



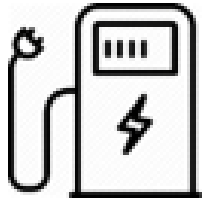
# CALIFORNIA PUBLIC UTILITIES COMMISSION TRANSPORTATION ELECTRIFICATION ACTIVITIES

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## Transportation Electrification Programs Overview

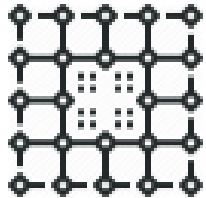


# The CPUC oversees the role energy providers serve in meeting CA's Transportation Electrification (TE) goals



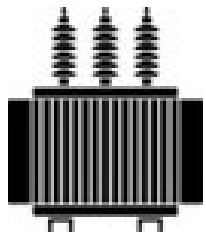
## Fuel Providers

Design rates that ensure electricity is a lower-cost option than conventional fuels  
Provide increasingly clean electricity with higher renewable generation procurements



## Grid managers

Ensure additional load from electric vehicles (EV) is integrated in a manner that provides grid benefits  
Encourage charging behavior that supports the integration of renewable energy onto the grid



## Infrastructure providers

Manage and build out distribution and transmission systems  
Ensure sites are ready for customers to install charging infrastructure and provide some support for EV service equipment (EVSE) installation



# CPUC TE programs implement legislative mandates

Bill	Sponsor	Year	Short Description
<b>AB 32</b>	Nunez	2006	California Global Warming Solutions Act
<b>SB 626</b>	Kehoe	2009	Plug-in Hybrid and Electric Vehicle Fueling Infrastructure
<b>SB 350</b>	De León	2015	Clean Energy and Pollution Reduction Act of 2015
<b>AB 1082</b>	Burke	2017	Electric vehicle charging infrastructure: school facilities and other educational institutions
<b>AB 1083</b>	Burke	2017	Electric vehicle charging infrastructure: state parks and beaches
<b>SB 1014</b>	Skinner	2018	California Clean Miles Standard and Incentive Program: zero-emission vehicles
<b>SB 1000</b>	Lara	2018	Electric vehicle charging infrastructure
<b>AB 2127</b>	Ting	2018	Electric vehicle charging infrastructure: assessment



# IOU TE infrastructure programs focus on increasing access to charging stations

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- ~\$1 billion in authorized IOU TE infrastructure spending through 2023
  - ~13,500 light-duty charge ports at workplaces and apartment buildings (SCE, PG&E, and SDG&E)
  - Medium- and heavy-duty infrastructure programs required to electrify ~15,000 vehicles (SCE and PG&E)
  - Public DC fast charging program to provide up to 234 new fast-charging ports (PG&E)
  - Pilot programs designed to address identified barriers to ZEV adoption (all 6 IOUs)
- ~\$1 billion in pending IOU TE infrastructure spending proposals under CPUC review
  - Program to electrify between 3,000 and 6,000 MD/HD vehicles (SDG&E)
  - Extension of SCE's light-duty program to provide another ~48,000 charge ports (SCE)
  - Pilot programs to install light-duty infrastructure at schools and state parks and beaches (SCE, PG&E, SDG&E, and Liberty Utilities)
  - Pilot to install infrastructure at low- and moderate income residences (PG&E)

# Light-Duty Vehicle Infrastructure Pilot Programs test different IOU ownership models

	<b>SDG&amp;E</b> <a href="#">Power Your Drive</a>	<b>SCE</b> <a href="#">Charge Ready</a>	<b>PG&amp;E</b> <a href="#">EV Charge Network</a>
<b>Program Status</b>	3,040 charging stations installed at 260 sites expected by March 2019; ~\$73 million in expected expenditures	1,063 charging station installed at 71 sites as of December 2018	322 charging stations installed at 23 sites as of November 30, 2018
<b>Scope</b>	3,500 charging stations at 300 sites	1,500 charging stations, with another 1,000 authorized in 2018	7,500 charging stations
<b>Budget</b>	\$45M	\$44M total after \$22M in additional funding authorized in D.18-12-006	\$130M
<b>Markets</b>	multifamily, workplace	multifamily, workplace, public	multifamily, workplace
<b>Disadvantaged Communities</b>	39% of installed sites in DACs, well above the 10% minimum adopted in D.16-01-045	~48% of projects in DACs, well above the 10% minimum adopted in D.16-01-023	≥15% charging stations in disadvantaged communities
<b>Charger Ownership</b>	SDG&E	Site host	Site host. PG&E ownership allowed only in multifamily or disadvantaged community up to 35% of total sites
<b>Cost to host</b>	Participant Payment at sites not in DACs	Rebate	Participant Payment or Rebate
<b>Rates</b>	Vehicle-grid integration rate to driver or host	Time-of-use rate to host	Time-of-use rate to driver or host
<b>Regulatory Status</b>	Approved Jan 2016 (CPUC Decision <a href="#">16-01-045</a> )	Approved Jan 2016 (CPUC Decision <a href="#">16-01-023</a> )	Approved Dec 2016 (CPUC Decision <a href="#">16-12-065</a> )



# NRG Settlement funds nearing exhaustion

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- California entered into a settlement with NRG in 2012 to settle outstanding claims from the 2001 Energy Crisis
- NRG committed to spend \$102.5 million on EV charging infrastructure
  - \$50.5M for DC fast charging stations (200 site minimum)
  - \$27.5M for make-ready infrastructure (6,875 port minimum)
  - \$12.5M for 10 DC fast charging plazas to serve residents of multi-unit dwellings
  - \$5M for technology R&D pilots (three pilots deployed)
  - \$4M for programs for underserved communities (two projects deployed)
- Extension on settlement expenditures approved November 2018 to fully exhaust funds and install additional charging infrastructure



# SB 350 programs currently under implementation

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- ~\$45 million in pilot programs addressing specific barriers in transportation electrification
  - Port electrification
  - Truck idle reduction efforts
  - Commuter lots/ encouraging use of mass-transit hubs
  - Urban DC fast charging plazas targeting apartment dwellers
- \$22.5 million to install DC fast charging stations along transit corridors
- \$579 million to install infrastructure to support medium- and heavy-duty vehicle electrification



# IOUs' participation in CARB's Low Carbon Fuel Standard

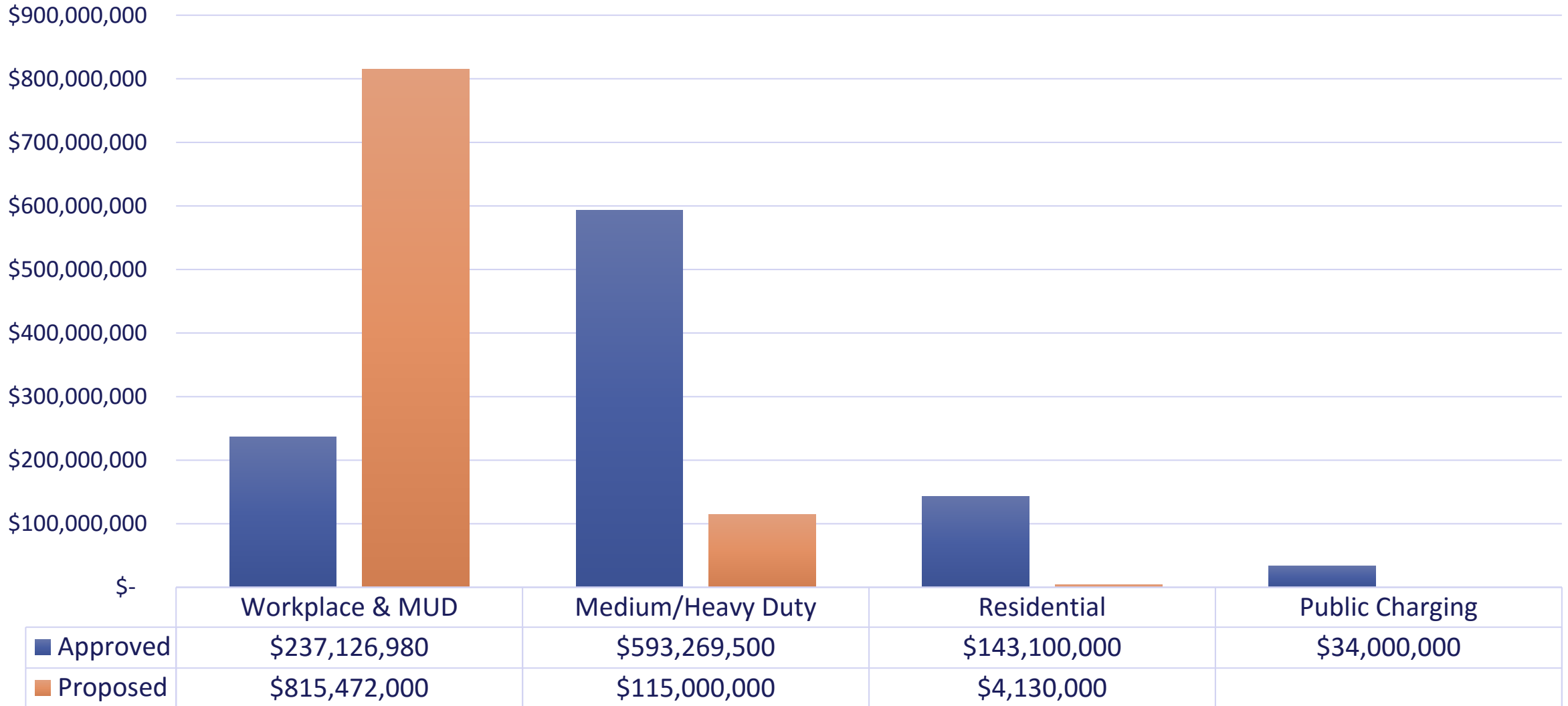
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- The IOUs (electric and natural gas) receive LCFS credits from CARB on behalf of their customers for low carbon-intensive fuel used for transportation (CNG vehicles and EVs)
- **Current programs:** the IOUs provide customers either a bill credit or a rebate
- **Future programs:**
  - **Statewide** – Recent CARB regulation changes directed the establishment of a statewide point-of-purchase rebate program, funded in part by 67% of the IOUs LCFS credits
  - **IOUs** – the remaining 33% of the IOUs' LCFS credits can fund other programs, as directed and approved by the CPUC





# IOU TE infrastructure investments approved and proposed



Note: SDG&E has declined to implement its Residential Charging Program authorized in D.18-05-040 which represents about \$137 million of the “approved” residential amount



# Open Transportation Electrification proceedings

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## **Reopening of SB 350 decision (D.18-05-040) via PFM (A.17-01-020)**

- SB 350 program proceeding, which Cal Advocates reopened via PFM to address cost allocation

## **SDG&E MD/HD Program (A.18-01-012)**

- A medium- and heavy-duty EV infrastructure program

## **SCE Charge Ready Phase 2 (A.18-06-015)**

- Expansion of SCE's Charge Ready program

## **AB 1082/1083 (A.18-07-020 et al.)**

- Pilot programs pursuant to 2017 legislation to install EV charging infrastructure at state beaches and parks and schools

## **PG&E Empower EV Charge Network (A.18-07-021)**

- Pilot to install EV charging infrastructure at low-and moderate-income customers' homes

## **PG&E Commercial EV Rate (A.18-11-003)**

- A new commercial EV rate to address unique challenges of fueling EVs

## **DRIVE OIR (R.18-12-006)**



# CPUC initiated a new rulemaking to provide clear guidance for future IOU TE investment programs

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- DRIVE OIR ([R.18-12-006](#)) directs the CPUC to identify a clear “role” for IOUs in meeting statewide TE goals
  - To be informed in part by AB 2127 needs assessment and statewide ZEV adoption, GHG, and air quality targets
  - Improve access to charging for all ratepayers
  - Align investments across state and local agencies
  - Design programs that encourage third-party investments
  - Explore emerging issues such as micromobility, car- and ride-sharing services, and autonomous vehicles
- CPUC Energy Division to propose Transportation Electrification Framework that guides future IOU investments
  - Prioritize program types needed to meet state goals
  - Streamline and expedite application review process
- New utility TE applications will continue to be processed under existing regulatory authority while the new framework is under development



# New rate designs to encourage low-cost EV fueling

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- Each of the IOUs offer optional EV rates for residential customers
  - Rates can be applied to EV-only load or a customer's whole-house load
  - Simple TOU-based rates
- SCE Commercial EV rate approved in May 2018 (D.18-05-040)
  - Energy-only volumetric rates in years 1-5
  - Demand charges phased back in during years 6-10
  - Anticipated to be available for enrollment starting March 2019
- SDG&E Vehicle-Grid Integration rate for commercial customers
  - Applies to customers participating in SDG&E's Power Your Drive light-duty vehicle infrastructure program
  - Hourly day-ahead energy pricing
  - Adders for grid-constrained hours system-wide and distribution-level
- PG&E's proposed Commercial EV rate class (A.18-11-003)
  - Subscription-based rate with time-variant volumetric energy rates
  - Subscription considered more consistent than demand charges



## Initial reporting results confirm some rate design success to shift charging from peak demand periods

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- IOU Load Research Reports show residential customers enrolled in EV-TOU rates avoid on-peak hours for EV charging
- SCE's Charge Ready demand-response program initial results suggest commercial EV charging load can be shifted to absorb midday excess renewable generation that may otherwise be curtailed
- SDG&E's dynamic, hourly VGI rate suggest customers at commercial sites reduce charging during system and circuit peak hours to avoid high cost fueling
  - SDG&E estimates more than 85% of fueling at its Power Your Drive charging stations occurs during off-peak hours
  - Average rate for fueling as of late 2018 was \$0.21/kWh compared to a system average cost of \$0.24/kWh



# Vehicle-Grid Integration is an interagency effort

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- California VGI Roadmap
  - Currently being updated by the CEC, in collaboration with CARB, CPUC, CAISO, and GO-Biz
- 2017 VGI Communication Protocols Working Group
  - Staff recommended hardware requirements to ensure infrastructure is capable of high-level communication
- New interagency VGI working group directed in DRIVE OIR
  - Directed to focus on identifying strategies to realize and capture the value of VGI use cases
  - Will consider VGI within the context of other available DER resources and use cases
- Plug-in Electric Vehicle Submetering Pilot
  - Workshop scheduled for 6/24 at the CPUC to discuss the pilot and next steps for submetering



# Energy Division TE Team

Sara Kamins	Supervisor, Transportation Electrification
Josh Huneycutt	EV Empower PG&E Commercial Rate
Audrey Neuman	Light-duty EV infrastructure pilots LCFS NRG Settlement
Carrie Sisto	SB 350 VGI
Michael Truax	AB 1082/1083 Submetering