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California Energy Commission

Advisory Committee Meeting for the Clean Transportation Program

2020-2023 Investment Plan

Meeting Agenda

- Opening remarks and Advisory Committee introductions
- Staff Presentation and Advisory Committee Discussion on Clean Transportation Program Overview and draft funding allocations
- Staff Presentations and Advisory Committee Discussion on Clean Transportation Program Funding Areas
- Public Comment

Purpose of the Clean Transportation Program (according to state law)

Provides approximately $95 M of funding per year through the end of 2023

“…to develop and deploy innovative technologies that transform California’s fuel and vehicle types to help attain the state’s climate change policies.”

Complementary goals:

- Improve air quality
- Investments in low-income and disadvantaged communities
- Promote economic development
- Increase alternative fuel use
- Reduce petroleum dependence

Purpose of the Investment Plan

- Determines how annual funds will be allocated across different categories, including infrastructure, fuels, technologies, and supporting elements (like workforce development)
- Takes into consideration state regulations and other funding programs to ensure coordination across state agencies
- Helps the state meet its clean transportation goals (as expressed in legislation and executive orders)
- Integrate feedback from the Advisory Committee & public

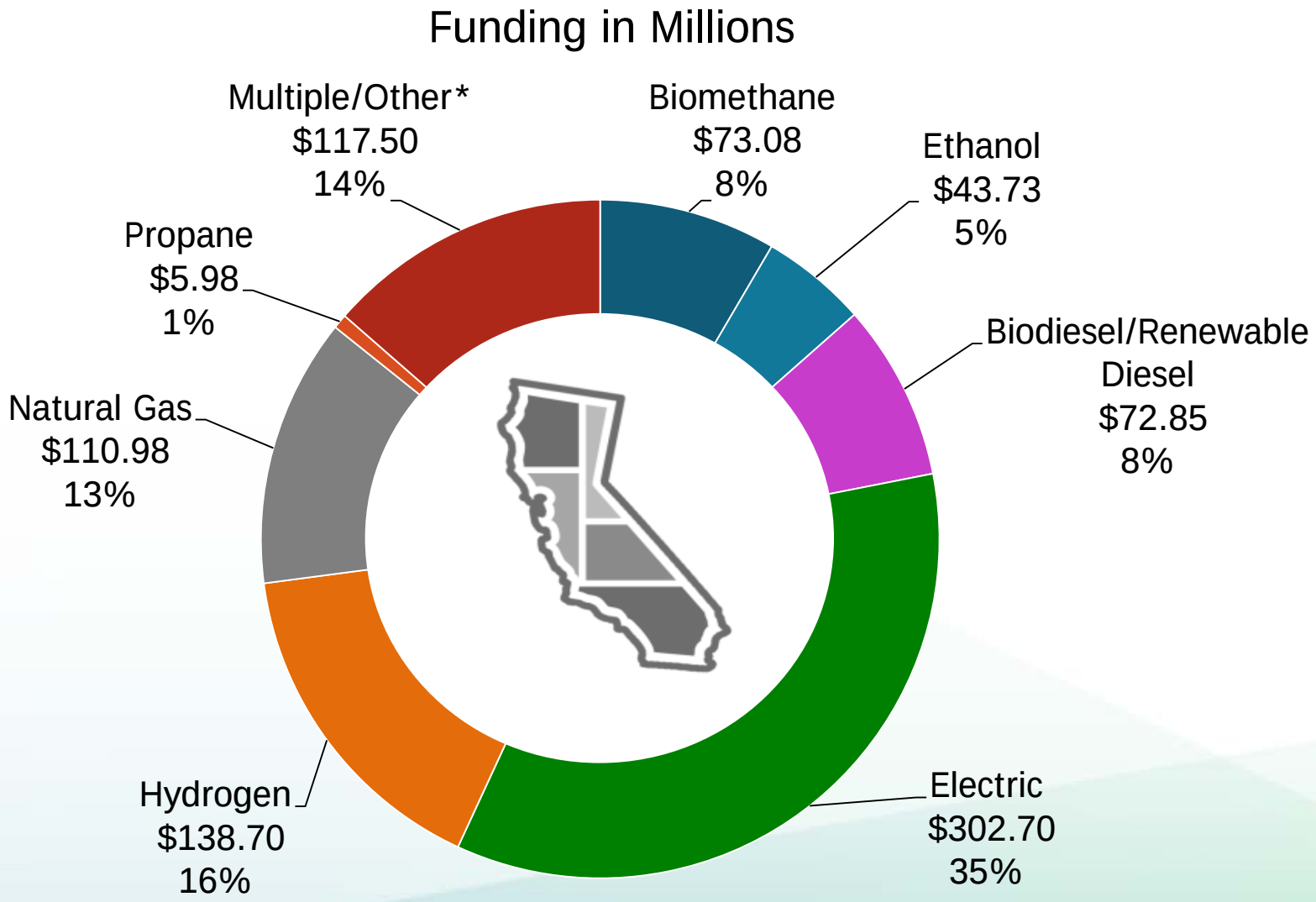
New to the 2020-2023 Investment Plan

- New Advisory Committee
- Multiyear funding projections (3½ FYs)
  - Conveys long-term & transformative goals
  - Conveys funding certainty
  - Provides transparency
- More concise document

2020-2023 Investment Plan Schedule and Next Steps

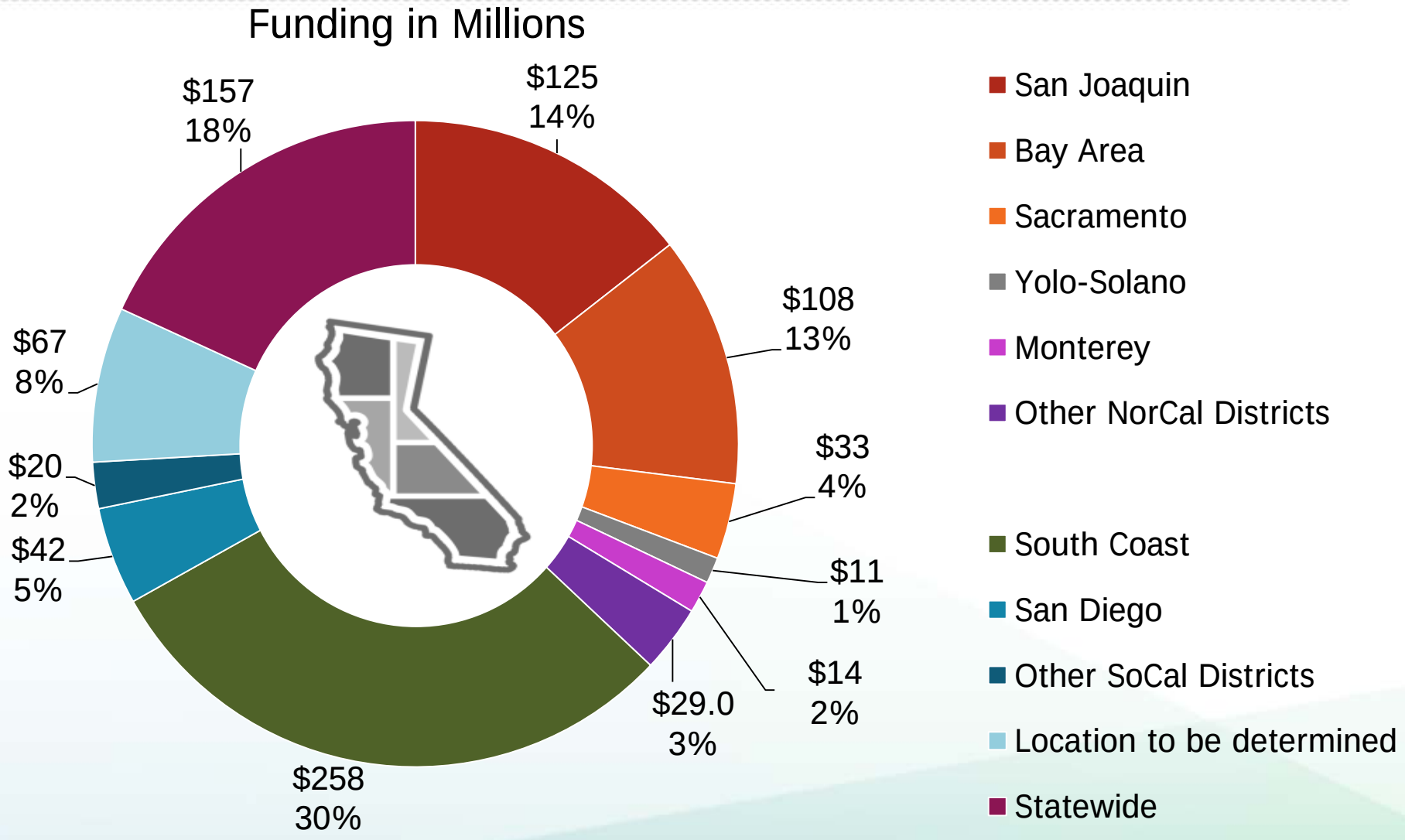
Milestones	Scheduled Date
Release Draft Staff Report	March 2, 2020
1st Advisory Committee Meeting	March 3, 2020
Release Lead Commissioner Report	April 2020
2nd Advisory Committee Meeting	May 2020
Business Meeting Approval	June 2020

Clean Transportation Program Funding To-Date



Note: As of December 1, 2019

Funding by Geography (Air Districts)



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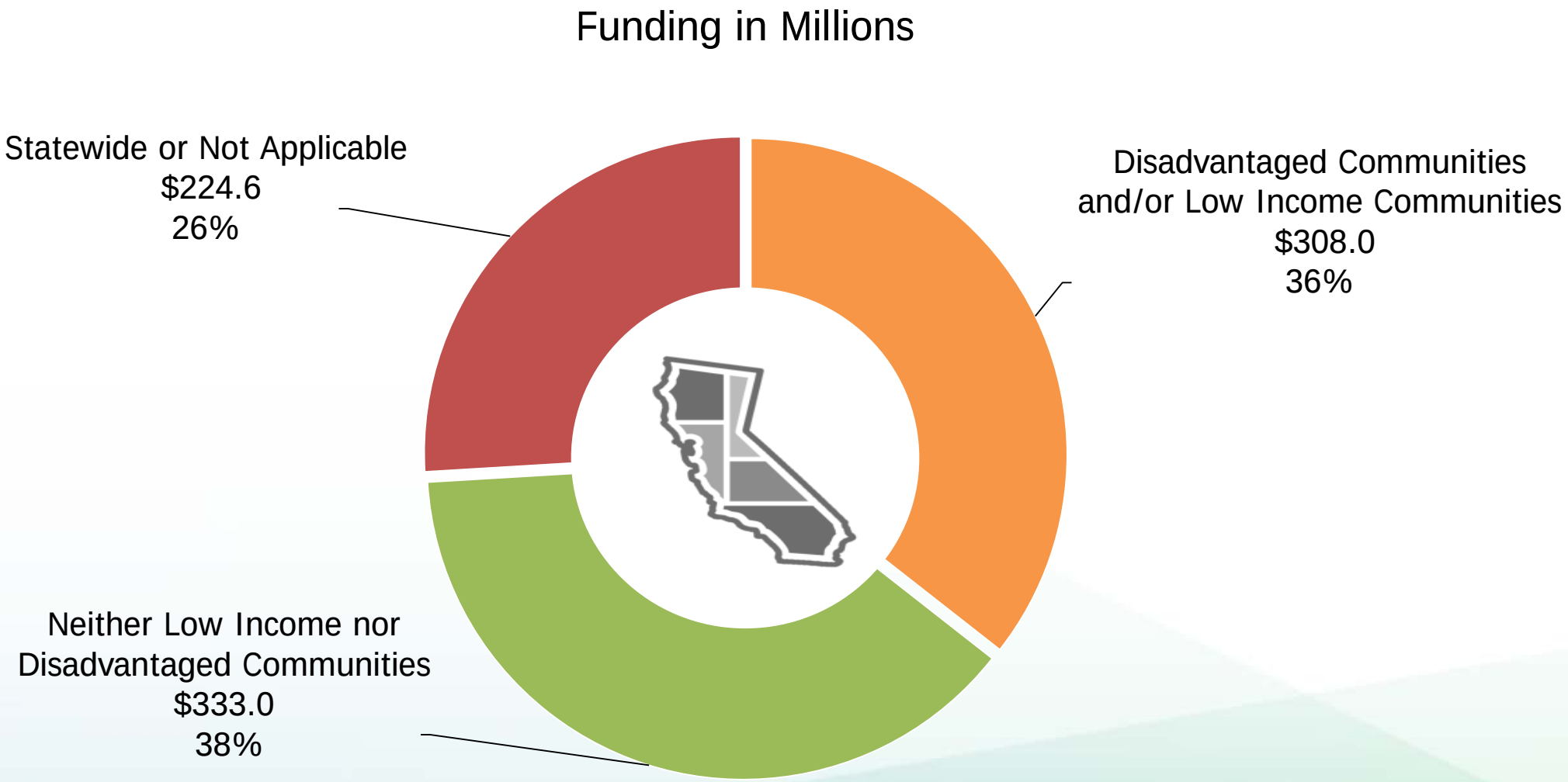
Clean Transportation Program Funding Toward Disadvantaged and/or Low-Income Communities



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Context Setting: State Goals

Legislation & Executive Orders are steering the state towards near- and zero-emission transportation

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

Context Setting: Vehicle and Fuel Regulations

Regulations by the California Air Resources Board that advance near- and zero-emission fuels & transportation

ZEV Regulation for Passenger Vehicles	• Requires automakers to generate or procure credits for plug-in hybrid, battery, and fuel cell electric vehicles
Innovative Clean Transit Regulation	• 2029: 100 percent of <u>new</u> buses will be zero-emission • 2040: 100 percent of <u>operating</u> buses will be zero-emission
Advanced Clean Trucks	• *Still under development* • Would require manufacturers to generate or procure ZEV credits, beginning in 2024 and increasing through 2030
Low Carbon Fuel Standard	• Sets carbon intensity standard for fuels • Producers of low-carbon fuel can produce and sell credits • New high credit price: $200 / Metric Ton CO_2e (January 2020)

Context Setting: Other Funding Programs

Air Resources Board spends $500M annually for clean vehicles; Utilities/others investing in electric vehicle (EV) charging infrastructure

Low-Carbon Transportation Grants by Air Resources Board	**$533 million in FY19-20, focusing on ZEVs** • $238 million for the Clean Vehicle Rebate Project (CVRP) • $182 million for clean trucks, buses and off-road freight (HVIP + CORE) • $65 million for Clean Transportation Equity Projects (Plus Up, EFMP) • $48 million to clean up heavy-duty truck emissions (AQIP)
Settlement Agreements	**$900 million in one-time funds for EVs and charging** • Volkswagen: $800 million in ZEV-related projects in CA • NRG: $100 million for electric vehicle charging
Investor-Owned Utility Investments	**>$1 billion approved over 10 years, mostly for EV charging infrastructure** • Pilot programs: CPUC approved pilot programs for PG&E, SDG&E & SCE • Post-SB 350: More than $1 billion approved, mostly related to charging infrastructure for medium- and heavy-duty vehicles

Progress Toward ZEV Goals

Proposed Funding Priorities

Zero Emission Vehicles	• CARB leads funding for vehicles • CEC invests when there is a direct connection to grid/fueling infrastructure or to meet priority needs
Zero Emission Vehicle Infrastructure	• Early focus on passenger vehicle infrastructure • Longer-term focus on infrastructure for commercial trucks, buses, & equipment
Near and Zero Emission Fuels	• Focus on overcoming key barriers to commercialization
Equity	• Prioritize investments that provide direct benefits to disadvantaged communities • Support workforce & economic development

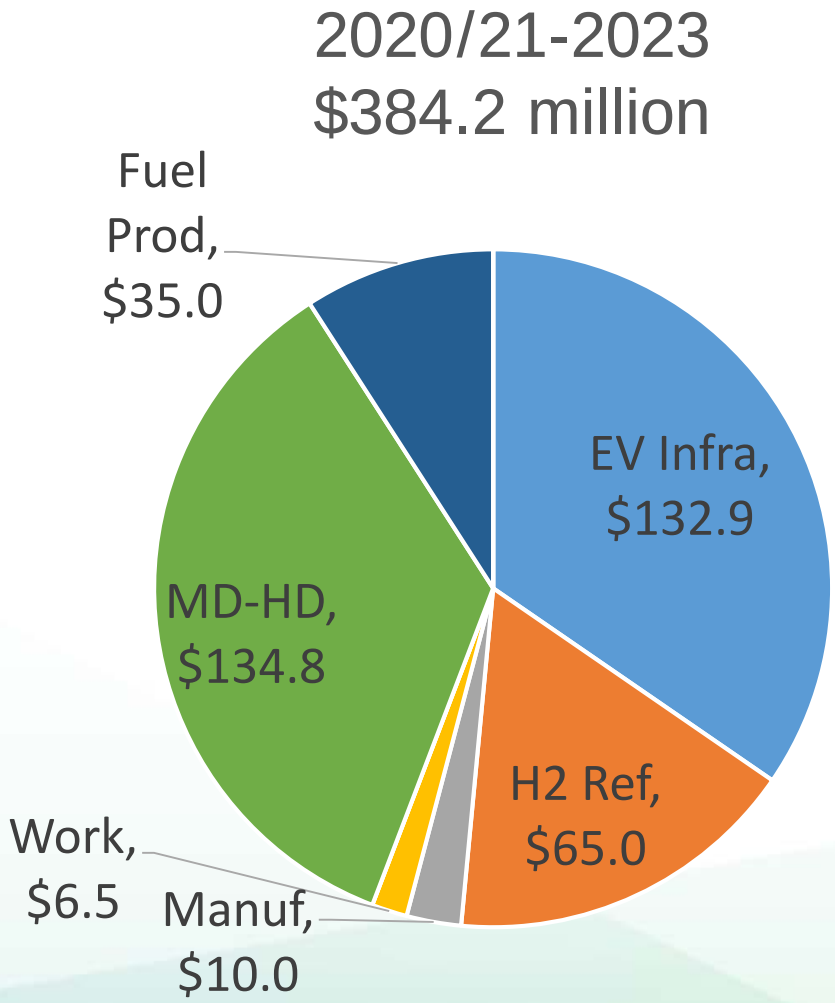
Proposed Funding Allocations

Category	Funded Activity	2020-2021	Next 2½ FYs
Zero-Emission Vehicles and Infrastructure	Light-Duty Electric Vehicle Charging Infrastructure and eMobility	$92.7*	$40.2
	Medium- and Heavy-Duty Zero-Emission Vehicles and Infrastructure	$20	$114.8
	Hydrogen Refueling Infrastructure	$20	$45
Alternative Fuel Production and Supply	Zero- and Near Zero-Carbon Fuel Production and Supply	$10	$25
Related Needs and Opportunities	Manufacturing	-	$10
	Workforce Development	$3.5	$3
	Total	$146.2	$238

*FY 20-21: $51 million one-time legislative expenditure authority to increase EV charging infrastructure

Key questions

- Is there additional context that we should factor into our decision-making on priorities?
- Do we have the right program funding priorities (ZEVs, ZEV infrastructure, near- and zero-emission fuels, equity)?
- Are we missing any important activities?
- How should we approach the new concept of multi-year funding allocations?



Proposed Light-Duty Charging Infrastructure and eMobility

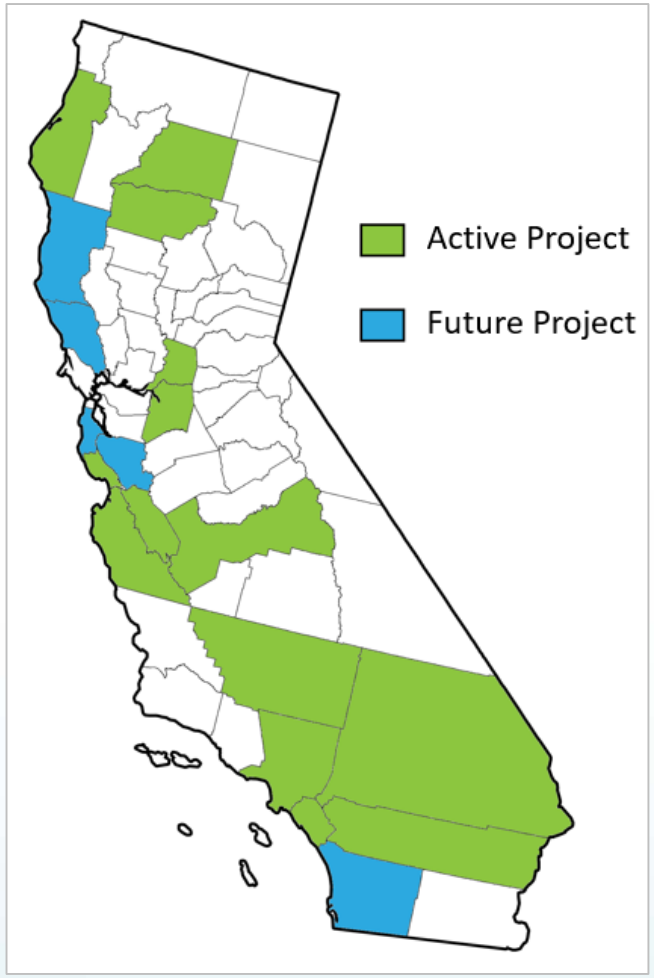
Category	Funded Activity	2020-2021	Next 2½ FYs
Zero-Emission Vehicles and Infrastructure	Light-Duty Electric Vehicle Charging Infrastructure and eMobility	$92.7* million	$40.2 million
*FY 20-21: $51 million one-time legislative expenditure authority to increase and accelerate EV charging infrastructure			

Jennifer Allen

Supervisor - EV Unit

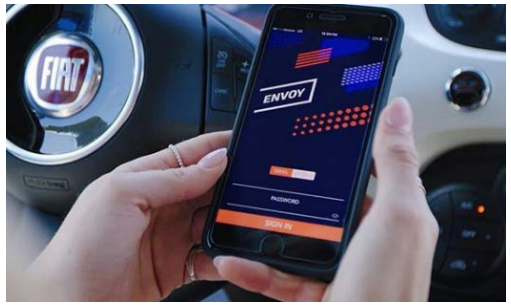
Contact: Jennifer.Allen@energy.ca.gov

California Electric Vehicle Infrastructure Project (CALeVIP)



- Provides grants for light duty vehicle charging infrastructure
- Current funding: $71 million
- Leverages funds from other sources: Potential for up to $35 million in partnership funding for 2020
- Projects are oversubscribed
- Nearly 60% of issued rebates have been for projects in disadvantaged communities

Equitable eMobility Projects



Envoy Technologies, Inc. ($1.5 million)

- Battery-electric vehicle car-sharing program in San Francisco Bay and Sacramento Metro area
- Multi-unit residential locations, including affordable housing developments and units within disadvantaged communities
- $145,000 for charging infrastructure

CALSTART, Inc. ($750,000)

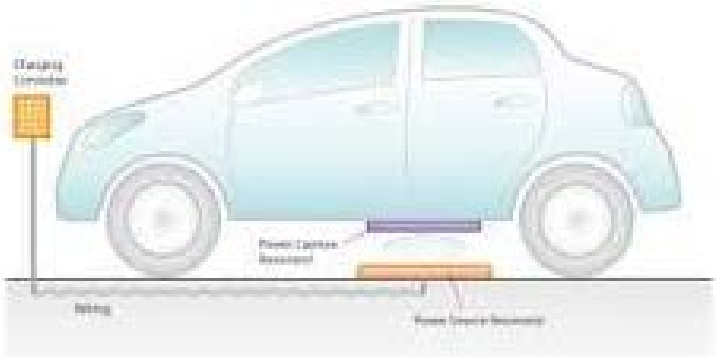
- Ride-sharing program with Chevrolet Bolts
- For students attending Fresno City College from the rural Fresno County area

StratosFuel, Inc. ($750,000)

- Fuel cell electric vehicle car-sharing platform in Riverside and Ontario
- Use mobile applications to reserve and rent fuel cell electric vehicles

Develop, Test, and Demonstrate Novel Charging Technologies

Fast Charging Hubs with Energy Storage



Induction Charging

Streetlight Charging

Autonomous Robot Electric Vehicle Charger

Off-grid and storage based systems

Charging in Automated Garages

Key Questions for Light-Duty Electric Vehicle Charging Infrastructure and eMobility

1. Is front-loading our investments in this category the right approach?
2. How should we balance (or prioritize) project types?
   - Charging infrastructure deployment
   - Equitable eMobility projects
   - Innovative and pre-commercial charging technologies

Proposed Medium- and Heavy-Duty Zero-Emission Vehicles and Infrastructure

Category	Funded Activity	2020-2021	Next 2½ FYs
Zero-Emission Vehicles and Infrastructure	Medium- and Heavy-Duty Zero-Emission Vehicles and Infrastructure	$20 million	$114.8 million

Esther Odufuwa

Energy Commission Specialist - Freight & Transit Unit

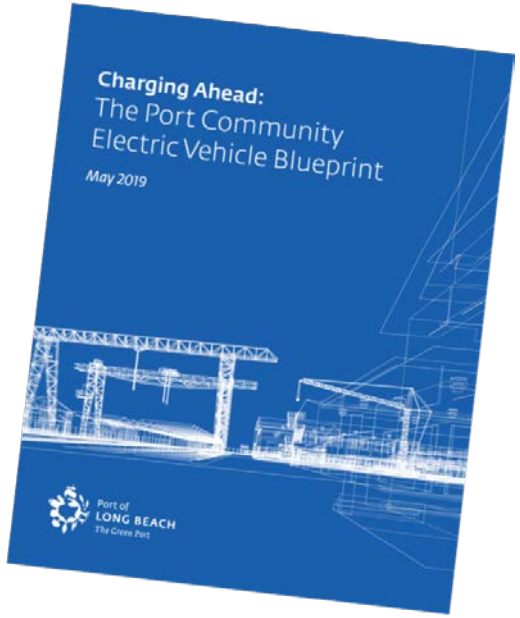
Contact: Esther.Odufuwa@energy.ca.gov

Medium- and Heavy-Duty Need to Transition to a Clean Energy Future

- 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
- 41% of USA imported goods pass through CA; vital to economy
- Strategic investments needed in infrastructure for widespread adoption of zero-emission vehicles
- All new bus purchases by all California transit agencies must be zero-emission buses by 2029 per CARB's Innovative Clean Transit regulation

Proposed Concepts for Available MD/HD Funding

- **Concept #1**: ZEV Infrastructure Deployment for Advanced Freight Vehicle Demonstrations
  - Coordinating with CARB on a potential joint project
- **Concept #2**: Zero-Emission Infrastructure Deployment for Transit Fleets
- **Concept #3**: Blueprints for MD/HD ZEVs and Infrastructure



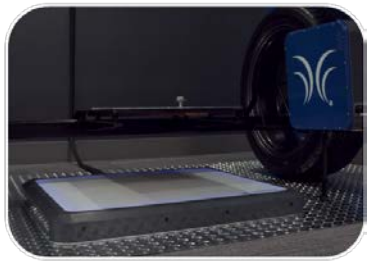
Proposed Concepts for Available MD/HD Funding

- **Concept #4**: Hydrogen Fuel Cell Demonstrations in Marine and Rail Applications at Ports

- **Concept #5**: Innovative Charging and Refueling Solutions

Wireless Advanced Vehicle Electrification (WAVE)
Inductive

Momentum Dynamics
Inductive



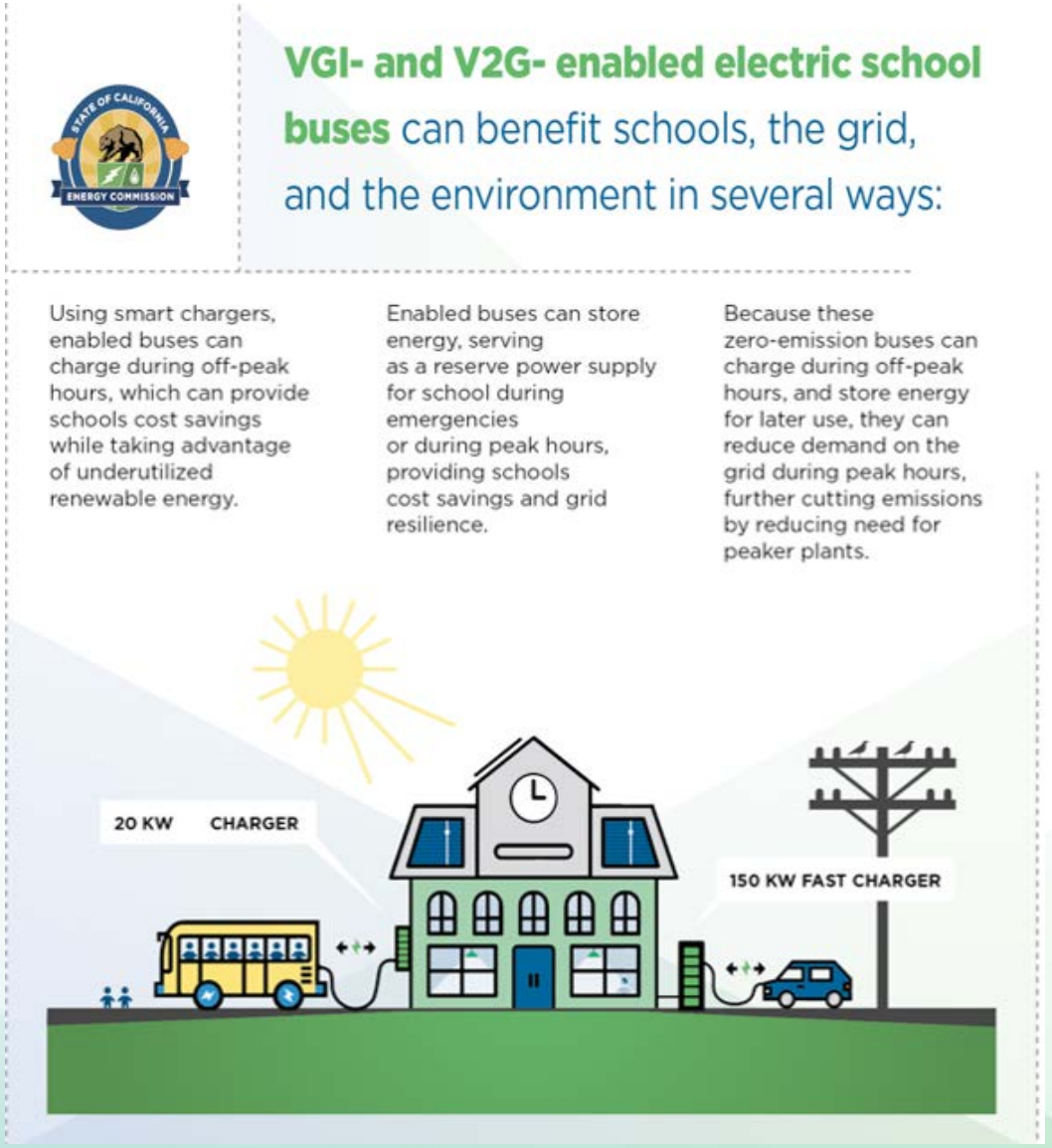
WiTricity
Magnetic Resonance

Wireless Charging

Added Concept: Block grant for streamlined infrastructure deployment

School Bus Replacement Program

- $75 million in funding for electric school buses
- 231 electric school buses awarded
- Six times as many buses were requested for replacement than were awarded
- It would require more than $400 million to replace the remaining school buses on the list (still just ~1,500 out of ~15,000 statewide)



Key Questions for Medium- and Heavy-Duty Zero Emission Vehicles and Infrastructure

1. Is the proposed funding approach (decrease in FY 2020-21; increase in the following 2 ½ FYs) the best approach for the MD-HD sector?
2. Which of the following concepts should be prioritized? Are there others that should be considered?
   - Freight demonstration infrastructure
   - Planning blueprints
   - Transit bus infrastructure
   - Marine and rail infrastructure
   - School buses + infrastructure (currently not proposed for funding)
   - Innovative charging/refueling
3. How should we account for the impact of current and anticipated MD/HD CARB regulations (e.g. Innovative Clean Transit; Advanced Clean Trucks)?

Proposed Hydrogen Refueling Infrastructure

Category	Funded Activity	2020-2021	Next 2½ FYs
Zero-Emission Vehicles and Infrastructure	Hydrogen Refueling Infrastructure	$20 million	$45 million

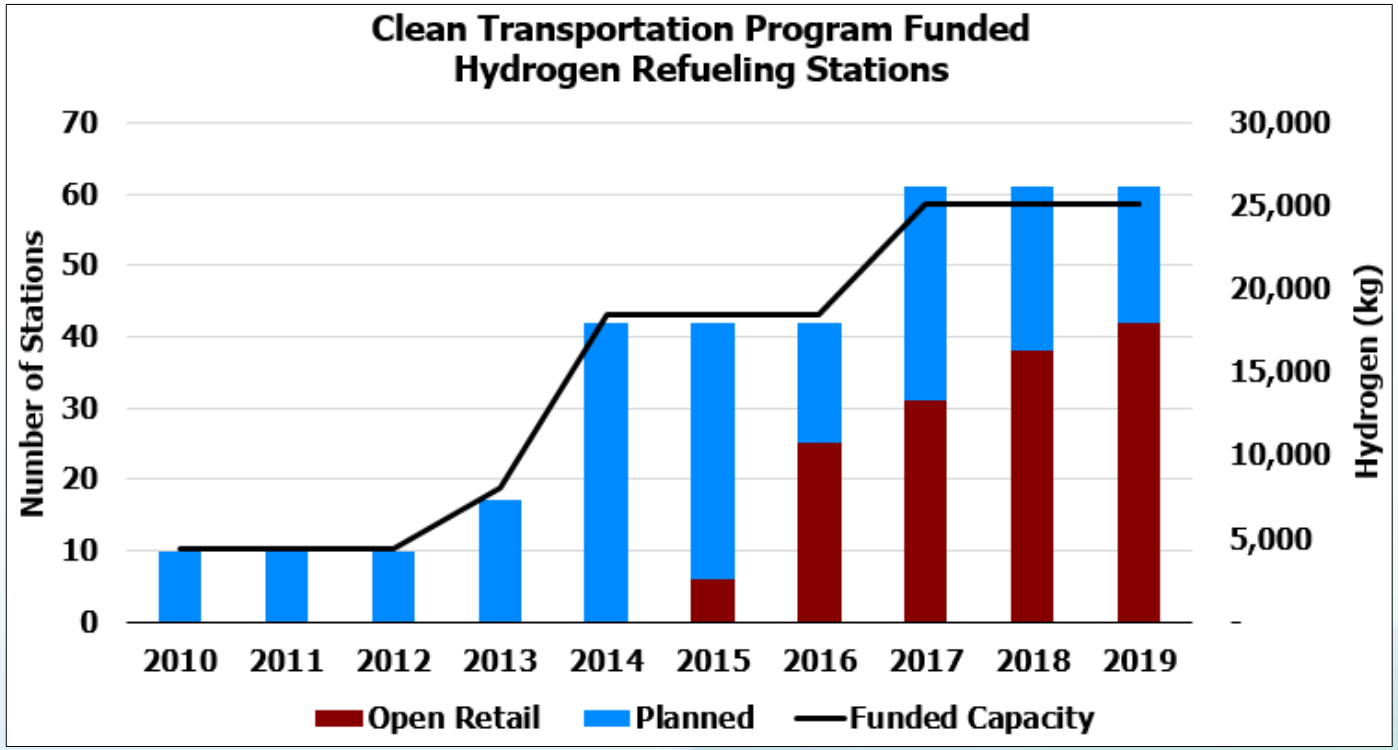
Phil Cazel

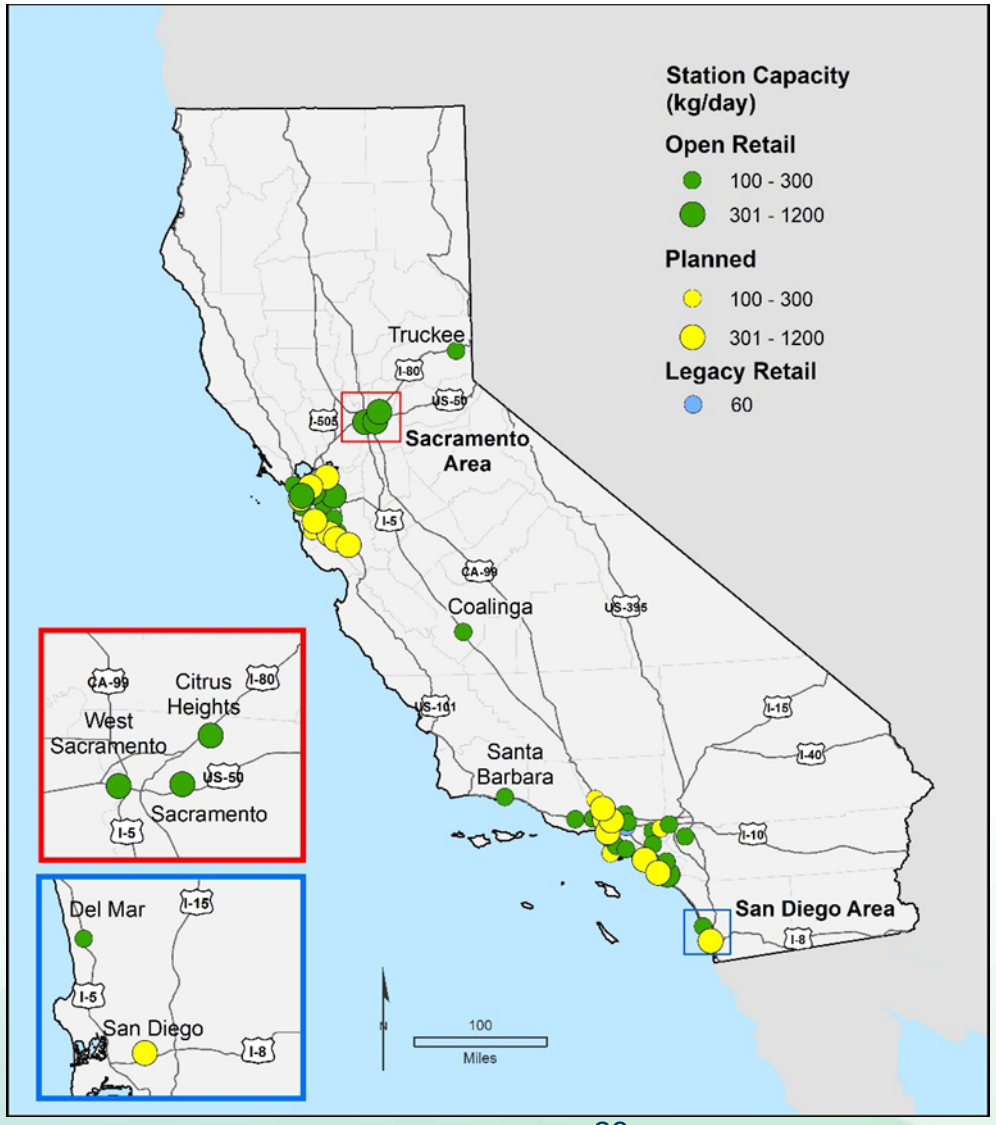
Air Pollution Specialist – Hydrogen Unit

Contact: Phil.Cazel@energy.ca.gov

Funded Station Locations

- 44 stations open retail
- 18 stations under construction
- Funded capacity can support 35,000 FCEVs
- 48,000 FCEVs by 2025 projected by CARB
- 7,600+ FCEVs in California as of Dec 2019

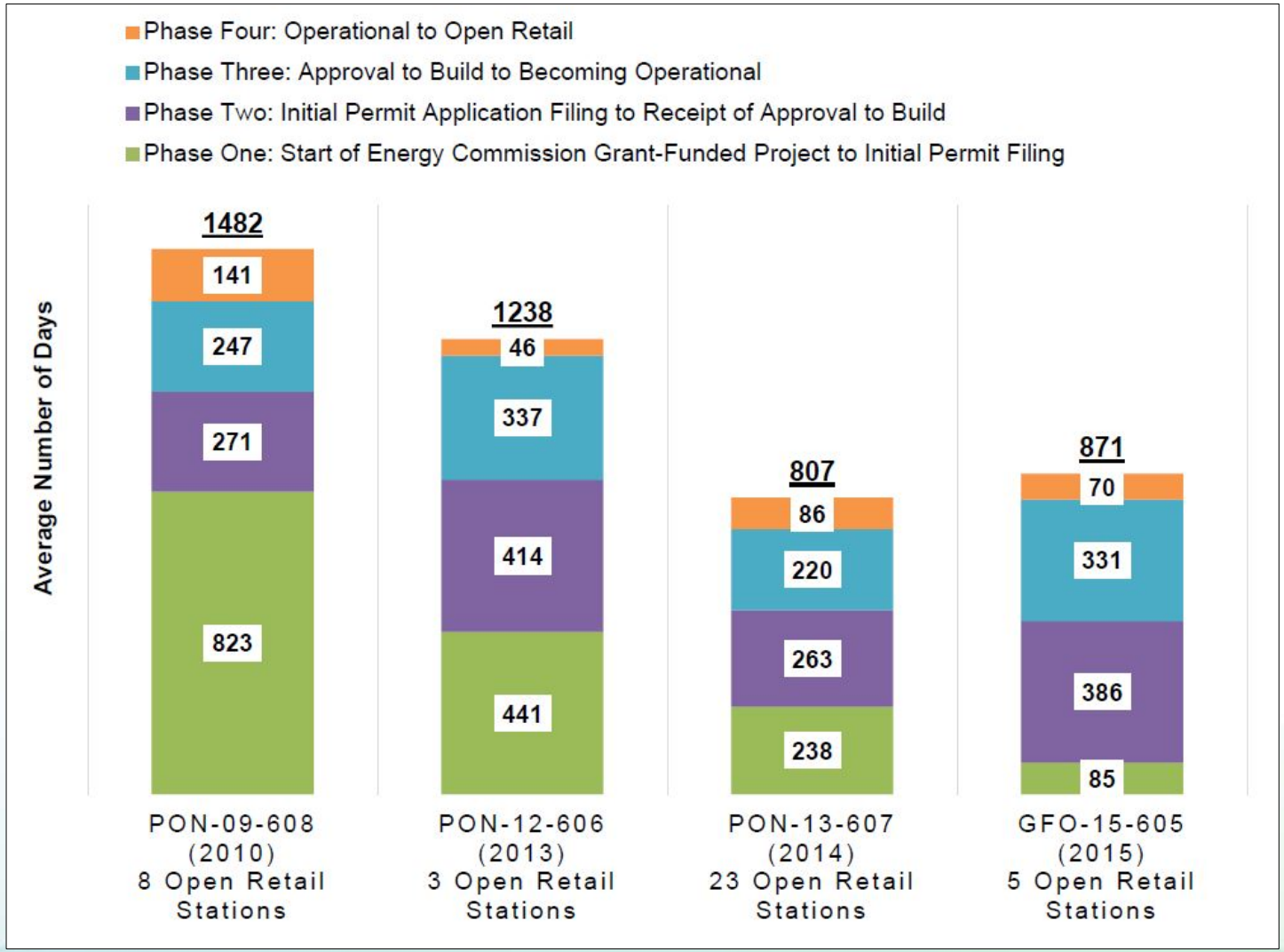




Station Size and Development Time

Since 2010:

- Average new station capacity has quintupled, from supporting 250 to 1400 cars
- Time from start to permit filing has dropped by 85% (average 823 days to 85 days)



Next Steps

Funding solicitation released December 2019

Up to $115.7 million available, subject to future appropriations and Clean Transportation Program Investment Plan funding allocations

- $45.7 million from prior funding allocations available
- Eligible costs include refueling infrastructure for transit bus and commercial FCEVs to increase station throughput and achieve economies of scale
- Preference points are available for projects serving commercial FCEV fleets or fuel cell transit buses while not diminishing the light duty customer experience

Key Questions for Hydrogen Refueling Infrastructure

1. AB 8 (2013) requires $20 million annually until there are at least 100 publicly available hydrogen stations. Once 100 retail hydrogen stations are open, should funding continue?
2. How much should the program focus on light vs. heavy duty hydrogen infrastructure, especially given new regulations on transit fleets?

Proposed Zero- and Near Zero-Carbon Fuel Production and Supply

Category	Funded Activity	2020-2021	Next 2½ FYs
Alternative Fuel Production and Supply	Zero- and Near Zero-Carbon Fuel Production and Supply	$10 million	$25 million

Andrew Hom

Air Resources Engineer – Advanced Fuel Production Unit

Contact: Andrew.Hom@energy.ca.gov

Low-Carbon Fuel Project Benefits* (as of 2/28/20)

Production Capacity

- California is 0.5% of the world's population, and uses nearly 5% of low-carbon fuels in the global market
- Low Carbon Fuel Standard reported 1.7 billion gallons of low-carbon fuel in California in 2017.
- 171 million gallons per year in CEC-funded capacity (in diesel gallon equivalents); 5% of total diesel consumption
- The CEC has funded almost 85% of the total waste-based low-carbon fuels produced in California.

GHG Displaced

- 11.2 gCO2e/MJ average carbon intensity (LCFS Ultra Low is 30 gCO2e/MJ)
- 4.6 million Metric Tons CO2e/year (about 1 million passenger vehicles)

Economic Benefits

- Over $1.1 billion public and private investment statewide
- 750 permanent jobs
- 2,600 temporary jobs

Disadvantaged Communities

- $152 million (73%) in disadvantaged communities

*Includes $12.5 million in Greenhouse Gas Reduction Funds

Low-Carbon Fuel Production Projects

Fuel Type	Feedstocks
Gasoline Substitutes (Ethanol, Renewable Gasoline)	Sugar beets; grain sorghum; almond & walnut wood; agricultural residues
Diesel Substitutes (Biodiesel, Renewable Diesel, DME)	Waste oils; distiller's corn oil; tallow
Biomethane	Dairy manure; forest biomass; fats, oils, & grease; food, green, yard, & municipal waste
Renewable Hydrogen	Renewable electricity & water, biogas

Key Questions for Zero- and Near Zero-Carbon Fuel Production and Supply

1. We intend to fund zero and near zero carbon fuel production (includes net negative fuels). These fuels may be used in ZEVs or combustion vehicles. How should we balance GHG emission reductions and technology flexibility?
2. We have traditionally funded grants to biofuel production facilities, but we are now considering expanding to address system barriers, like the lack of blending equipment for biodiesel. Is this the right direction?
3. What is the best way to scale up in-state production of renewable fuels? Are there other funding mechanisms besides grants to facilities that can be used to better scale up the market and allow CA businesses to thrive (e.g., loans)?

Proposed Manufacturing and Workforce Training and Development

Category	Funded Activity	2020-2021	Next 2½ FYs
Related Needs and Opportunities	Manufacturing	-	$10 million
	Workforce Development	$3.5 million	$3 million

Larry Rillera

Air Pollution Specialist – Program Integration Unit

Contact: Larry.Rillera@energy.ca.gov

Manufacturing: Investments

Product Type	Funding (millions)	Match Funding (millions)
Battery Systems	$9.6	$13.2
Charging Equipment	$7.0	$8.0
Electric Motorcycles	$6.1	$8.9
Electric Powertrains and Platforms	$12.5	$30.3
Electric Trucks / Buses	$19.2	$31.3
Total	$54.5	$91.7

"The projects enabled through the CEC grants met the goals of demonstrating the benefits of adapting electric propulsion technology to large vehicles and stimulating commercial adoption."
- Mike Simon, founder and CEO, TransPower.

ZEV Manufacturing Companies

Workforce: Past Projects

Workforce Training and Development Funding

(FY 2008-09 through FY 2015-16)

Agency	CEC Funding (M)	Match Contributions (M)	Total (M)
Employment Development Department	$8.2	$7.5	$15.7
Community Colleges	$5.5	N/A	$5.5
Workforce Development Board	$0.25	$0.5	$0.5
Community Colleges	$0.25	$0.5	$0.75
Employment Training Panel	$13.5	$10.8	$24.3
Advanced Transportation Technology and Energy	$2.0	N/A	$2.0
TOTAL	**$29.7**	**$19.3**	**$49.0**

San Bernardino Valley College

"The Advanced Transportation and Logistics Sector of the California Community Colleges works in partnership with the California Energy Commission to prepare a highly skilled, clean energy workforce in California."

Workforce: Current Projects

- Clean Transportation Training Project ($1.4M)
- Clean Fuels Transportation Pilot Career Opportunity Project ($2.0M)
- Electric School Bus Training Project ($1.0M)
- Sustainable Freight Foundations Certificate ($0.175M)

CALEXICO HIGH SCHOOL
HOME OF THE BULLDOGS

Key Questions for Manufacturing and Workforce Development

1. What considerations and priorities should guide the program's investment into the ZEV manufacturing supply chain?
2. What approaches or priorities should we apply toward future investments in workforce development?
3. We are choosing to fund manufacturing and workforce development in alternating years; is this the right approach?

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More information:
https://www.energy.ca.gov/programs-and-topics/topics/transportation

Submit e-comments by March 17, 2020 at:
https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=19-ALT-01

Contact:
Patrick.Brecht@energy.ca.gov

Staff Draft Report Proposed Funding Allocations

Category	Funded Activity	2020-2021	Next 2½ FYs
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