3167-E						
On-Peak		Hours - Weekday Summer	Hours - Weekday March/April	Hours - Weekend/Holiday	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	4:00pm	4:00pm	4:00pm	0.53781	0.24799
	End	9:00pm	9:00pm	9:00pm		
Peak						
	Start	N/A	N/A	N/A	N/A	N/A
	End	N/A	N/A	N/A		
Off-Peak						
	Start	6:00am; 9:00pm*	6:00am; 2:00m; 9:00pm*	2:00pm; 9:00pm*	0.2861	0.23893
	End	4:00pm; midnight*	10:00am; 4:00pm; midnight*	4:00pm; midnight*		
Super Off-Peak						
	Start	Midnight	Midnight; 10:00am*	Midnight	0.22801	0.22887
	End	6:00am	6:00am; 2:00pm*	2:00pm		

* SDG&E's TOU Periods includes multiple instances of the same TOU Period within a given day. As such, the start time of each such period is listed in the "Start" row, and the end time of each such period is listed in the "End" row.

EV-TOU-2						
Residential						
Whole-House						
Rates effective as of 1/1/18 - AL 3167-E						
On-Peak		Hours - Weekday Summer	Hours - Weekday March/April	Hours - Weekend/Holiday	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	4:00pm	4:00pm	4:00pm	0.53781	0.24799
	End	9:00pm	9:00pm	9:00pm		
Peak						
	Start	N/A	N/A	N/A	N/A	N/A
	End	N/A	N/A	N/A		
Off-Peak						
	Start	6:00am; 9:00pm*	6:00am; 2:00m; 9:00pm*	2:00pm; 9:00pm*	0.2861	0.23893
	End	4:00pm; midnight	10:00am; 4:00pm; midnight*	4:00pm; midnight*		
Super Off-Peak						
	Start	Midnight	Midnight; 10:00am*	Midnight	0.22801	0.22887
	End	6:00am	6:00am; 2:00pm*	2:00pm		

* SDG&E's TOU Periods includes multiple instances of the same TOU Period within a given day. As such, the start time of each such period is listed in the "Start" row, and the end time of each such period is listed in the "End" row.



EV-TOU-5					
Residential					
Whole-House					
On-Peak	Hours - Weekday Summer	Hours - Weekday March/April	Hours - Weekend/Holiday	Summer Prices (\$/kWh) ¹	Winter Prices (\$/kWh) ¹
Start	4:00pm	4:00pm	4:00pm	0.53019	0.24037
End	9:00pm	9:00pm	9:00pm		
Peak					
Start	N/A	N/A	N/A	N/A	N/A
End	N/A	N/A	N/A		
Off-Peak					
Start	6:00am; 9:00pm*	6:00am; 2:00m; 9:00pm*	2:00pm; 9:00pm*	0.27848	0.23131
End	4:00pm; midnight*	10:00am; 4:00pm; midnight*	4:00pm; midnight*		
Super Off-Peak					
Start	Midnight	Midnight; 10:00am*	Midnight	0.09317	0.09403
End	6:00am	6:00am; 2:00pm*	2:00pm		

Customer Charge: \$16.00

* SDG&E's TOU Periods includes multiple instances of the same TOU Period within a given day. As such, the start time of each such period is listed in the "Start" row, and the end time of each such period is listed in the "End" row.

¹ SDG&E's anticipates implementing its Schedule EV-TOU-5 on 7/1/18. SDG&E has filed its proposed rates in AL 3226-E.



Liberty Utilities Existing EV Rates (Residential)

TOU D-1 Time of Use Electric Vehicle Service

Residential Customers TOU Meters

Whole-House

On-Peak		Winter Hour	Summer Hour	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	5:01PM	10:01AM	0.13872	0.14215
	End	10:00PM	10:00PM		
Mid-Peak					
	Start	7:01AM			0.13839
	End	5:00PM			
Off-Peak					
	Start	10:01PM	10:01PM	0.08146	0.08146
	End	7:00AM	10:00AM		

Customer Charge (\$/month)

\$13.43

TOU D-1 Time of Use CARE Electric Vehicle Service

Residential CARE Customers TOU Meters

Whole-House

On-Peak		Winter Hour	Summer Hour	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	5:01PM	10:01AM	0.12068	0.1238
	End	10:00PM	10:00PM		
Mid-Peak					
	Start	7:01AM			0.10911
	End	5:00PM			
Off-Peak					
	Start	10:01PM	10:01PM	0.06357	0.06357
	End	7:00AM	10:00AM		

Customer Charge (\$/kW/month)

\$10.74



Liberty Utilities Existing EV Rates (Commercial)

TOU A-1 Time of Use Electric Vehicle Service
 Small General Service Customers TOU Meters
 Whole-Facility

On-Peak	Winter Hour	Summer Hour	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)	
	Start	5:01PM	10:01AM	0.14468	0.15911
	End	10:00PM	10:00PM		
Mid-Peak					
	Start	7:01AM		0.14468	
	End	5:00PM			
Off-Peak					
	Start	10:01PM	10:01PM	0.09359	0.09359
	End	7:00AM	10:00AM		

Customer Charge (\$/kW/month) \$20.21

A-3 Time of Use Electric Vehicle Service - Buses
 Large General Service Customers TOU Meters - Buses/Stations
 Bus Fleet Charging Stations

On-Peak	Winter Hour	Summer Hour	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)	
	Start	5:01PM	10:01AM	0.07306	0.06907
	End	10:00PM	10:00PM		
Mid-Peak					
	Start	7:01AM		0.06813	
	End	5:00PM			
Off-Peak					
	Start	10:01PM	10:01PM	0.05523	0.05445
	End	7:00AM	10:00AM		

Demand Charge (\$/kW/month)

On-Peak	\$13.12	\$7.95
Mid-Peak		\$2.99

Customer Charge (\$/month)	\$455.59	
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SCE Recently-Approved Commercial EV-TOU Rates (Illustrative)

TOU-EV-8

Large Power with Monthly Max Demand between 21 - 500 kW

EV-Only

TOU Period		2019-2023 <u>All Energy Rate</u> <u>Year 5</u>	2024 Year 6	2025 Year 7	2026 Year 8	2027 Year 9	2028 Year 10	2029+ <u>Full FRD Rate</u> <u>Year 11</u>
Summer On - \$/kWh	4-9pm weekdays	\$0.41816	\$0.41131	\$0.40447	\$0.39762	\$0.39077	\$0.38393	\$0.25882
Summer Mid - \$/kWh	4-9pm weekends	\$0.27718	\$0.27034	\$0.26349	\$0.25664	\$0.24980	\$0.24295	\$0.20051
Summer Off - \$/kWh	All except 4-9pm all days	\$0.12550	\$0.11866	\$0.11181	\$0.10496	\$0.09812	\$0.09127	\$0.10135
Winter Mid - \$/kWh	4-9pm all days	\$0.27801	\$0.27116	\$0.26432	\$0.25747	\$0.25062	\$0.24378	\$0.20134
Winter Off - \$/kWh	9pm-8am all days	\$0.13206	\$0.12522	\$0.11837	\$0.11152	\$0.10467	\$0.09783	\$0.11078
Winter Super-Off- \$/kWh	8am-4pm all days	\$0.08133	\$0.07448	\$0.06764	\$0.06079	\$0.05394	\$0.04710	\$0.05837
Customer Charge (\$/Month)		\$106.75	\$106.75	\$106.75	\$106.75	\$106.75	\$106.75	\$106.75
FRD (\$/kW)		\$0.00	\$1.99	\$3.99	\$5.98	\$7.97	\$9.97	\$11.96
% of Final FRD		0	16.67%	33.33%	50.00%	66.67%	83.33%	100.00%
FRD % Increase By Year			16.67%	16.67%	16.67%	16.67%	16.67%	16.67%

Illustrative rates as proposed in SCE's Electric Transportation (TE) Application (A.17-01-021) for implementation in early 2019

Rate levels reflect Jan. 1, 2017 revenue requirement and current 2015 GRC Phase 2 revenue allocations

NOTES:

Yr1 – Yr5: Energy only; No Demand Charges

Yr6 – Yr10: Phase-in Demand Charges

Yr11+: Return to Energy and Demand Charges (The distribution grid component after the 10-yr period will reflect only 60%, rather than 100%, of distribution costs, with the balance of distribution costs recovered through energy charges.



Bear Valley Electric Service Pilot TOU-EV Rates Authorized in D.18-09-034

TOU-EV-1

Residential

On-Peak	Hours (Summer)	Hours (Winter)	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	4:00 p.m.	\$0.18149	\$0.31446
	End	9:59 p.m.		
Off-Peak	Hours (Summer)	Hours (Winter)	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	10:00 p.m.	\$0.13612	\$0.12704
	End	8:59 a.m.		
Super Off-Peak	Hours (Summer)	Hours (Winter)	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	9:00 a.m.	\$0.09074	\$0.09074
	End	3:59 p.m.		

TOU-EV-2

Commercial Customers < 20 kW

On-Peak	Hours (Summer)	Hours (Winter)	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	4:00 p.m.	\$0.18149	\$0.31446
	End	9:59 p.m.		
Off-Peak	Hours (Summer)	Hours (Winter)	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	10:00 p.m.	\$0.13612	\$0.12704
	End	8:59 a.m.		
Super Off-Peak	Hours (Summer)	Hours (Winter)	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	9:00 a.m.	\$0.09074	\$0.09074
	End	3:59 p.m.		



TOU-EV-3

Commercial customers 20 kW - 500 kW

On-Peak	Hours (Summer)	Hours (Winter)	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	4:00 p.m.	\$0.18149	\$0.31446
	End	9:59 p.m.		
Off-Peak	Hours (Summer)	Hours (Winter)	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	10:00 p.m.	\$0.13612	\$0.12704
	End	8:59 a.m.		
Super Off-Peak	Hours (Summer)	Hours (Winter)	Summer Prices (\$/kWh)	Winter Prices (\$/kWh)
	Start	9:00 a.m.	\$0.09074	\$0.09074
	End	3:59 p.m.		

Demand Charge*: \$9.00 per kWh per meter per month for customers with a kW demand >50kW/month



Appendix B. IOUs' Light-Duty Infrastructure Programs and Status

	SDG&E Power Your Drive	SCE Charge Ready	PG&E EV Charge Network
Program Status	932 charging stations installed at 85 sites as of September 2018	1,266 charging station installed as of August 2018; \$22M in additional funding authorized in D.18-12-006	322 charging stations installed at 23 sites as of November 30, 2018
Scope	3,500 charging stations	1,500 charging stations, with another 1,000 authorized in 2018	7,500 charging stations
Budget	\$45M	\$44M	\$130M
Markets	multifamily, workplace	multifamily, workplace, public	multifamily, workplace
Disadvantaged Communities	≥10% charging stations in disadvantaged communities	≥10% charging stations in disadvantaged communities	≥15% charging stations in disadvantaged communities
Charger Ownership	SDG&E	Site host	Site host. PG&E ownership allowed only in multifamily or disadvantaged community up to 35%
Cost to host	Participant Payment	Rebate	Participant Payment or Rebate
Rates	Vehicle-grid integration rate to driver or host	Time-of-use rate to host	Time-of-use rate to driver or host
Regulatory Status	Approved Jan 2016 (CPUC Decision 16-01-045)	Approved Jan 2016 (CPUC Decision 16-01-023)	Approved Dec 2016 (CPUC Decision 16-12-065)



Appendix C. Current CPUC Transportation Electrification Proceedings

Proceeding #	IOU	Short Title	Requested Budget
A.18-01-012	SDG&E	Medium/Heavy-Duty Infrastructure Proposal (PD scheduled for Q1 2019)	\$115M
A.18-06-015	SCE	Charge Ready Phase 2 Proposal (PD scheduled for Q3 2019)	\$760.1M
A.18-07-020+	PG&E, SCE, SDG&E, Liberty	Pilot programs at schools at state parks and state beaches under AB 1082/1083 (PD scheduled for Q1 2019)	\$54.5M
A.18-07-021	PG&E	Empower EV Charge Network (PD scheduled for Q2 2019)	\$4.13M
A.18-11-003	PG&E	Commercial EV Charging Rate (PHC scheduled for Jan 22, 2019)	
R.18-12-006	N/A	OIR To Continue the Development of Rates and Infrastructure for Vehicle Electrification	
A.17-01-020, et al.	PG&E SCE SDG&E	SB 350 Programs – D.18-05-040 reopened on a PFM	