HYDROGEN ECONOMY CONFERENCE

COMMISSIONER CLIFF RECHTSCHAFFEN

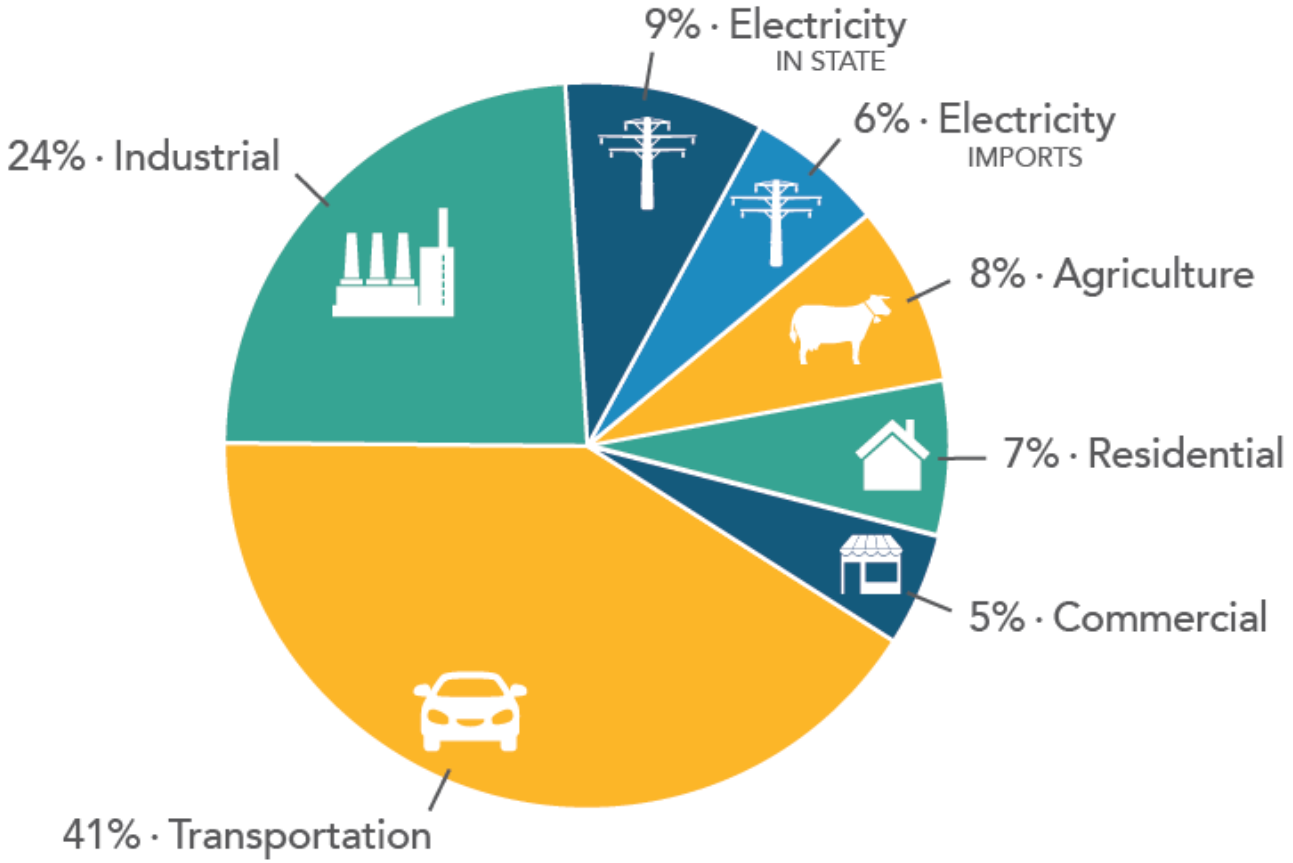
CALIFORNIA PUBLIC UTILITIES COMMISSION

MAY 13, 2020

CONTEXT SETTING: STATE GOALS

Climate	• 2045: 100% zero carbon electricity • 2045: Carbon neutral economy
Air Quality	• 2031: 80 percent reduction in smog-forming NOx
Zero Emission Vehicles (ZEVs)	• 2025: 1.5 million ZEVs • 2030: 5 million ZEVs
ZEV infrastructure	• 2025: 250,000 electric vehicle chargers & 200 hydrogen stations

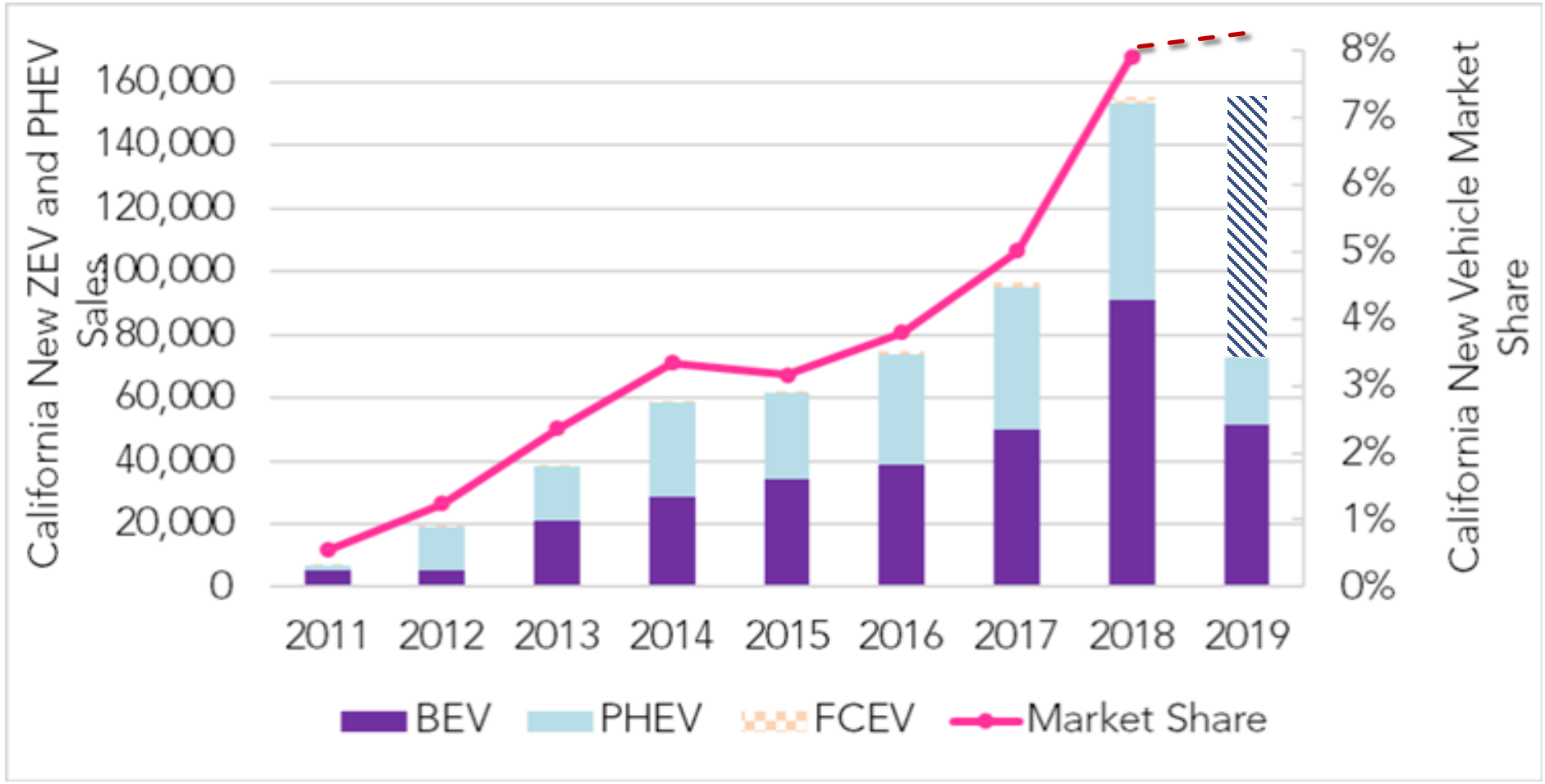
GHG EMISSIONS BY SECTOR



424.1 $MMTCO_2e$
2017 TOTAL CA EMISSIONS

Source: 2019 Edition, California Greenhouse Gas Emission Inventory: 2000-2017

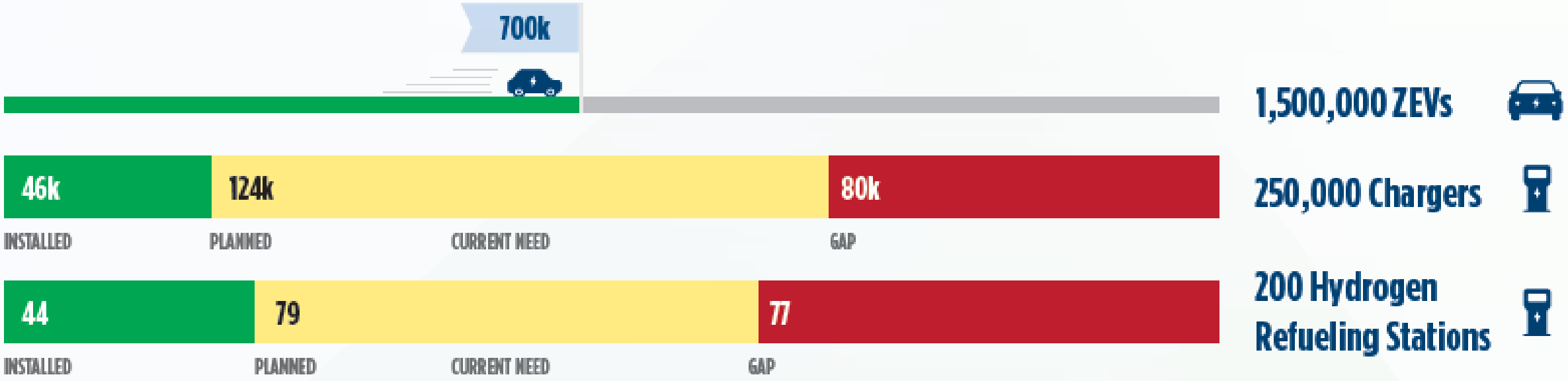
ZEVS GAINING MOMENTUM AND MARKET SHARE
(PRE-COVID DATA)



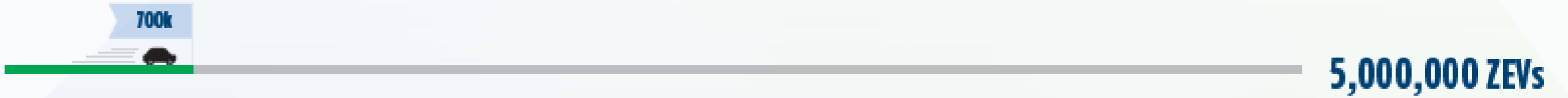
Note: 2019 figures reflect actual sales for January – June and estimates for the remainder of the year

PROGRESS TOWARD ZEV GOALS

PROGRESS TO 2025 GOAL



PROGRESS TO 2030 GOAL: 5,000,000 ZEVs

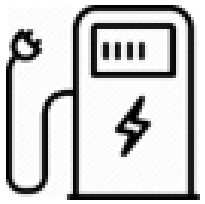


SIGNIFICANCE OF MEDIUM AND HEAVY-DUTY SECTORS

- MD/HD vehicles are 3% of CA's vehicles
  - 70% of state's on-road NOx emissions; 45% of on-road PM emissions
  - 21% of on-road GHG emissions
- Programs designed specifically for MD/HD sector

CPUC AREAS OF FOCUS

Transportation Electrification

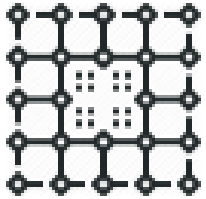


Rate Design

-- Designing rates for various use cases

-- Make charging cheaper than gas

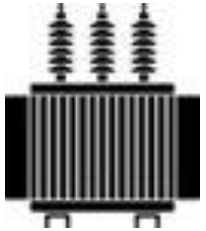
-- Considering a hydrogen rate



Grid Management

-- Locating EV charging in areas with extra capacity

-- Incentivizing charging at right times via price signals



Infrastructure

Promoting IOU investment in infrastructure

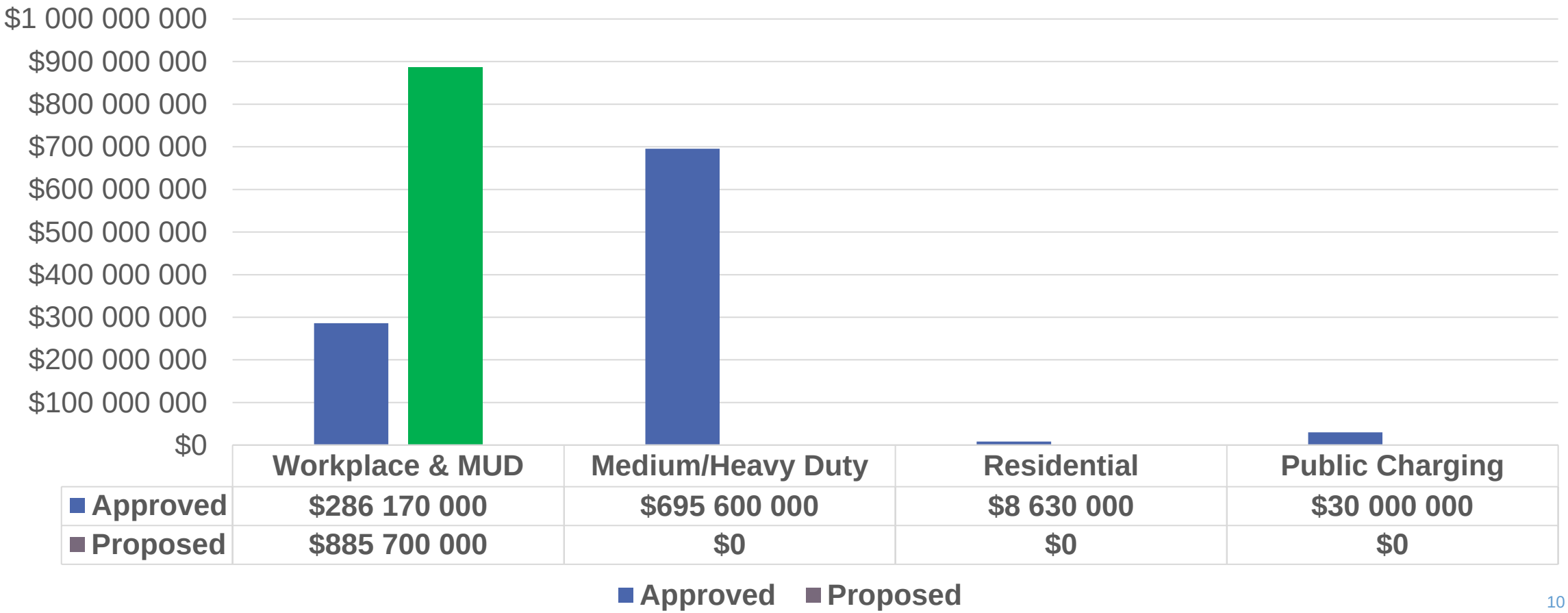
TRANSPORTATION ELECTRIFICATION FRAMEWORK

- Overarching guidance on TE investment priority areas
  - addressing market adoption barriers
  - fostering competition
  - considering equity impacts

OFF PEAK EV CHARGING: CHEAPER THAN GAS

IOU Territory	PG&E/SCE	SDG&E
Off-peak residential EV charging rate ($/kWh)	$ 0.13	$ 0.24
EV fueling is roughly equivalent to ($/gal)	$ 1.12	$ 2.07
% difference to charge EV than to fuel with gas	-72%	-48%
Total monthly EV fueling cost	$ 45.50	$ 84.00
Total monthly gasoline fueling cost	$ 162.34	$162.34

IOU INVESTMENTS IN EV CHARGING INFRASTRUCTURE

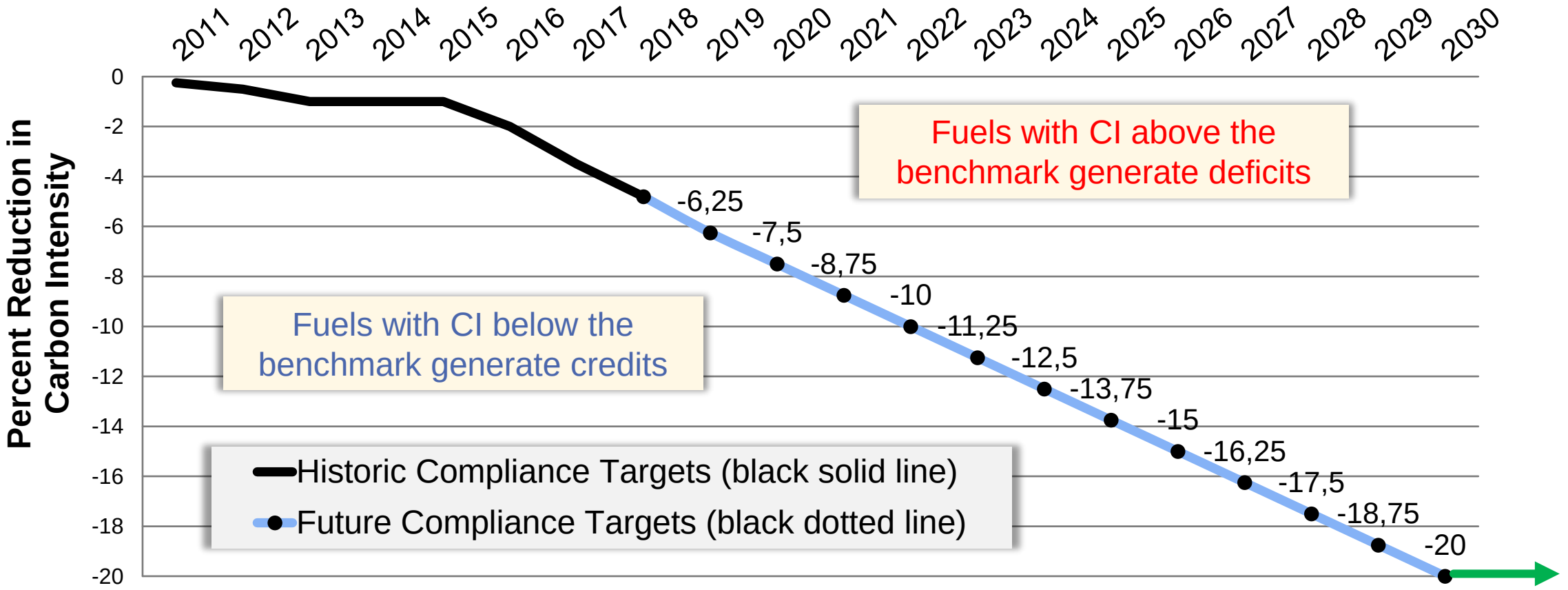


	Workplace & MUD	Medium/Heavy Duty	Residential	Public Charging
Approved	$286 170 000	$695 600 000	$8 630 000	$30 000 000
Proposed	$885 700 000	$0	$0	$0

CARB REGULATIONS

ZEV Regulation for Passenger Vehiciles	• Requires car manuf to sell increasing share of ZEVs • ~8% of new vehicle sales in CA in 2025
Clean Transit Regulation	• 2029: 100 percent of new buses will be zero-emission • 2040: 100 percent of operating buses will be zero-emission
Advanced Clean Trucks	• *Still under development* • Require truck manufacturers to sell increasing share of zero emission trucks from 2024 to 2030. • 2030: 50% of sales for Class 4-8 straight trucks; 15% for all other trucks
Low Carbon Fuel Standard (LCFS)	• Sets carbon intensity standard for fuels

AGGRESSIVE LCFS TARGETS THROUGH 2030 (AND BEYOND)



CARB'S HYDROGEN REFUELING INFRASTRUCTURE PROGRAM

- Amended LCFS regulation introduced the Hydrogen Refueling Infrastructure (HRI) Program, effective January 2019.
  - Station owner participants can receive LCFS credits for both dispensed hydrogen and unused capacity.
  - Reduces financial risk of station development and operation → allowing the Clean Transportation Program to reduce funding per station and fund more stations.
  - Encourages dispensing renewable hydrogen to obtain more credits.
- 48 stations approved to participate:
  - 26 open retail and 22 under development.

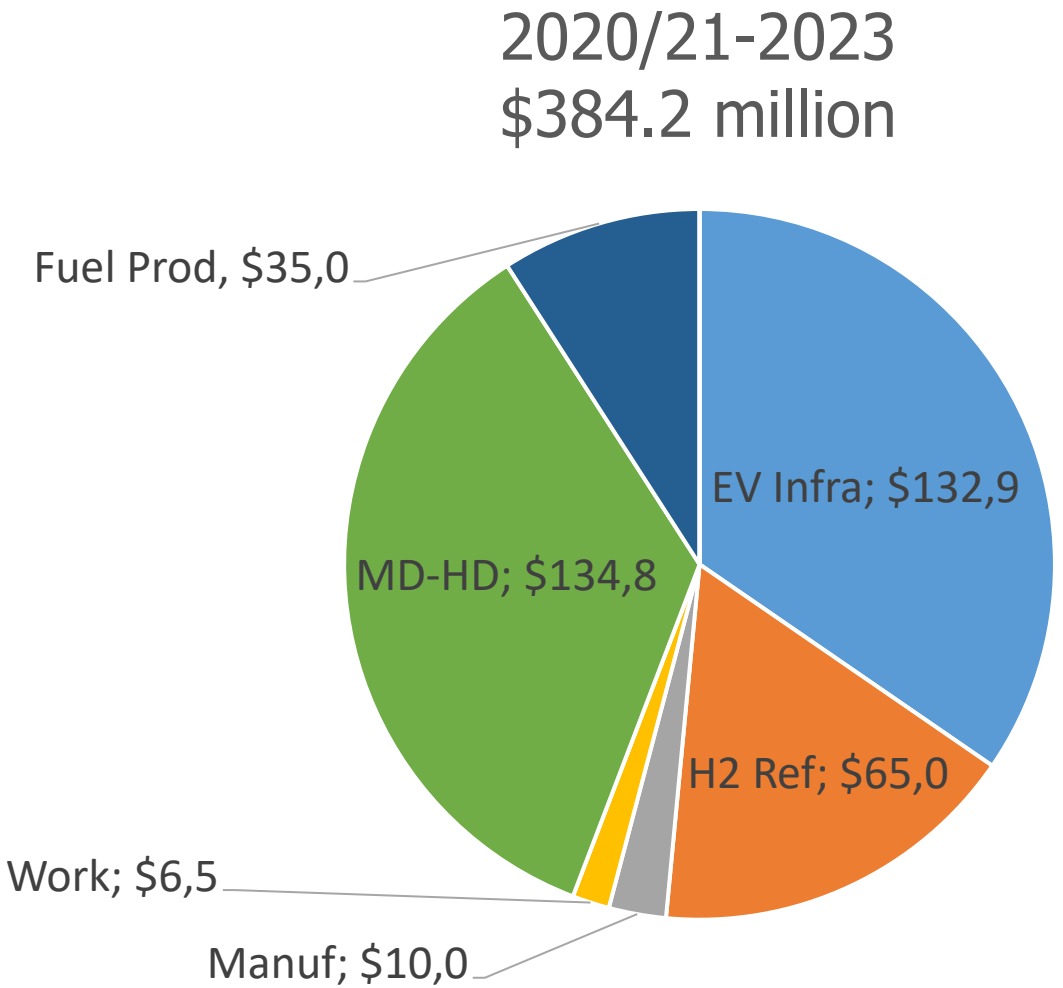
CARB CLEAN VEHICLE INCENTIVE PROGRAMS

CALIFORNIA
CLEAN VEHICLE
REBATE PROJECT℠

CALIFORNIA
HVIP

clean vehicle
assistance program

CEC PROPOSED CLEAN TRANSPORTATION INVESTMENT PLAN (2020-23)



Source: CEC

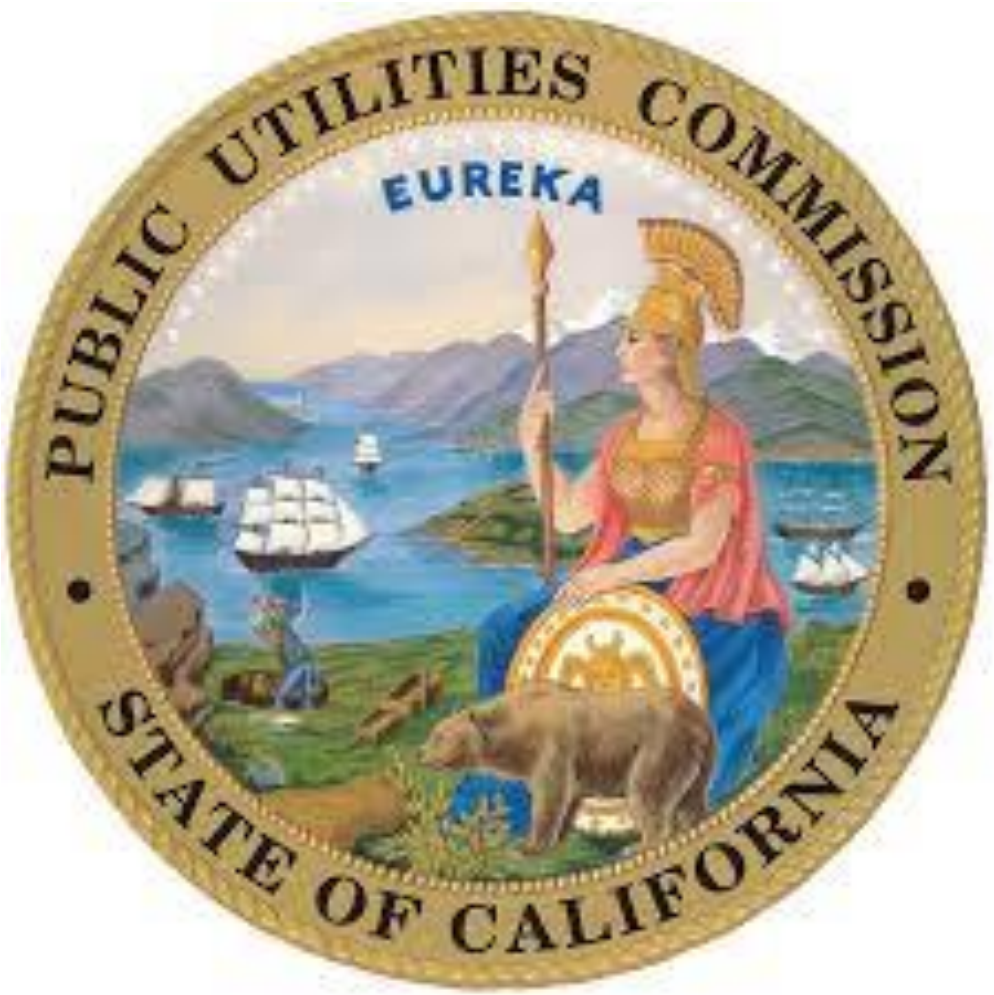
FUEL CELL VEHICLES – BY THE NUMBERS

FCEVs—Fuel cell cars sold and leased in US	**8,285**
FCEBs—Fuel cell buses in operation	**42**
Retail hydrogen stations open in California	**41**
Fuel cell buses in development in California	**7**
Fuel cell shuttles in development in California	**4**
Retail hydrogen stations in development in California	**18**

Source: California Fuel Cell Partnership, April 2020

CEC INVESTMENTS PROMOTING FCEVS

- $20 million/year to hit target of 100 hydrogen refueling stations (AB 8)
- Investment of ~$120M since 2010 to fund hydrogen refueling stations
- $115.7 million in grants for hydrogen refueling infrastructure projects



THANK YOU

FOR MORE INFORMATION
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