DOCKETED

Docket Number:	17-ALT-01
Project Title:	2018-2019 Investment Plan Update for the Alternative and Renewable Fuel and Vehicle Technology Program
TN #:	221698
Document Title:	Staff Presentations on ARFVTP Activities
Description:	Staff presentations on funding categories from the November 7, 2017 ARFVTP Advisory Committee meeting and public workshop.
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Low-Carbon Fuel Production and Supply

Bill Kinney

Biofuels Unit

Fuels and Transportation Division

California Energy Commission

November 7, 2017

Biofuels Project Funding

(as of 10/31/2017)

Crimson Renewable Energy LP

CR&R, Inc.

Altex Technologies Corporation

ARFVTP Biofuels Production Awards		
Fuel Type	**Awards Made**	**Funds Awarded (in millions)**
Gasoline Substitutes	15	$32
Diesel Substitutes	25	$75
Biomethane	20	$61
Total	60	$168

Biofuels Project Benefits

(as of 10/31/2017)

Production Capacity

- 135.7 million gallons per year funded capacity (diesel gallon equivalents)

GHG Displaced

- 1,300,000 Metric Tons CO2e/year
- 24.1 gCO2e/MJ volume weighted average carbon intensity

Economic Benefits

- 572 long-term / 1,589 short-term jobs
- $105.8 million in annual tax benefits
- $84.4 million (80%) in DACs

Disadvantaged Communities

- Over $500 million public and private investment statewide
- $390 million (78%) in disadvantaged communities

Opportunities for Meeting California's Climate Change Goals

Large commercial facilities

- High volumes of low-carbon fuels

Community scale facilities

- Matching production with locally available feedstock supply
- Addressing complementary state goals (such as short lived climate pollutant reduction of SB 1383)

Transformative technologies

- Advancements to increase yield, productivity, or cost effectiveness, and hurdle blend wall
- Sustainability and new feedstock utilization, such as woody biomass

AltAir Fuels, LLC

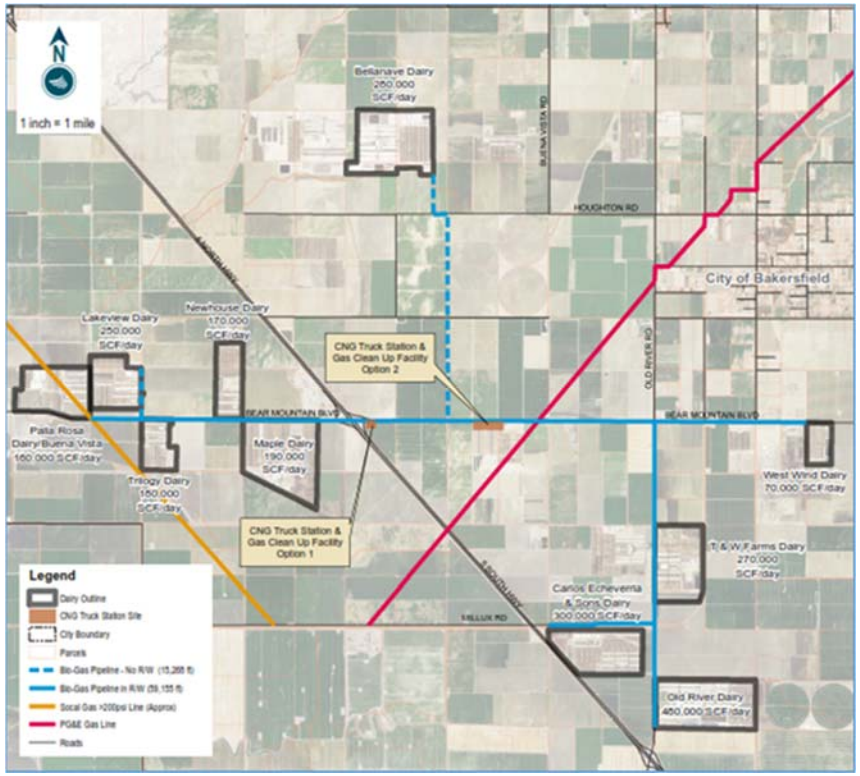
40+ million gallons/year

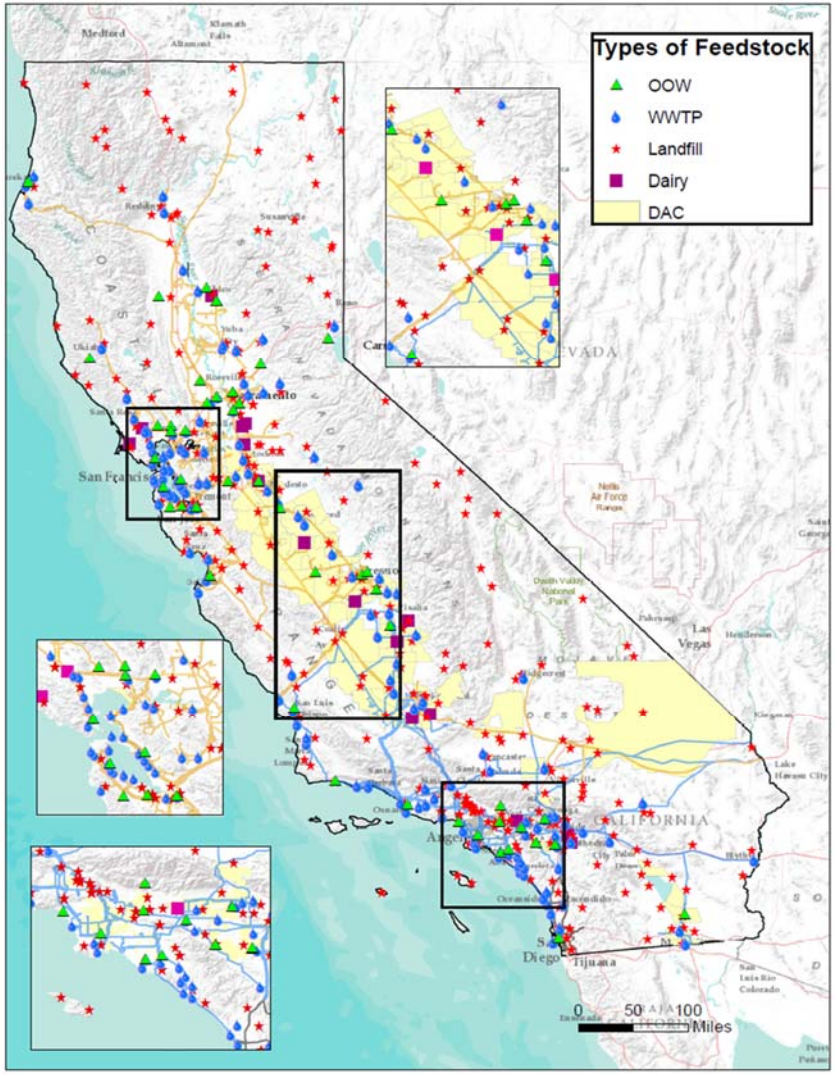
Supports 200 direct and indirect jobs

Renewable diesel and jet fuel

Community Scale Facilities

California Bioenergy LLC





Transformative Technologies and New Feedstocks

Tracy Renewable Energy

G4 Insights

Emerging Opportunities for Advancement of Biofuels

- Renewable (drop-in) diesel & gasoline, woody biomass conversion, other renewable fuel pathways, and biocrude
- Approximately $17 million in FY 17-18 funding available
- Demonstration facilities – early 2018
  Commercial facilities – late 2018

Low-Carbon Fuel Production and Supply

$25 million allocation

(proposed)

FY 2018-2019

Electric Vehicle Charging Infrastructure

Brian Fauble

Electric Vehicles Unit

Fuels and Transportation Division

California Energy Commission

November 7, 2017

History of Energy Commission
Electric Vehicle Charging Infrastructure Deployment

Partnering with the American Recovery and Reinvestment Act

2010

Planning, Deploying EV Charging Infrastructure and Upgrades to Legacy Chargers

2012

Increasing the Numbers and Meeting Specific Needs for Charging

2014

Allowing Border-to-Border Travel on California's Major Highway Corridors

2015-2016

Center for Sustainable Energy® CALIFORNIA

Block Grant for Targeted EV Charging Incentive Projects

2017

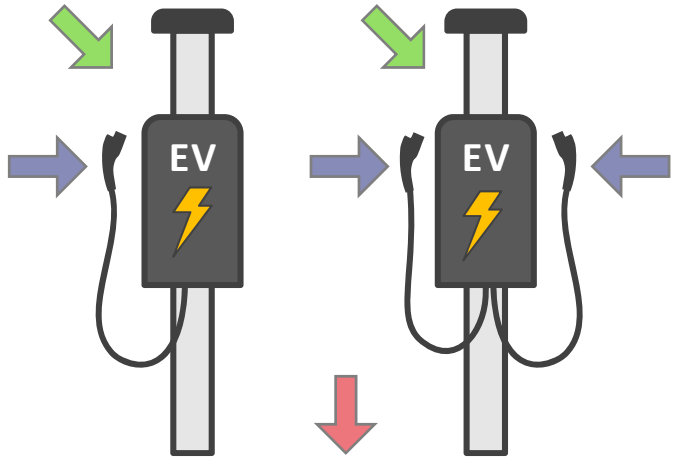
Electric Vehicle Charging Infrastructure

ARFVTP Funding to Date: $80.1 million	
1,297 public sites	4,088 private sites
4,280 public connectors	4,403 private connectors

AFDC Electric Station Locator	ARFVTP Funded Sites	AFDC
Charging Sites/ Electric Stations	1,053	3,965
Charging Connectors/ Outlets	3,251	13,795

CHARGING STATION
A device that provides electrical power to charge an EV battery.

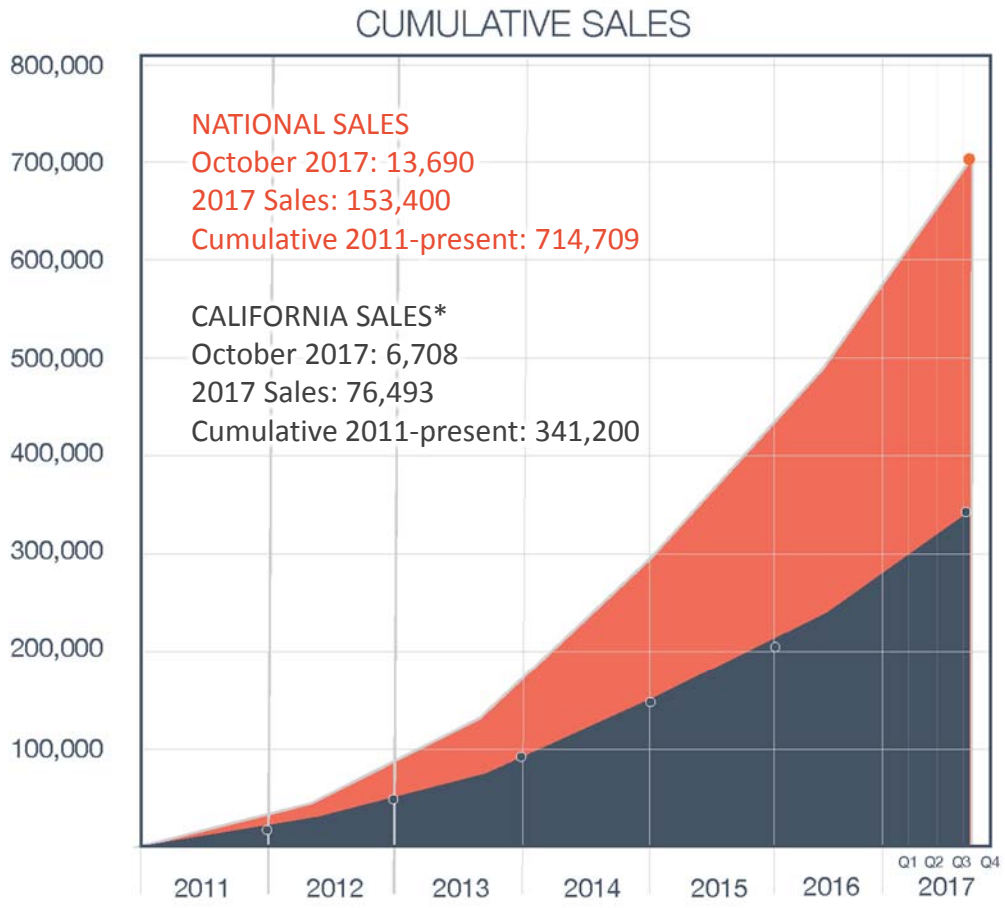
CHARGING CONNECTOR (charging outlet)
A part that connects the charging station to the vehicle.



CHARGING SITE (electric station)
A physical address with EV charging infrastructure.

Cumulative Electric Vehicle Sales

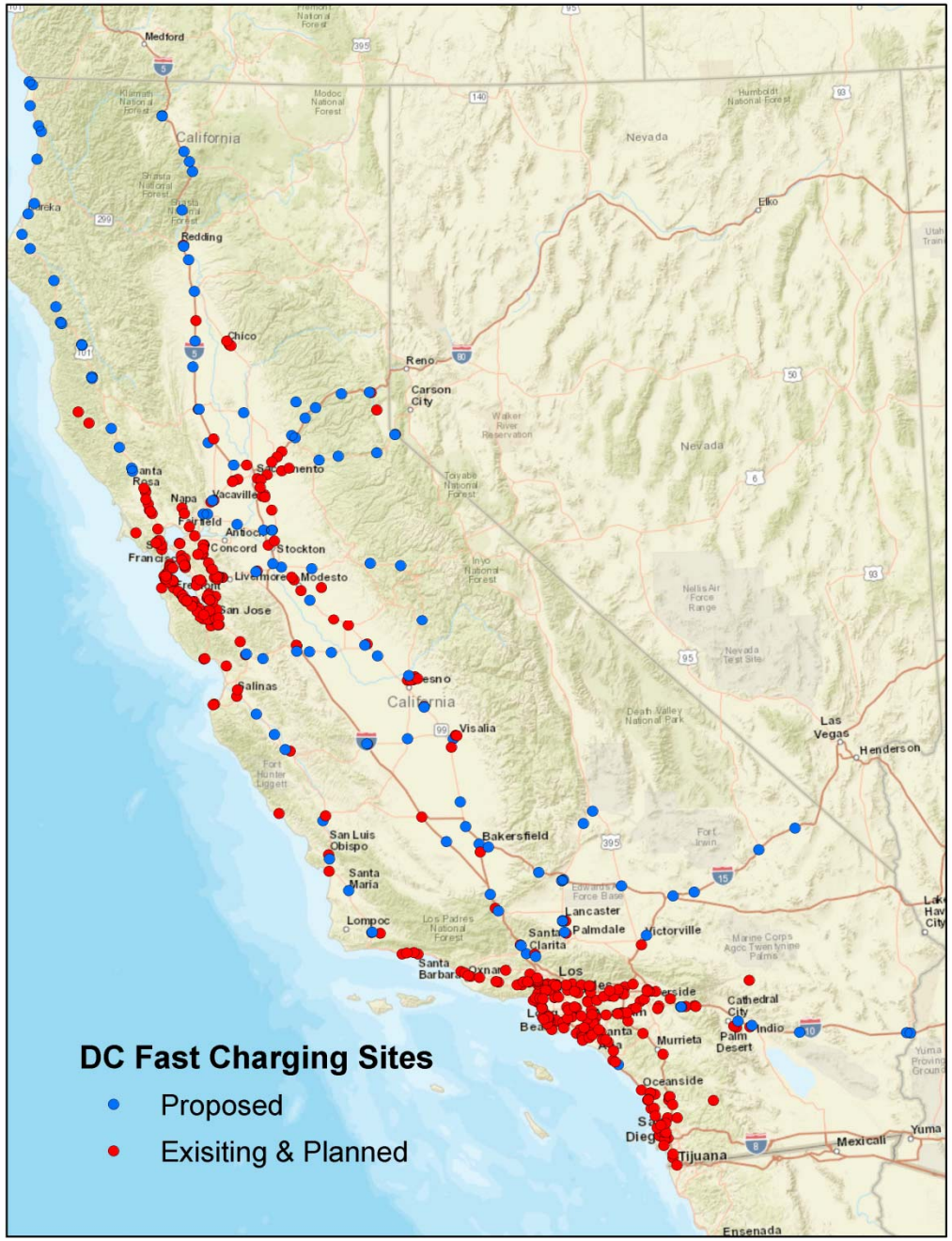
Compared to national sales of over 700,000 vehicles, California accounts for about 46% of the nationwide total



* Assumes CA sales are approximately 50% of National sales (9/6/2017)
Reference: www.hybridcars.com

DC Fast Charging Corridors

- 2015-2016
- 120 Sites
- 187 DC Fast Chargers
- 129 Level 2 Chargers



Source: Energy Commission Staff Analysis, PlugShare.com, US Department of Energy Alternative Fuels Data Center

California EV Infrastructure Project (CALeVIP)

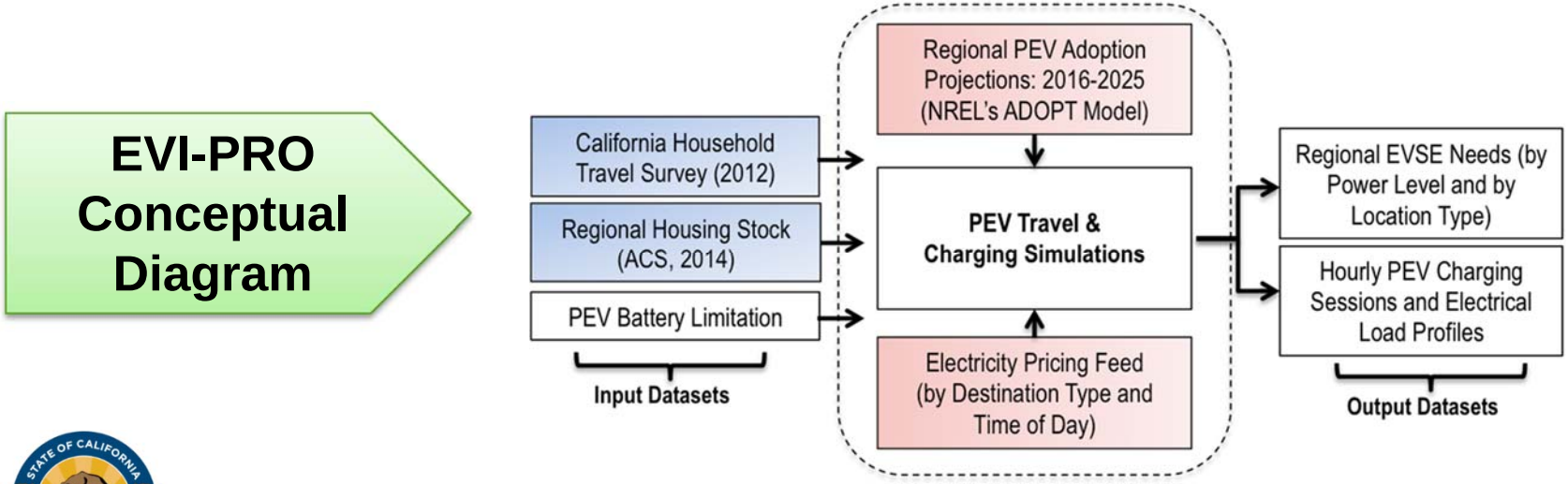
- Implemented by the Center for Sustainable Energy
- Geographically targeted incentive projects to install EV infrastructure for future charging needs
- $15.25 million currently funded, up to $200 million
- Fresno County Incentive Project expected to launch in December 2017
  - $4 million total funding available
  - Rebates for Level 2 charging stations
  - Public, private and MUD sites

Innovative Mobility Services With Zero-Emission Vehicles

- Purpose of the solicitation: Demonstrating innovative mobility services among disadvantaged communities using zero-emission vehicles.
- Total funding: $3 million
- Four projects awarded funding:
  - Envoy: Two electric car sharing awards for affordable housing, Bay Area and North Central Valley (Yuba City to Los Banos)
  - CALSTART: Electric ride-hailing for college students in Kerman to commute to Fresno City College
  - StratosFuel: Car sharing using FCEVs in Riverside and Ontario areas

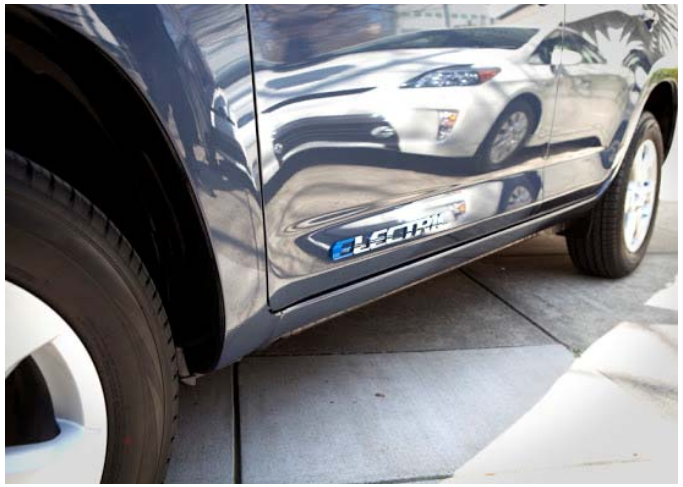
Data Collection and Analysis

- Strategically plan for additional stations and funding opportunities that will support the goal of 1.5 million vehicles on California roadways by 2025
- Track impact of electric vehicle charging station investments
- Electric Vehicle Infrastructure Projections or EVI-PRO



Continued Infrastructure Support for PEVs

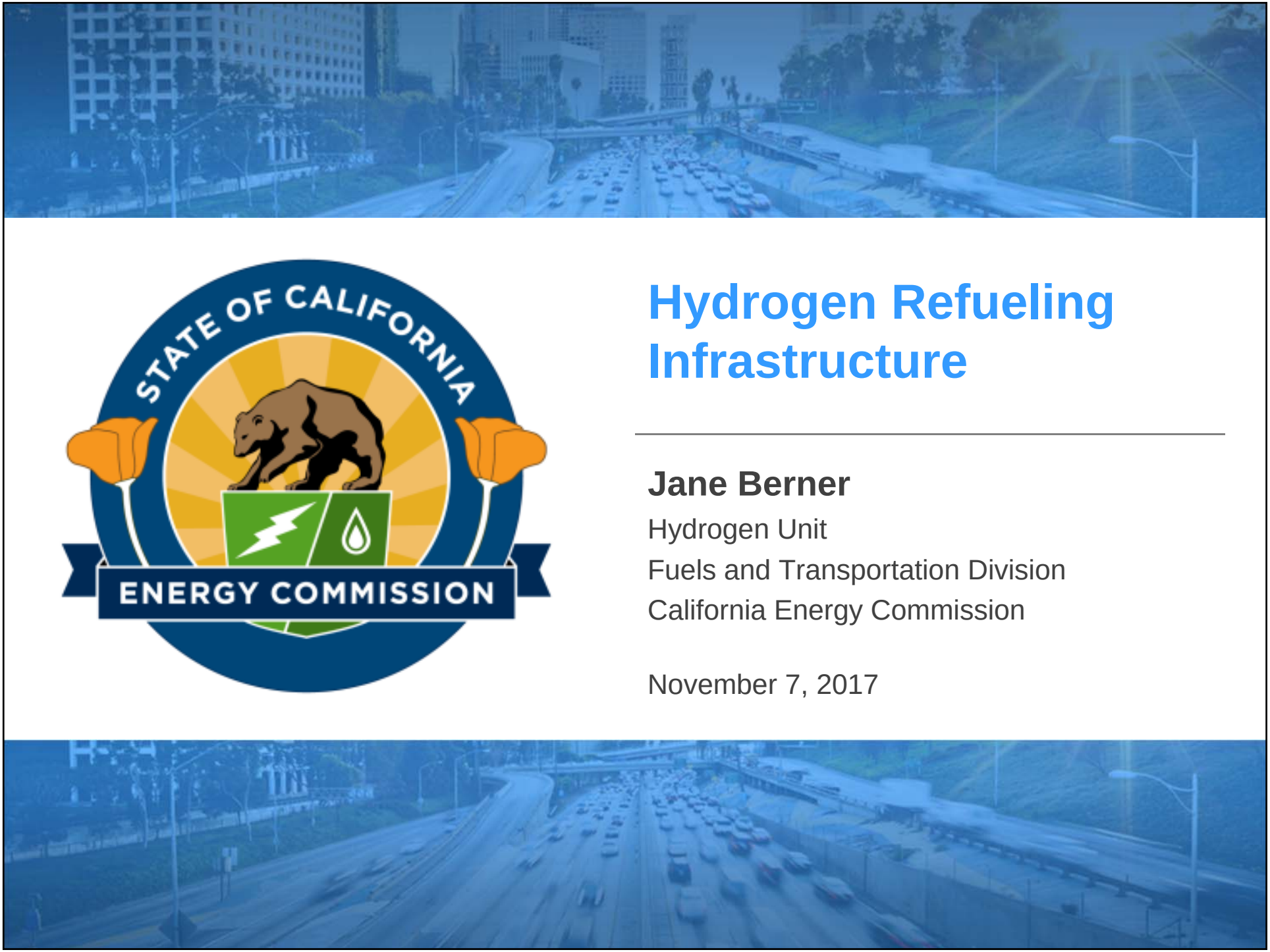
- Monitor vehicle markets and consumer response



- Evaluate electric charging requirements and support infrastructure demands through focused funding efforts
- Work with community based programs in underserved areas
- Work cooperatively with utilities, regional readiness planning coalitions, air districts, and OEMs on strategic placement of charging infrastructure, deployment of adequate service to support chargers, and support zero-emission vehicle deployment.

Electric Charging Infrastructure

$20 million allocation
(proposed)
FY 2018-2019



Hydrogen Refueling Infrastructure

Jane Berner

Hydrogen Unit

Fuels and Transportation Division

California Energy Commission

November 7, 2017

Hydrogen Refueling Infrastructure Overview

- Establishing a hydrogen refueling network for the fuel cell electric vehicle (FCEV) market in California
- 60 hydrogen refueling stations funded so far, towards milestone of 100
- 12 are in disadvantaged communities
- The funded stations will support nearly 19,000 FCEVs
- 31 stations open today can support 8,500 FCEVs
- 2,699 FCEVs in California through September 2017

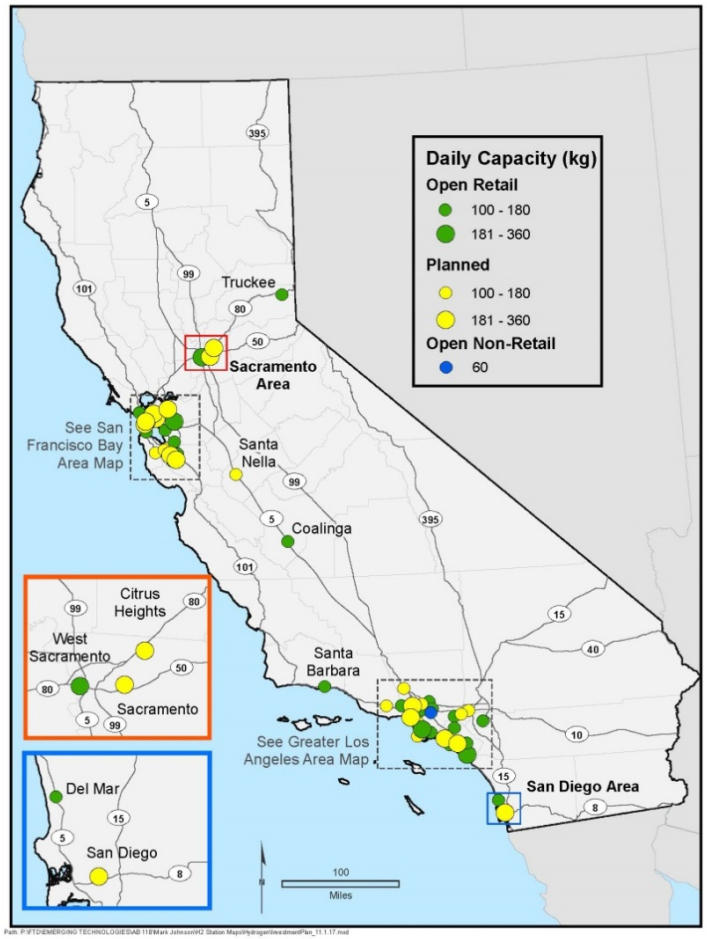
FCEV Makes and Models

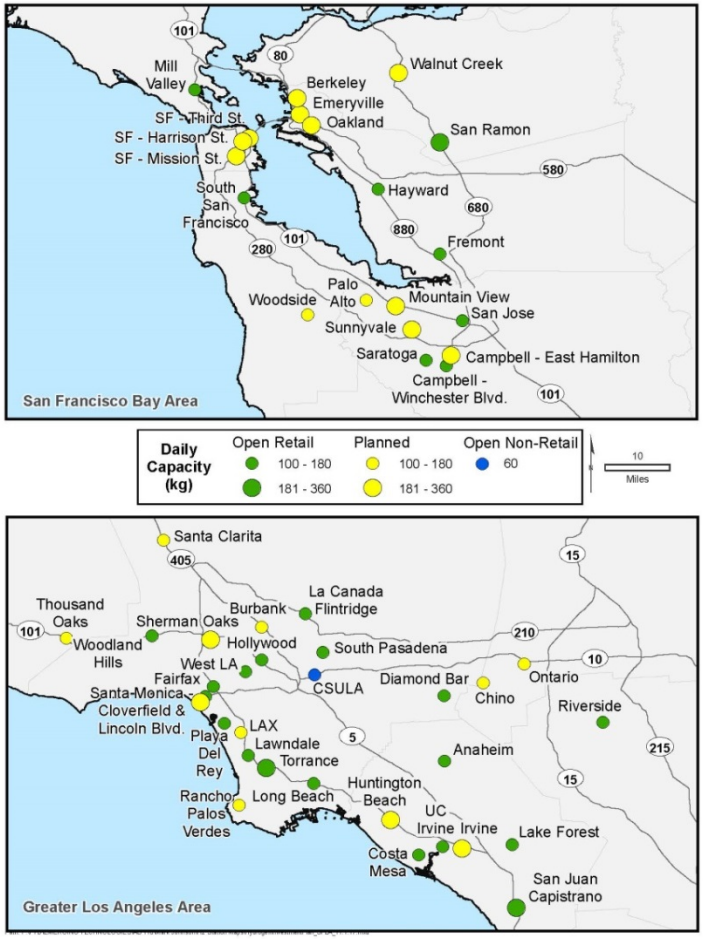
No tailpipe emissions, 300+ mile EPA-rated range, refills in 5 minutes

Available Now:

Coming Soon:

Hydrogen Refueling Network





Hydrogen Refueling Station in Fremont

- Open as of September 7, 2017
- Hydrogen dispenser is integrated under the station canopy
- 18th station to open from FirstElement Fuel
- 31st station to open in the state

Hydrogen Refueling Station in Torrance

On October 9, 2017, Commissioner Janea Scott attended a celebration of the upgraded Torrance station, which was the 30th station to open in California and is Shell's first retail hydrogen station in the U.S.

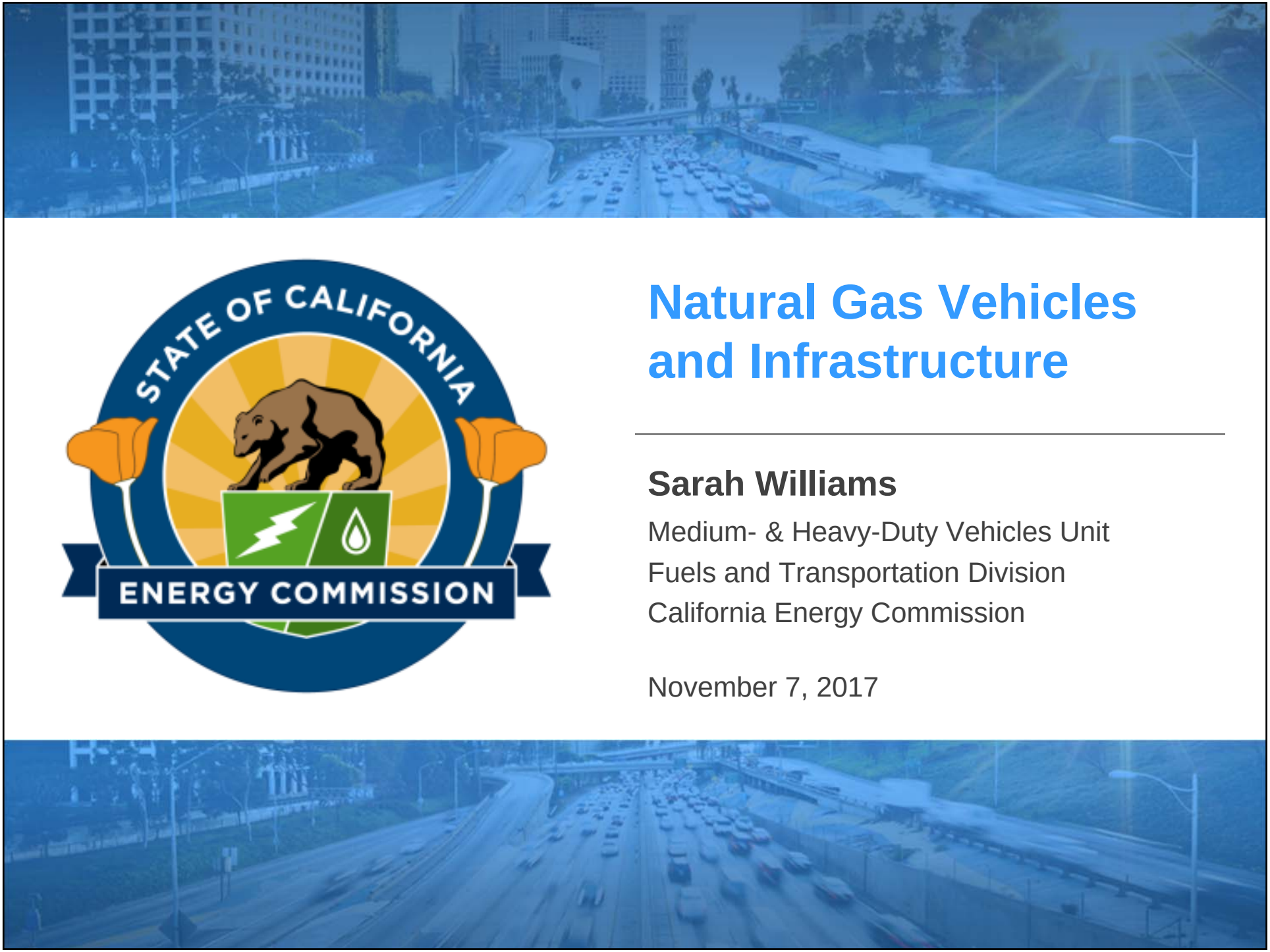
This event was scheduled to follow National Hydrogen and Fuel Cell Day (October 8 or 10/08, reflecting hydrogen's atomic weight of 1.008).

Hydrogen Refueling Infrastructure

$20 million allocation

(proposed)

FY 2018-2019



Natural Gas Vehicles and Infrastructure

Sarah Williams

Medium- & Heavy-Duty Vehicles Unit
Fuels and Transportation Division
California Energy Commission

November 7, 2017

Natural Gas Fueling Infrastructure 2016-2017

GFO-16-602 released September 2016

Awarded $1.5 million for 3 projects

Awardees were Public K-12 school districts

Mix of private and public access stations

Provides fueling for over 61 vehicles (currently operating)

Allows for the expansion of additional CNG vehicles for fleets

Kings Canyon Unified School District

GFO-16-602 Natural Gas Infrastructure Projects

Recipient	Funding
Lemoore Union High School District	$500,000
Kings Canyon Unified School District	$500,000
Exeter Unified School District	$500,000

Natural Gas Fueling Infrastructure

Huntington Beach Union High School District

Kings Canyon Unified School District

Beaumont Unified School District

Natural Gas Vehicle Deployment Portfolio

Funding Agreement or Solicitation	Vehicle Type	# of Vehicles	Funding (in Millions)
San Bernardino Associated Governments (ARV-09-001)	Heavy-duty trucks	202	$9.3
South Coast AQMD (ARV-09-002)	Heavy-duty drayage trucks	132	$5.1
Buydown Incentives (PON-10-604, PON-11-603, and PON-13-610)	Class 1 – 8	1,734	$29.6
Natural Gas Vehicle Incentive Project	Class 1 – 8	984 (est.)	$21.8
	Total	**3,052**	**$65.8**

Natural Gas Vehicle Incentive Project (NGVIP)

Administered by the University of California, Irvine

Initiated in October of 2015

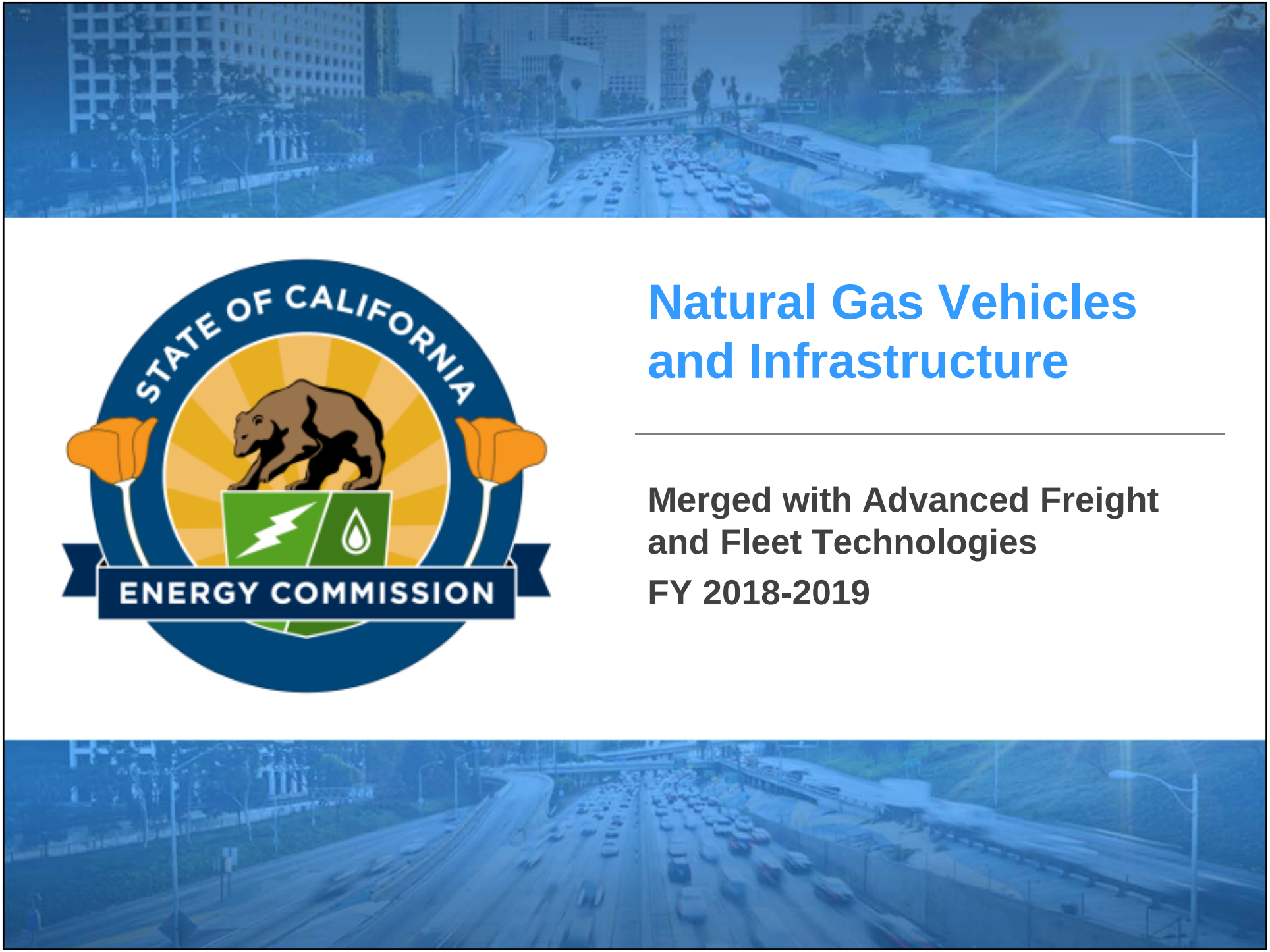
Offered incentives for the purchase of light-, medium-, and heavy-duty vehicles

Majority of incentives being utilized for class 8 waste disposal vehicle purchases

$21.8 million of ARFVTP funding has been added the NGVIP since its inception:

- $9.8 million has been utilized by applicants for completed vehicle purchases
- $10.6 million reserved for applicants to make future vehicle purchases with
- $1.4 million available for new reservations

Natural Gas Vehicle Incentives



Natural Gas Vehicles and Infrastructure

Merged with Advanced Freight and Fleet Technologies

FY 2018-2019

Advanced Freight and Fleet Technologies

Sam Lerman

Medium- & Heavy-Duty Vehicles Unit
Fuels and Transportation Division
California Energy Commission

November 7, 2017

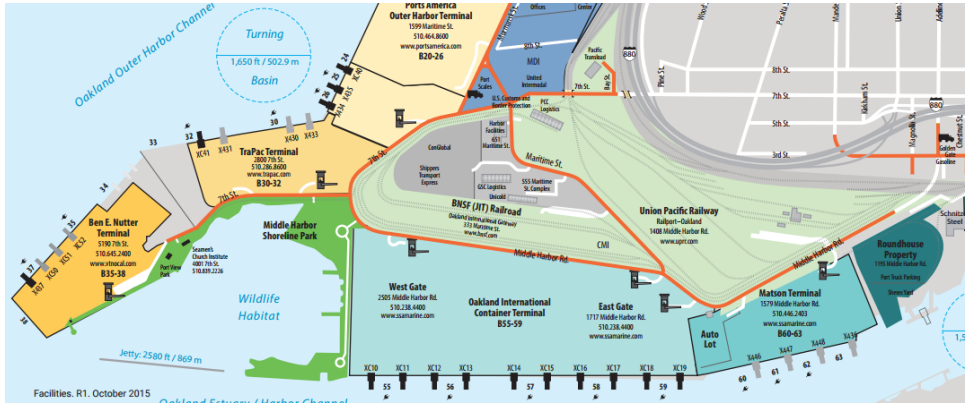
Summary of MD-HD Vehicle Demonstrations

Vehicle/Technology Type	# of Vehicles	ARFVTP Funding (in Millions)
Medium-Duty Hybrids, PHEVs and BEVs	166	$16.4
Heavy-Duty Hybrids, PHEVs and BEVs	78	$48.6
Electric Buses	35	$14.6
Natural Gas Trucks	51	$19.1
Fuel Cell Trucks and Buses	13	$14.5
Vehicle-to-Grid	6	$7.7
Off-Road Hybrids	2	$4.5
E85 Hybrids	1	$2.7
Intelligent Transportation Systems	110	$2.0
Total	**462**	**$130.1**

Port Energy Collaborative

Focus Areas

- MD-HD Vehicle Demonstrations
- Electric Truck Charging Standardization
- Grid Resiliency
- Clean Energy and Efficiency Measures
- Lighting Enhancements



Container Terminal at Port of Oakland

Port of Los Angeles

Advanced Freight and Fleet Projects 2016-2017

GFO-16-604 released November 2016

Awarded $24.3 million for 3 projects

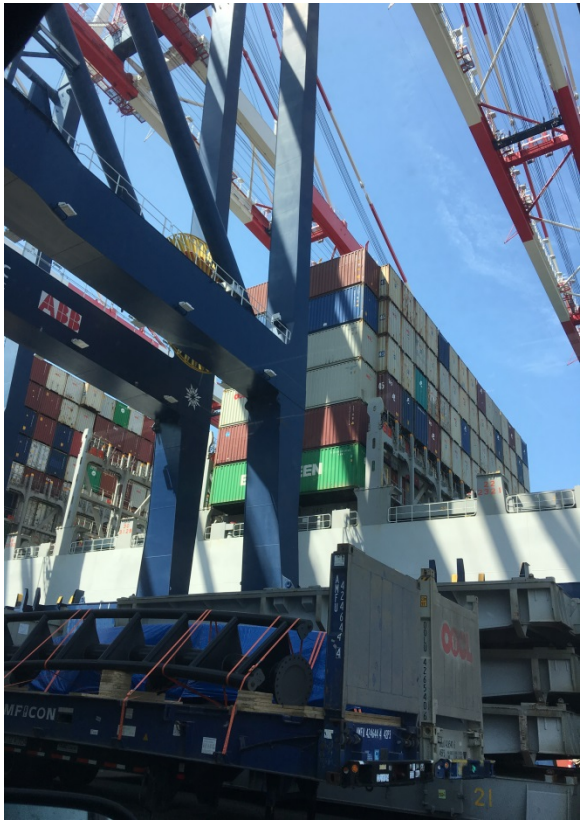
Focused on demonstrating technologies at California Seaports

28 drayage trucks (20 Low NOx, 7 PHEV, 1 BEV)
15 BEV yard trucks, 3 BEV top handlers, and
9 electric RTGs

Direct reduction of 3,900 MT CO2e, 22 tons NOx, 0.4 tons PM10 over term of projects.

Next GFO expected to be released later this year

$22 million with focus on freight infrastructure



Port of Long Beach

GFO-16-604 Project Summaries

Recipient	Advanced Vehicles	Technology Vendors	Fleet Demonstrators
Port of Los Angeles	• 2 BEV Top Handlers • 3 BEV Yard Tractors	• Taylor Machine Works • BYD	• Everport Terminal
Port of Long Beach	• 9 electric RTGs • 12 BEV Yard Trucks • 4 PHEV-LNG Drayage Trucks	• BYD • Cavotec • US Hybrid	• SSA Marine • Long Beach Container Terminal • Total Transportation Services
SCAQMD	• 20 Low Nox Drayage Trucks • 3 PHEV-CNG Drayage Trucks • 1 BEV Drayage Truck • 1 BEV Top Handler	• Cummins Westport • Efficient Drivetrains • Hyster-Yale • Wave	• APM Terminals • Total Transportation Services • Mayor Logistics • Southern Counties Express • Heavy Load Transfer • Three Rivers Trucking

Advanced Freight and Fleet Demonstrations

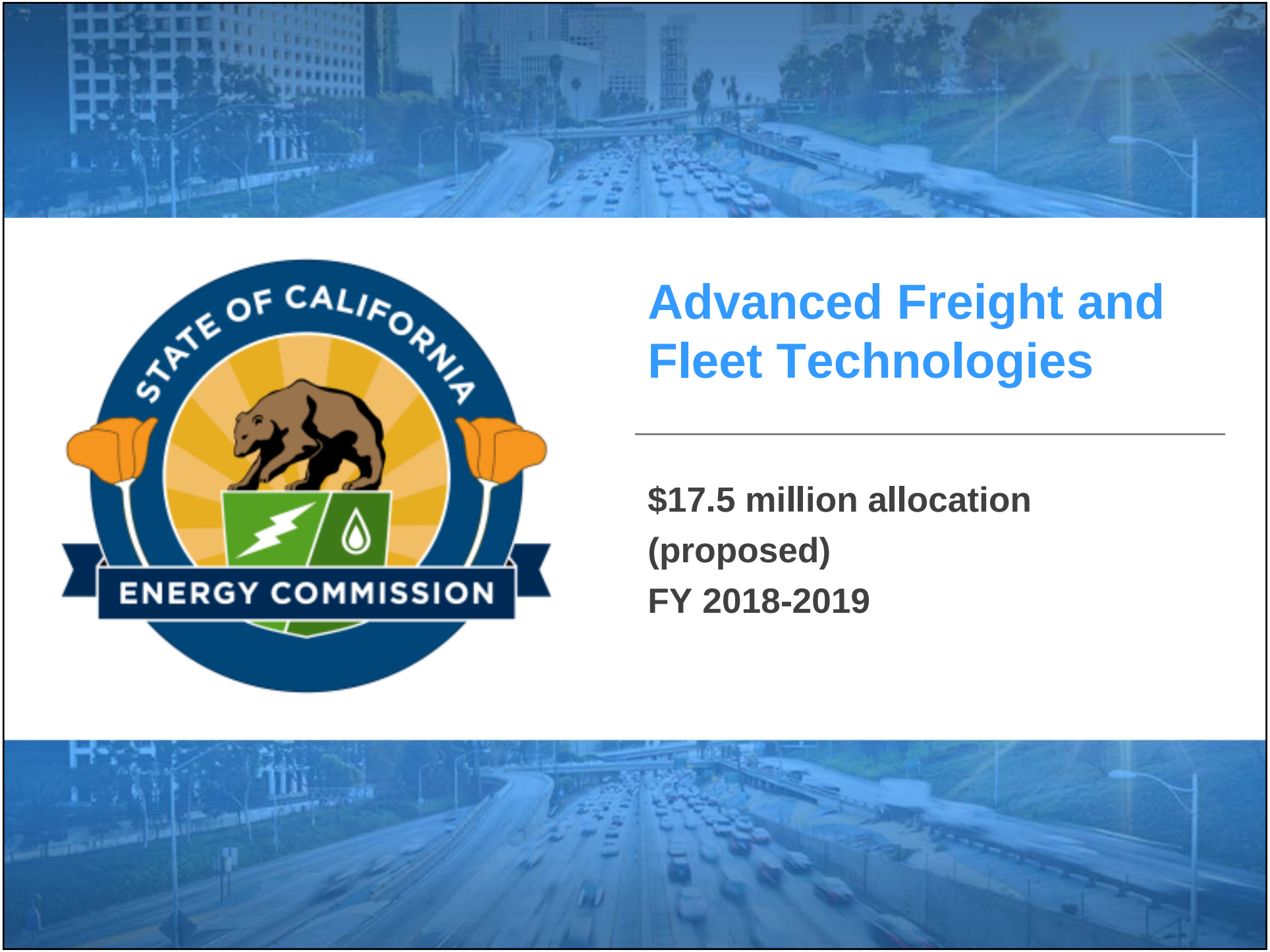
Low NOx Natural Gas Engine

Battery-Electric Drayage Truck

Rubber-Tired Gantry Crane

Battery-Electric Yard Tractor

Battery-Electric Reach Stacker



Advanced Freight and Fleet Technologies

$17.5 million allocation
(proposed)
FY 2018-2019

Manufacturing

Larry Rillera

Program Implementation Unit
Fuels and Transportation Division
California Energy Commission

November 7, 2017

Manufacturing Advanced Transportation Vehicle Technologies to Meet California's Climate Change and Economic Development Goals

- Vertically Integrated Vehicles
- Powertrains
- Batteries
- Control Systems
- Refueling Infrastructure
- On-/Off-Road Technologies

Manufacturing Investments

Summary of Manufacturing Projects			
Category	**Number of Projects**	**ARFVTP Funding (Millions)**	**Match Funding (Millions)**
Battery Systems	4	$11.6	$16.6
Charging Equipment	1	$1.1	$1.1
Electric Cars	1	$0.2	$2.9
Electric Motorcycles	3	$3.7	$3.2
Electric Powertrains & Platforms	4	$7.5	$12.0
Electric Trucks & Buses	8	$22.4	$43.7
Total	21	$46.5	$79.5

Manufacturing Projects

PROTERRA

$3.0 million to design and build a new manufacturing line in the City of Industry for battery-electric transit buses.

Catalyst battery-electric bus has a nominal range of up to 350 miles.

chargepoint

$1.1 million to develop hardware, software, and improve manufacturing to communications processor for EV charging stations in the city of Campbell.

Provides smart grid and peak load management functions to reduce GHG emissions by regulating the electricity demand load of the charger and to reduce the cost of charging at most economical time.

ARFVTP Manufacturing in Context

Support from Other Incentives/Programs	Percentage of ARFVTP Projects
Sales and Use Tax Exclusion for Manufacturers	24%
California Competes Tax Credit	5%
Workforce Development	20%
No Other Incentives Received	51%

Supporting for Deployment Incentives	Percentage of ARFVTP Projects
Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project	20%
Clean Vehicle Rebate Project	5%

Manufacturing Workforce

BYD Motors Inc. employees fabricating an all-electric transit bus shell in Lancaster.

Governor Brown and employees at an open house for all-electric transit bus manufacturer Proterra Inc. in the City of Industry

Manufacturing

$5 million allocation
(proposed)
FY 2018-2019

Workforce Training and Development

Tami Haas

Fuels and Transportation Division
California Energy Commission

November 7, 2017

Workforce Training to Meet California's Climate Change and Economic Development Goals

- Sustainable Transportation
- Jobs and Wages
- Service Delivery
- Partnerships and Leverage
- Growth

Workforce Investments

(as of 9/1/2017)

Summary of Funding and Trainees				
Partner	Funding (millions)	Match Funding (millions)	Trainees	Businesses Assisted
Employment Training Panel	$13.5	$11.3	16,441	173+
Employment Development Department	$8.2	$7.5	1,000	36+
California Community Colleges Chancellor's Office	$5.75	$0.5	-	68+
California Workforce Development Board	$0.25	$0.5	TBD	TBD
Clean Energy and Transportation Initiative	$4.0	-	TBD	TBD
Total	**$31.7**	**$19.8**	**17,441**	**277+**

Community Colleges: Automotive Technology

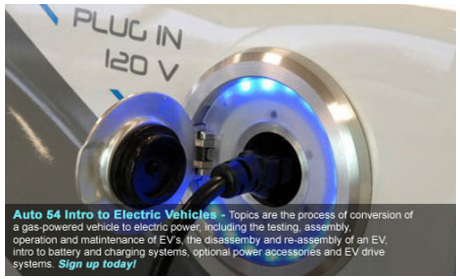
Cerritos College

Automotive Mechanical Repair:

- Alternative Fuels Service Technician
- Manufacture Specialty
- Electrical/Diagnosis
- Machining Technology
- Automotive Management

Partnerships:

- LA New Car Dealership
- CETI
- Northwood University
- Southeast ROP
- La Mirada/Norwalk USD



RIO HONDO COLLEGE

Alternative Fuel Program & Advanced Transportation Technology:

- Electric Vehicle Technology
- Hybrid Technology
- Fuel Cell Technology
- CNG/LNG
- Light & Heavy Duty Vehicles

Workforce Training: Policy and Investment Drivers

- Clean Energy and Pollution Reduction Act (SB 350)
  - Disadvantaged Communities
  - Barriers Studies
- ZEV Action Plan
- Clean Energy Job Creation Fund (SB 110)

Freight Workforce

- Freight Workforce Development and Pilot Project (GO-Biz and CSULB)

- Zero-Emission Port Equipment Workforce Development Group (POLB)

Workforce Training and Development

$3.5 million allocation

(proposed)

FY 2018-2019

Emerging Opportunities

$4.2 million allocation
(proposed)
FY 2018-2019

Public Comment

Docket No. 17-ALT-01

https://efiling.energy.ca.gov/EComment/EComment.aspx?docketnumber=17-ALT-01

Alternative and Renewable Fuel and Vehicle Technology Program

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http://energy.ca.gov/transportation